

Sustainability in Health care by Allocating Resources Effectively (SHARE)

An investigation of disinvestment in the local healthcare setting

Claire Agnes Harris MBBS GradDipChildDevelopment MScPH FAFPHM

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Contents

Copyright notice	2
Figures	4
Tables	4
Abbreviations	4
Abstract	5
Publications during enrolment	6
Declaration	7
Acknowledgements	10
Chapter 1. Introduction	11
The 'Sustainability in Health care by Allocating Resources Effectively' (SHARE) Program	
Thesis overview	
Paper 1. Introducing a series of papers reporting an investigation of disinvestment	
Chapter 2. SHARE Phase One	28
Paper 2: Identifying opportunities for disinvestment	29
Paper 3: Examining how resource allocation decisions are made, implemented and evaluated	31
Paper 4: Exploring opportunities and methods for consumer engagement in resource allocation	53
Paper 5: Developing a model for evidence-driven resource allocation	55
Chapter 3. SHARE Phase Two	74
Paper 6: Investigating methods to identify, prioritise, implement and evaluate disinvestment proje	cts 76
Paper 7: Supporting staff in evidence-based decision-making, implementation and evaluation	107
Paper 8: Developing, implementing and evaluating an Evidence Dissemination Service	108
Chapter 4. SHARE Phase Three	135
Paper 9: Conceptualising disinvestment in a local healthcare setting	135
Paper 10: Operationalising disinvestment in a conceptual framework for resource allocation	135
Chapter 5. Discussion and conclusions	190
Paper 11: Reporting outcomes of an evidence-driven approach to disinvestment	190
References	215
Appendix 1. Collation of data collection aims, methods and sources	219
Appendix 2a. Paper 3 Additional file: Methods	225
Appendix 2b. Paper 3 Additional file: Strengths and weaknesses, barriers and enablers	233
Appendix 3. Paper 5 Additional file	243
Appendix 4. Paper 6 Additional file	254
Appendix 5. Paper 8 Additional file	265
Appendix 6. Paper 9 Additional file	342
Appendix 7. Paper 10 Additional file	345
Appendix 8. Paper 11 Additional file	361

Figures

Figure 1. Overview of the SHARE Program	13
Figure 2. Framework of potential mechanisms to integrate disinvestment into health service systems and processes	29
Figure 3. Model for integrating consumer values and preferences into the resource allocation process	54
Figure 4. Model for exploring Sustainability in Health care by Allocating Resources Effectively in the local healthcare setting	75

Tables

Table 1. SHARE Papers	. 11
Table 2. Issues to consider in development of an organisational program for disinvestment	. 30

Abbreviations

MRC	Medical Research Council
IVINC	Medical Research Council

- SHARE Sustainability in health care by allocating resources effectively
- TCPs Technologies and clinical practices

Abstract

The Sustainability in Health care by Allocating Resources Effectively (SHARE) Program was established to explore a systematic, integrated, organisation-wide, evidence-based approach to disinvestment in a large Australian health service network. Although there is no clear single definition, disinvestment is generally understood to be removal or restriction of health technologies and clinical practices that are unsafe or of little benefit, or where a more effective or cost-effective alternative is available.

Preliminary investigations failed to identify any models or methods, practical advice or theoretical guidance for a systematic, organisation-wide approach to disinvestment in the local setting. A two-phased approach was proposed to identify and then evaluate potential opportunities for disinvestment.

Design of the SHARE Program was informed by the UK Medical Research Council framework for development and evaluation of complex interventions, the SEAchange model for evidence-based change, and a framework for evaluation and explication of evidence-based innovations. Detailed implementation and evaluation plans were developed for individual projects.

Phase One was undertaken to understand concepts and practices related to disinvestment and the implications for a local health service and, based on this information, to identify potential settings and methods for decision-making.

The aim of Phase Two was to implement and evaluate the proposed initiatives to determine which were sustainable, effective and appropriate at Monash Health.

A review of the current literature incorporating SHARE findings was conducted in Phase Three to contribute to the understanding of systematic approaches to disinvestment in the local healthcare context.

The SHARE program contributes new approaches, new knowledge and new resources for research and practice in disinvestment.

SHARE differed from other disinvestment activities in several ways: by seeking to identify and implement disinvestment opportunities within organisational infrastructure rather than as standalone projects; considering disinvestment in the context of all resource allocation decisions rather than in isolation; including allocation of non-monetary resources as well as financial decisions; and focusing on effective use of limited resources to optimise healthcare outcomes.

Novel findings from SHARE investigations include details and understanding of organisational decision-making; methods for consumer participation in resource allocation; rationale for and outcomes of piloting in-house resources to support evidence-based practice; and the practical experience of the journey from identification to implementation, evaluation and explication of disinvestment projects in the local setting.

The resources arising from SHARE activities include four frameworks, three models and an algorithm; definitions; protocols and instruments used in surveys, interviews, workshops and literature reviews; and summaries of current practice; staff knowledge, skills, confidence and needs; factors influencing decision-making; and barriers and enablers.

Many of the SHARE findings are the first of their kind and therefore require confirmation or refutation in subsequent studies. They are published as a thematic series using a case study approach. This provides a level of detail not usually reported, enabling replication or adaptation in future research or health service implementation.

The frameworks, models, methods and tools arising from the SHARE Program have potential to enhance health care and patient outcomes and inform policy, practice and research in disinvestment in the local healthcare setting.

Publications during enrolment

Papers 3-13 are included in this thesis, either in full or with a summary of findings.

- 1. Harris C, Garrubba M, Allen K, King R, Kelly C, Thiagarajan M et al. Development, implementation and evaluation of an evidence-based program for introduction of new health technologies and clinical practices in a local healthcare setting. BMC health services research. 2015;15(1):575. doi:10.1186/s12913-015-1178-4.
- Harris C, Turner T, Wilkinson F. SEAchange: Guide to a pragmatic evidence-based approach to Sustainable, Effective and Appropriate change in health services. 2015. Available from: <u>http://arrow.monash.edu.au/hdl/1959.1/1225377</u>. Accessed: 24/10/2017
- 3. Harris C, Green S, Ramsey W, Allen K, King R. Sustainability in Health care by Allocating Resources Effectively (SHARE) 1: Introducing a series of papers reporting an investigation of disinvestment in a local healthcare setting BMC health services research. 2017. doi:https://doi.org/10.1186/s12913-017-2210-7.
- 4. Harris C, Allen K, King R, Ramsey W, Kelly C, Thiagarajan M. Sustainability in Health care by Allocating Resources Effectively (SHARE) 2: Identifying opportunities for disinvestment in a local healthcare setting BMC health services research. 2017. doi:https://doi.org/10.1186/s12913-017-2211-6.
- Harris C, Allen K, Waller C, Brooke V. Sustainability in Health care by Allocating Resources Effectively (SHARE) 3: Examining how resource allocation decisions are made, implemented and evaluated in a local healthcare setting BMC health services research. 2017. doi:https://doi.org/10.1186/s12913-017-2207-2.
- Harris C, Ko H, Waller C, Sloss P, Williams P. Sustainability in Health care by Allocating Resources Effectively (SHARE) 4: Exploring opportunities and methods for consumer engagement in resource allocation in a local healthcare setting BMC health services research. 2017. doi:https://doi.org/10.1186/s12913-017-2212-5.
- Harris C, Allen K, Waller C, Green S, King R, Ramsey W et al. Sustainability in Health care by Allocating Resources Effectively (SHARE) 5: Developing a model for evidence-driven resource allocation in the local healthcare setting BMC health services research. 2017. doi:https://doi.org/10.1186/s12913-017-2208-1.
- 8. Harris C, Allen K, Brooke V, Dyer T, Waller C, King R et al. Sustainability in Health care by Allocating Resources Effectively (SHARE) 6: Investigating methods to identify, prioritise, implement and evaluate disinvestment projects in a local healthcare setting. BMC health services research. 2017. doi:https://doi.org/10.1186/s12913-017-2269-1.
- 9. Harris C, Allen K, Waller C, Dyer T, Brooke V, Garrubba M et al. Sustainability in Health care by Allocating Resources Effectively (SHARE) 7: Supporting staff in evidence-based decision-making, implementation and evaluation in a local healthcare setting BMC health services research. 2017. doi:https://doi.org/10.1186/s12913-017-2388-8.
- Harris C, Garrubba M, Melder A, Voutier C, Waller C, King R et al. Sustainability in Health care by Allocating Resources Effectively (SHARE) 8: Developing, implementing and evaluating an Evidence Dissemination Service in a local healthcare setting. BMC health services research. 2018. doi:https://doi.org/10.1186/s12913-018-2932-1.
- 11. Harris C, Green S, Ramsey W, Allen K, King R. Sustainability in Health care by Allocating Resources Effectively (SHARE) 9: Conceptualising disinvestment in the local healthcare setting BMC health services research. 2017. doi:https://doi.org/10.1186/s12913-017-2507-6.
- Harris C, Green S, Elshaug AG. Sustainability in Health care by Allocating Resources Effectively (SHARE) 10: Operationalising disinvestment in an evidence-based framework for resource allocation BMC health services research. 2017. doi:https://doi.org/10.1186/s12913-017-2506-7.
- Harris C, Allen K, King R, Ramsey W, Green S. Sustainability in Health care by Allocating Resources Effectively (SHARE) 11: Reporting outcomes of an evidence-driven approach to disinvestment in a local healthcare setting. BMC health services research. 2018. doi:https://doi.org/10.1186/s12913-018-3172-0.3.

Declaration

I hereby declare that this thesis contains no material which has been accepted for the award of any other degree or diploma at any university or equivalent institution and that, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

This thesis includes eight original papers published in peer reviewed journals. The core theme of the thesis is disinvestment in the local healthcare setting. The ideas, development and writing up of all the papers in the thesis were the principal responsibility of myself, the student, working within the Department of Public Health and Preventive Medicine under the supervision of Professor Sally Green and Associate Professor Richard King.

The inclusion of co-authors reflects the fact that the work came from active collaboration between researchers and acknowledges input into team-based research.

Thesis Chapter	Publication Title	Nature and % of student contribution	Co-author name(s) Nature and % of Co-author's contribution	Co-author Monash student
1	Sustainability in Health care by Allocating Resources Effectively (SHARE) 1: Introducing a series of papers reporting an investigation of disinvestment in a local healthcare setting	75%, contributed to project design, delivery, decision- making and direction throughout the SHARE Program; conceived the design of the paper; compiled data; drafted initial manuscript	 Sally Green 3%, contributed to design of the paper and provided critical revisions Wayne Ramsey 6%, contributed to project design, delivery, decision-making and direction throughout the SHARE Program; provided feedback on draft manuscript Kelly Allen 10%, contributed to project design, delivery, decision-making and direction throughout the SHARE Program; provided feedback on draft manuscript Richard King 6%, contributed to project design, delivery, decision-making and direction throughout the SHARE Program; provided feedback on draft manuscript Richard King 6%, contributed to project design, delivery, decision-making and direction throughout the SHARE Program; provided feedback on draft manuscript 	No
2	Sustainability in Health care by Allocating Resources Effectively (SHARE) 3: Examining how resource allocation decisions are made, implemented and evaluated in a local healthcare setting	75%, contributed to design and implementation of methods, initial analysis and reporting; developed classifications and framework, conceived the design of the paper; drafted initial manuscript	 Kelly Allen 12%, contributed to design and implementation of methods, initial analysis and reporting; provided feedback on draft manuscript Cara Waller 10%, contributed to design and implementation of methods, initial analysis and reporting; provided feedback on draft manuscript Vanessa Brooke 3%, assistance with interviews and reporting, provided feedback on draft manuscript 	No

All papers have been published. My contribution to the work involved the following:

2	Sustainability in Health care by Allocating Resources Effectively (SHARE) 5: Developing a model for evidence-driven resource allocation in the local healthcare setting	75%, contributed to design and implementation of methods and development of proposal for change; developed early frameworks; co-conceived the model and design of the paper, drafted initial manuscript	•	Kelly Allen 5%, contributed to design and implementation of methods and development of proposal for change; provided feedback on draft manuscript Cara Waller 4%, contributed to design and implementation of methods and development of proposal for change; provided feedback on draft manuscript Sally Green 4%, co-conceived the model and design of the paper, provided feedback on draft manuscript Richard King 4%, provided guidance and direction; provided feedback on draft manuscript Wayne Ramsey 4%, provided guidance and direction; provided feedback on draft manuscript Cate Kelly 2%, provided guidance and direction; provided feedback on draft manuscript Malar Thiagarajan 2%, provided guidance and direction; provided feedback on draft manuscript	No
3	Sustainability in Health care by Allocating Resources Effectively (SHARE) 6: Investigating methods to identify, prioritise, implement and evaluate disinvestment projects in a local healthcare setting	70%, contributed to design and implementation of methods, drafted initial manuscript	•	Kelly Allen 10%, contributed to design and implementation of methods, provided feedback on draft manuscript Vanessa Brooke 5%, contributed to design and implementation of methods, provided feedback on draft manuscript Tim Dyer 5%, contributed to design and implementation of methods, provided feedback on draft manuscript Cara Waller 5%, contributed to design and implementation of methods, provided feedback on draft manuscript Richard King 2%, provided direction and decisions and feedback on draft manuscript Wayne Ramsey 2%, provided direction and decisions and feedback on draft manuscript Duncan Mortimer 1%, provided health economics advice and feedback on draft manuscript	No
3	Sustainability in Health care by Allocating Resources Effectively (SHARE) 8: Developing, implementing and evaluating an Evidence Dissemination Service in a local healthcare setting	70%, contributed to design and implementation of the study, conceived the design of the paper; drafted initial manuscript	•	Marie Garrubba 10%, contributed to design and implementation of the study, provided feedback on draft manuscript Angela Melder 4%, contributed to design and implementation of the study, provided feedback on draft manuscript Catherine Voutier 6%, contributed to design and implementation of the study, provided feedback on draft manuscript Cara Waller 6%, contributed to design and implementation of the study, provided feedback on draft manuscript	Yes Angela Melder

			 Richard King 2%, contributed to design and implementation of the study, provided feedback on draft manuscript Wayne Ramsey 2%, contributed to design and implementation of the study, provided feedback on draft manuscript 	
4	Sustainability in Health care by Allocating Resources Effectively (SHARE) 9: Conceptualising disinvestment in the local healthcare setting	90%, co-conceived the design of the paper; undertook the literature review; drafted initial manuscript	 Sally Green 6%, co-conceived the design of the paper; provided critical revisions to draft manuscript Wayne Ramsey 2%, co-conceived the design of the paper; provided feedback on draft manuscript Kelly Allen 1%, co-conceived the design of the paper; provided feedback on draft manuscript Richard King 1%, co-conceived the design of the paper; provided feedback on draft manuscript 	No
4	Sustainability in Health care by Allocating Resources Effectively (SHARE) 10: Operationalising disinvestment in an evidence-based framework for resource allocation	90%, co-conceived the conceptual approach; undertook the literature review; developed the framework; drafted initial manuscript	 Sally Green 5%, co-conceived the conceptual approach, provided critical revisions to draft manuscript Adam Elshaug 5%, provided critical revisions to draft manuscript; proposed refinements and change in scope 	No
5	Sustainability in Health care by Allocating Resources Effectively (SHARE) 11: Reporting outcomes of an evidence-driven approach to disinvestment in a local healthcare setting	90%, contributed to project design and delivery, decision- making and direction; co- conceived the design of the paper; developed frameworks and models, drafted initial manuscript	 Kelly Allen 3%, contributed to project design and delivery, decision-making and direction; provided feedback on draft manuscript Wayne Ramsey 2%, contributed to project design and delivery, decision-making and direction; provided feedback on draft manuscript Richard King 2%, contributed to project design and delivery, decision-making and direction; provided feedback on draft manuscript Sally Green 3%, assisted in development of frameworks and models, provided feedback on draft manuscript 	No

I have not renumbered sections of submitted or published papers in order to generate a consistent presentation within the thesis.

Student signature:



Date: 20.06.2018

The undersigned hereby certify that the above declaration correctly reflects the nature and extent of the student's and co-authors' contributions to this work. In instances where I am not the responsible author I have consulted with the responsible author to agree on the respective contributions of the authors.

Main Supervisor signature:

Date: 20.06.2018

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The literature reviews and drafting of the SHARE series of publications were undertaken as part of this unfunded PhD.

* * *

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Chapter 1. Introduction

"Disinvestment from existing health care practices that offer little or no health gain is a policy challenge that requires greater attention, both for quality of care and sustainable resource allocation."

Elshaug et al 2007 [14]

The 'Sustainability in Health care by Allocating Resources Effectively' (SHARE) Program

The 'Sustainability in Health care by Allocating Resources Effectively' (SHARE) Program was established by one Australian health service to investigate opportunities for disinvestment in a local healthcare setting.

Following implementation of a rigorous, transparent, accountable, evidence-based program for introduction of new health technologies and clinical practices (TCPs) [1], leaders at Monash Health sought to take a similar approach to disinvestment of TCPs in current use that were not safe, effective or cost-effective, or where a better alternative was available.

The initial aims of the SHARE Program were to establish organisation-wide, systematic, integrated, evidence-based systems and processes for disinvestment decision-making and to undertake pilot disinvestment projects. In the absence of guidance from the literature and consultation with experts regarding existing models or methods for an organisation-wide approach to disinvestment, a two-phased approach was taken.

Phase One was required to understand the implications of disinvestment within a local health service, discern current decision-making processes for resource allocation, and identify potential mechanisms for systematic integration of disinvestment into organisational infrastructure. The results of these investigations were used to underpin development of a multi-faceted program of initiatives to explore disinvestment opportunities.

The proposed initiatives were developed, implemented and evaluated in Phase Two to determine which were sustainable, effective and appropriate at Monash Health.

A third phase was subsequently undertaken to integrate the decisions, processes and outcomes of the SHARE Program within a review of the disinvestment literature presented from the local healthcare perspective and to consider the implications for policy, practice and research.

The results are published as a thematic series of 11 papers in Biomed Central Health Services Research (Table 1) [15].

Table 1. SHARE Papers

- 1. Introducing a series of papers reporting an investigation of disinvestment in a local healthcare setting
- 2. Identifying opportunities for disinvestment in a local healthcare setting
- 3. Examining how resource allocation decisions are made, implemented and evaluated in a local healthcare setting
- 4. Exploring opportunities and methods for consumer engagement in resource allocation in a local healthcare setting
- 5. Developing a model for evidence-driven resource allocation in a local healthcare setting
- 6. Investigating methods to identify, prioritise, implement and evaluate disinvestment projects in a local healthcare setting
- 7. Supporting staff in evidence-based decision-making, implementation and evaluation in a local healthcare setting
- 8. Developing, implementing and evaluating an Evidence Dissemination Service in a local healthcare setting
- 9. Conceptualising disinvestment in the local healthcare setting
- 10. Operationalising disinvestment in an evidence-based framework for resource allocation
- 11. Reporting outcomes of an evidence-driven approach to disinvestment in a local healthcare setting

Thesis overview

The three phases of the SHARE Program form the central chapters of the thesis. One or more of the SHARE papers are the basis for each chapter.

A summary of the research questions and methods within each paper as they relate to the phases of the SHARE Program is provided in Figure 1. A collation of data collection aims, methods and sources is provided in Appendix 1.

Chapter 1. Introduction

Paper 1 of the SHARE series presents the background to disinvestment in health care and a summary of the literature, including significant gaps, relevant to the SHARE Program. It also provides an overview of the program to orient readers in how to find information and resources within this suite of publications. Details of Monash Health, the Australian public hospital context and overarching methods used in design of the program are also included.

Chapter 2. SHARE Phase One

The two-phased approach was guided by the UK Medical Research Council (MRC) framework for complex interventions [32]. Phase One involved specifying the context, understanding the problem and defining the components of an optimal intervention (Figure 1). This is reported in Papers 2-5. Papers 3 and 5 are provided in full and key findings from Papers 2 and 4 are noted for completeness.

Chapter 3. SHARE Phase Two

Phase Two involved assessing acceptability and feasibility of the components of the intervention and identifying methodological issues for implementation and evaluation. The proposed interventions were piloted and the decisions, processes and outcomes are reported in Papers 6-8. Papers 6 and 8 are provided in full and key findings from Paper 7 are noted for completeness.

Chapter 4. SHARE Phase Three

Phase Three involved consolidating, reflecting and considering the implications of the SHARE outcomes. These findings are reported in Papers 1 and 9-11. Papers 9 and 10 present a review of the current disinvestment literature incorporating the SHARE findings discussed from the perspective of the local healthcare setting. Paper 9 focuses on the conceptual aspects of disinvestment and Paper 10 considers operational aspects. Both papers are provided in full in Chapter 4. The outputs and outcomes of the SHARE Program are summarised in Papers 1 and 11 respectively. Since Paper 1 provides the background to the SHARE Program it is provided in Chapter 5.

Chapter 5. Discussion and Conclusions

Paper 11 discusses the contribution of the SHARE Program to the knowledge and understanding of disinvestment in the local healthcare setting and the implications for future policy, practice and research.

Figure 1. Overview of the SHARE Program

SHARE	PAPER	RESEARCH QUESTIONS/AIMS METHODS	
	2	 What concepts, definitions and perspectives underpin disinvestment? What models or methods of disinvestment have been implemented in local health services? Where are the opportunities for systematic decisions about disinvestment in a local health service? 	
PHASE ONE Specifying the context, understanding the problem and defining the components of an optimal intervention	3	 Where, how and by whom are decisions about resource allocation made, implemented and evaluated at Monash Health? What factors influence these processes? What knowledge or experience of disinvestment exists within Monash Health? 	makers, consumers, committee representatives, project staff Workshops • Decision-makers in diagnostic services • Community Advisory Committee • Health service leadership groups
	4	 How can consumer values and preferences be integrated into organisation-wide decision-making for resource allocation? 	Consultation National and international experts in disinvestment Health program evaluator and health economist State health department Health Technology Program Development and delivery of national workshop
What are the implications for disinvestment at Monash Health? What is the most appropriate and effective approach to enable organisation-wide, systematic, integrated, evidence-driven decision-making for disinvestment at Monash Health? Can a model for evidence-driven resource allocation in the local healthcare setting be derived from the Monash Health program to enable replication and testing?		Synthesis and analysis Deliberation and decision-making Development of frameworks and proposals	
PHASE TWO Assessing acceptability and feasibility of the components and	6	at methods are available Literature reviews to identify potential disinvestment opportunities in a local health service? Opportunities for disinvestment in priority setting for prioritisation and decision-making to initiate disinvestment projects in a local health service? Opportunities for disinvestment in system redesig to develop, implement and evaluate disinvestment projects in a local health service? Methods for prioritisation and decision-making ta were the processes and outcomes of application of these methods at Monash Health? Staff needs to enable evidence-based decision-m nat factors influenced the processes and outcomes? Interviews and surveys with stakeholders: clinicians,	
identifying methodological issues for implementation and evaluation What was cr evaluating of 7 & 8 Building and • What decisi		 What was current practice in accessing and using evidence for making, implementing and evaluating decisions at Monash Health? What decisions were made and outcomes achieved in the piloting of the Evidence, Data, Capacity Building and Project Support services? What factors influenced these decisions and subsequent processes and outcomes? 	Analysis of barriers and enablers Development of implementation and evaluation plans Workshops with senior decision-makers Consultation with local experts and the Public Affairs and Communications Department
PHASE THREE Consolidating,	9&10	 To discuss the current literature on disinvestment from a conceptual perspective, consider the implications for local healthcare settings and propose a new definition and two potential approaches to disinvestment to stimulate further research and discussion To discuss the current literature on disinvestment from an operational perspective and propose a framework for disinvestment in the context of resource allocation 	Literature review of disinvestment from the local healthcare perspective Development of framework for system-wide program of disinvestment within the context of resource allocation
reflecting and considering the implications	1&11	 To consolidate the findings of the SHARE program and literature reviews and identify the key messages arising from these activities To discuss the contribution of the SHARE program to the knowledge and understanding of disinvestment in the local healthcare setting To consider the implications for policy, practice and research 	Summary of outputs and outcomes Analysis and discussion of key messages

"Health systems around the world are facing rising patient expectations at a time of increasing economic pressure, and decision makers are seeking to enhance system efficiency to allow improved access to care that is effective, safe, and offers worthwhile benefit."

Henshall and Schuller 2012 [16]

Paper 1. Introducing a series of papers reporting an investigation of disinvestment

This paper presents the background to disinvestment, the drivers for change and the need for research in the local healthcare setting. It also provides details of the history and rationale for the SHARE Program, the context in which it was undertaken and methods used for development, implementation and evaluation of the program as a whole. As an overview of the SHARE papers, it assists readers to find information and resources within the thematic series. The outputs of the program are outlined and their contribution to future policy, practice and research in disinvestment is discussed.

EDITORIAL

Open Access



Sustainability in Health care by allocating resources effectively (SHARE) 1: introducing a series of papers reporting an investigation of disinvestment in a local healthcare setting

Claire Harris^{1,2*}, Sally Green¹, Wayne Ramsey³, Kelly Allen^{1,2} and Richard King⁴

Abstract

This is the first in a series of papers reporting Sustainability in Health care by Allocating Resources Effectively (SHARE). The SHARE Program is an investigation of concepts, opportunities, methods and implications for evidence-based investment and disinvestment in health technologies and clinical practices in a local healthcare setting. The papers in this series are targeted at clinicians, managers, policy makers, health service researchers and implementation scientists working in this context. This paper presents an overview of the organisation-wide, systematic, integrated, evidence-based approach taken by one Australian healthcare network and provides an introduction and guide to the suite of papers reporting the experiences and outcomes.

Keywords: Disinvestment, Decommission, De-adopt, De-list, De-implement, Health technology, TCP, Resource allocation, Decision-making, Implementation

Background

The primary focus of health care should be on optimising patient outcomes, but without due consideration of value for money healthcare systems will not be sustainable [1, 2]. There are many challenges to the sustainability of healthcare services. Ageing populations and the increasing prevalence of chronic diseases, the proliferation and high costs of new health technologies, duplication and gaps in service delivery from poorly coordinated care, ineffective practices, systemic waste and external economic pressures all threaten the ability to maintain health services at acceptable standards [3–10].

In the first decade of this century healthcare expenditure rose steadily, in total and as a percentage of gross domestic product (GDP) [11]. The average for countries in the Organisation for Economic Co-operation and Development (OECD) rose from 8.2% GDP in 2001 to 9.3% 10 years later [11]. Advances in technology are considered to be a major driver of increased costs [12–14]. In 2011 the global health technology market was valued at US\$325 billion with an annual growth rate of 7% [15]. It has been estimated that health technologies account for 25–48% of health spending growth [16, 17]. The growth is not just due to adoption of new technology but also to rapidly increasing use of existing technology [12].

However, since 2010 the growth in global health care expenditure has plateaued and many countries have reduced public spending on health [11]. This has directed attention towards opportunities to save money, reduce waste and maximise outcomes from existing resources.

Many healthcare interventions reduce costs by improving timely access to treatment, facilitating earlier diagnosis, enhancing patient outcomes, decreasing hospital stays or minimising side effects, and provide value by increasing quality or length of life. Unfortunately it is also true that many interventions do not provide these benefits and the outcomes of many others



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^{*} Correspondence: claire.harris@monash.edu

¹School of Public Health and Preventive Medicine, Monash University, Victoria, Australia

²Centre for Clinical Effectiveness, Monash Health, Victoria, Australia Full list of author information is available at the end of the article

are unknown. It has been estimated that "*a third of medical practices are effective or likely to be effective;* 15% are harmful, unlikely to be beneficial, or a trade-off between benefits and harms; and 50% are of unknown effectiveness" [18]. The cost-effectiveness is even less well known [14].

It is now customary to thoroughly appraise new technologies and procedures before introducing them into widespread use. Health Technology Assessment (HTA) involves systematic evaluation of safety, effectiveness and cost-effectiveness and often includes broader social and ethical impacts. However many practices in current use were not subjected to this rigorous evaluation prior to their introduction and would not meet contemporary standards [19]. In Australia, only 3% of all items on the Medicare Benefits Schedule have been formally assessed against evidence of safety, effectiveness and costeffectiveness [20]. Reviews of the international literature have found that many interventions were implemented based on early evidence and the initial promising findings were reversed in subsequent studies [18, 21, 22]. Even practices that have clearly demonstrated benefits may be applied inappropriately or incorrectly [23–25]. These issues can be seen as shortcomings, or viewed more constructively as opportunities to improve patient outcomes, optimise use of resources and possibly save money by removing or restricting practices that are unsafe or of little value.

Health authorities, hospitals and other health facilities have always moved resources from one area to another to achieve better clinical or corporate outcomes. Previously, decisions to restrict or reallocate resources were generally reactive, undertaken in response to established or emerging problems, and the processes and assumptions underpinning them were frequently implicit and opaque. However in the past two decades proactive, explicit and transparent methods have been sought to address rising health costs and the need to meet continuing advances in expensive technologies. Debate and research have focused on practices that offer little or no benefit, or where a better alternative is available, and the concept of disinvestment has emerged.

The early research in this area concentrated on projects guided by health economic principles to disinvest specific technologies or clinical practices (TCPs) in a local setting, while the broader discussion focused on central policy-making and the role of national agencies to inform decision-making [26–28]. Although both play a vital role, there are limitations to these approaches. Individual projects can potentially be instigated and implemented independently of organisational goals, priorities, decision-making systems and communication processes. They may be driven by *ad hoc* decisions or individual champions and be undertaken in isolation from other local initiatives resulting in lack of coordination, duplication, inconsistent messages and change fatigue [29]. National recommendations cannot take into account local factors such as population needs, organisational priorities, budgets, capacity or capability; hence many crucial decisions about the use of TCPs have to be made at regional and institutional levels.

Although the research and debate has broadened considerably, a number of significant gaps remain. There is little evidence to guide healthcare networks or individual facilities in how they might take a systematic organisation-wide approach to disinvestment [26, 30–34]. There is also a lack of information about the factors that influence resource allocation, the processes involved in implementation of disinvestment decisions, and the perspectives and experiences of healthcare staff undertaking disinvestment [29, 34–38]. It has been proposed that in-depth research using longitudinal approaches from inception to implementation of disinvestment decisions at the health service level is needed to close these gaps and contribute to both the theory and practice of disinvestment [29, 35, 36, 39, 40].

The 'Sustainability in Health care by Allocating Resources Effectively' (SHARE) Program was the approach taken by one Australian health service to address these issues at the local level. The resulting suite of papers may contribute in part to filling these gaps [41–50].

Aims

The aim of the SHARE Program was to establish organisation-wide, systematic, integrated, transparent, evidence-based systems and processes for decision-making about disinvestment in the context of resource allocation at Monash Health.

The aims of the SHARE series of publications are 1) to present the experiences and outcomes of the SHARE Program, 2) to review and discuss the current literature from the perspective of the local healthcare setting and 3) to propose frameworks and methods to inform future work in this area.

The aims of this paper are 1) to provide an overview of the SHARE Program, 2) to orient readers in how to find information and resources in this suite of publications, and 3) to discuss the contribution of the outputs of the program to policy, practice and research in disinvestment. The outcomes of SHARE are discussed in the final paper [50].

The SHARE program

Context

Monash Health (previously Southern Health), in the south east of Melbourne, Australia, is the largest health service network in the state of Victoria. It delivers primary, secondary, tertiary and quaternary services across more than 40 sites including six acute hospitals, subacute and rehabilitation services, mental health and community health services, and residential aged care [51]. Services are provided across the lifespan from conception and antenatal care through to care of the elderly; and all clinical specialties are offered.

Australian public hospitals operate under a stateallocated activity-based fixed-budget model of financing [52]. Staff are salaried and services are provided free of charge.

Monash Health established the first Technology/Clinical Practice Committee in Victoria to assess new TCPs prior to their introduction within the health service [53]. Australia has robust evidence-based processes for assessment at national level, however they do not address all the needs of health service decision-makers [53] and, as noted above, there are many reasons why decisions are required at local level. Although early leaders in this area, the Monash Health committee acknowledged that there were opportunities for improvement in their processes and undertook a project to identify and implement international best practice [53].

To build on this work, Monash Health leaders sought to explore the potential for a similar systematic organisationwide approach to disinvestment of established practices that were unsafe, ineffective or inefficient or where better alternatives were available; and the SHARE Program was born.

The SHARE Program was undertaken by the Centre for Clinical Effectiveness (CCE), an Evidence Based Practice (EBP) Hospital Support Unit within Monash Health [54, 55]. Its role is to enable clinicians, managers and policy makers to use the best available evidence to improve healthcare decision-making. CCE facilitates knowledge translation by providing expertise, education and support in evidence synthesis and implementation and evaluation of evidence-based change; and delivering programs and projects underpinned by EBP. Consultants in health program evaluation and health economics were engaged to provide additional expertise to the SHARE project team.

The program was governed by a Steering Committee comprised of three Executive Directors (Medical, Nursing and Support Services), Clinical Program Directors (Medical, Nursing, Allied Health, Pharmacy and Diagnostic Services), Chairs of key committees (Technology/Clinical Practice, Therapeutics, Human Research and Ethics, and Clinical Ethics), representatives from relevant support services (Information Services, Procurement, Biomedical Engineering and Research Services), Legal counsel and two Consumer representatives.

Design

Case study

The SHARE papers present a case study of disinvestment in the local healthcare setting. This approach seeks to address the limited understanding of resource allocation processes in health services, particularly regarding disinvestment [35, 36], and the lack of detailed reporting of implementation of change in the literature [56, 57]. Case studies allow in-depth, multi-faceted explorations of complex issues in their real-life settings [58] and facilitate development of theory and interventions [59]. The case study approach enables examination of the complex behaviours of, and relationships among, actors and agencies; and how those relationships influence change [60]. All three case study approaches are used: description, exploration and explanation [61].

Framework for design and evaluation of complex interventions

When a review of the literature found no specific information to guide development of an organisation-wide approach at the local health service level, a two-phased program based on the UK Medical Research Council framework for design and evaluation of complex interventions was proposed (Fig. 1) [62]. Phase One includes specifying the context, understanding the problem and defining the components of an optimal intervention. Phase Two is a series of exploratory trials assessing acceptability and feasibility of the components and identifying methodological issues for implementation and evaluation.

The questions outlined in Fig. 1 reflect the information needs of Monash Health decision-makers as they emerged in the respective phases of the SHARE process. The methods used to address these questions are noted alongside.

Model for evidence-based change

The SHARE Program was undertaken using the SEAchange model for Sustainable, Effective and Appropriate change in health services [63]. The model involves four steps: identifying the need for change, developing a proposal to meet the need, implementing the proposal and evaluating the extent and impact of the change. Each step is underpinned by the principles of evidence-based practice to ensure that the best available evidence from research and local data, the experience and expertise of health service staff and the values and perspectives of consumers are taken into account. Sustainability, avoidance of duplication and integration of new processes within existing systems are considered at each step. An action research component enables continuous investigation of the change process to improve the current project and inform future work.

The principles of this model were applied to the whole SHARE Program and to each individual project. In the overall SHARE Program, Steps 1 and 2 of the model map to Phase One and Steps 3 and 4 correspond to

Questions	Methods	SHARE
How can we improve our systems and processes for safe and effective introduction of new health technologies and clinical practices?	Literature review; Needs analysis; Best Practice Guide; development, implementation and evaluation of evidence- based program	Inspiration
How can we improve our systems and processes to get maximum benefit from health technologies and clinical practices in current use?	Literature reviews Concepts, methods and activities related to disinvestment Consumer engagement in organisation-wide decisions Interview and survive with telebolders elivities measures	
What is distrives the first works it done elsewhere? What can we learn from others? Where are the opportunities for systematic decisions	policy-makers, consumers, committee representatives, project staff	PHASE ONE
about disinvestment in a health service? How do we currently make, implement and evaluate decisions about resource allocation? Will this work for disinvestment?	• Decision-makers in diagnostic services • Community Advisory Committee • Health service leadership groups Consultation	Specifying the context, understanding the problem and
How do we involve consumers? How can we incorporate consumer perspectives in decisions about disinvestment?	National and international experts in disinvestment Health program evaluator and health economist State health denartment Health Technology Program	components of an optimal
How can we share what we have learned and continue to learn from others?	Development and delivery of national workshop	Intervention
What are the implications of these findings? How could we approach decision-making for resource allocation in an organisation-wide, systematic, integrated, evidence-based way?	Synthesis and analysis Deliberation and decision-making Development of frameworks and proposals	
Which of the proposals will be appropriate, effective and sustainable?	Literature reviews Opportunities for disinvestment in priority setting 	PHASE TWO
What do our staff need to enable them to use evidence in decision-making, implementation and evaluation?	 Opportunities for disinvestment in system redesign Methods for prioritisation and decision-making 	Assessing acceptability and
 What are the best ways to develop, implement, evaluate and research 1. Systems and processes for decision-making for disinvestment? 2. Methods to identify and disinvest targeted health technologies and clinical practices in pilot projects? 3. Support services to enable evidence-based decision- making, implementation and evaluation? 	 Staff needs to enable evidence-based decision-making Interviews and surveys with stakeholders: clinicians, managers, policy-makers and consumers Analysis of barriers and enablers Development of implementation and evaluation plans Workshops with senior decision-makers Consultation with Public Affairs & Communications Department 	identifying methodological issues for implementation and evaluation
How does the SHARE Program contribute to the body of knowledge on disinvestment and resource allocation?	Literature review of disinvestment from the local healthcare perspective	PHASE THREE Consolidating, reflecting and
How can this information be integrated for use by policy makers, managers, clinicians and researchers?	disinvestment within the context of resource allocation Analysis and discussion of key messages	considering the implications

Phase Two (Fig. 2). The questions asked by decisionmakers have been reframed as the research questions addressed in the SHARE papers.

Frameworks for evaluation and explication

Evaluation frameworks and plans were created for the SHARE Program as a whole [64] and for individual projects.

A framework and associated taxonomy for evaluation and explication of implementation of an evidence-based innovation were adapted for use in SHARE activities (Figs. 3a and 4) [65]. Evaluation and research activities were mapped to the corresponding components of the framework (Fig. 3b).

Activities and publications

The activities in Phase One focused on understanding disinvestment from the local health service perspective and identifying potential mechanisms for a systematic organisation-wide approach; discovering where, how and by whom decisions are made, implemented and evaluated at Monash Health; and exploring opportunities and methods for consumer engagement in this process. These are reported in Papers 2, 3 and 4 respectively [41–43]. A national workshop was conducted to share knowledge about disinvestment from three perspectives: health policy researchers, health economists and health service decision-makers. A report containing all findings and presentation materials is available [66, 67].

SHARE					
Sustainability in Health care by Allocating Resources Effectively					
PHAS	E ONE	PHASE	TWO		
STEP 1 Identify need for change	STEP 2 Develop proposal for change	STEP 3 Implement change proposal	STEP 4 Evaluate outcomes of change		
 What concepts, definitions and perspectives underpin disinvestment? What models or methods of disinvestment have been implemented in hospitals or health services? Where are the opportunities for systematic decisions about disinvestment in a local health service? Where, how and by whom are decisions about resource allocation made, implemented and evaluated at Monash Health? What factors influence these processes? What knowledge or experience of disinvestment exists within Monash Health? How can consumer values and preferences be integrated into organisation-wide decision-making? 	 What are the implications for disinvestment at Monash Health? What is the most appropriate and effective approach to enable organisation-wide, systematic, integrated, evidence-driven decisionmaking for disinvestment at Monash Health? Can a model for evidence-driven resource allocation in the local healthcare setting be derived from the Monash Health program to enable replication and testing? 	 Aim 1. Systems and Processes To develop, implement and evalu organisation-wide systematic, tra evidence-based decision-making Aim 2. Disinvestment Projects To develop, implement and evalu identify and prioritise potentia undertake evidence-based disi Aim 3. Support Services To develop, implement and evalu deliver evidence from research build capacity in evidence-based implementation and evaluation support staff in project conduct Aim 4. Program Evaluation, Researt To undertake eviden to me To undertake action research to deliver a national workshop experience of disinvestment ar 	ate systems and processes for nsparent, accountable and ate methods to I disinvestment opportunities nvestment projects ate methods to a and data to decision-makers ad decision-making and n of evidence-based decisions at and administration ch and Dissemination easure outcomes to understand processes to share knowledge and nd develop links for collaboration gh publications and presentations		
Take an evidence-based approach: each step underpinned by Evidence from research and local data, Experience and expertise of health service staff, and Values and perspectives of consumers Address systems issues: Ensure sustainability through structure, skills, resources, leadership and commitment; Avoid duplication; and Integrate with existing systems Use action research methods: Document, investigate and learn from barriers and enablers encountered in the change process					
Fig. 2 SEAchange model for evidence-based change adapted for SHARE (with permission from Harris et al [63])					

Following synthesis and analysis of the findings from these investigations and consideration of the implications that emerged, a plan for a multi-faceted disinvestment program was established. This is presented as a model for a systematic approach to evidencebased resource allocation in a local health service in Paper 5 [44].

Phase Two involved development, implementation and evaluation of the activities proposed in the model to determine which were sustainable, effective and appropriate at Monash Health. These projects are reported in Papers 6, 7 and 8 [45–47].

After completion of Phase Two a review of the disinvestment literature from the perspective of the local health service was undertaken and the findings were integrated with the experiences and outcomes of the SHARE Program in Paper 9 [48]. Although there is little practical guidance in the literature, there are clear and consistent messages regarding principles for decision-making, settings and opportunities to identify disinvestment targets, steps in the disinvestment process, methods and tools, and barriers and enablers. This information was drawn together into an organisation-wide framework for disinvestment in the local healthcare setting in Paper 10 [49].

Paper 11 summarises the outcomes of the SHARE Program, discusses the contribution of SHARE to the knowledge and understanding of disinvestment in the local setting, and considers the implications for research, policy and practice [50].

To aid readers in navigation of this series, the research questions addressed in each paper are listed in Table 1.



Outcomes and outputs

Outcomes are the changes that result from a program of activities. The outcomes of each investigation are reported and discussed in detail in the individual papers and summarised in the final paper [50].

Outputs are materials or methods produced in the delivery of a program that could be used to inform decision-making and planning for other programs, reproduced to save time and resources, or adjusted to suit local needs. The SHARE outputs may be useful resources for knowledge brokers, decision-makers and change agents in healthcare settings and offer opportunities for application, testing, refinement and theory development by researchers.

In addition to this suite of papers, the SHARE activities have also produced a range of outputs that includes summaries of concepts, definitions, current practice, needs, emerging issues, decision-making criteria and influencing factors; frameworks and models, a taxonomy and algorithm; sources of information and data; and survey instruments. These are collated in Table 1 and discussed below.

Discussion

Limitations

SHARE is a case study in a single public health service in the Australian health system which limits the generalisability to other contexts and settings. It was developed as a health service improvement initiative, not a research project. However the importance of a research component was recognised at project inception and was built into the funding application and evaluation design [44, 64].

The project team responsible for delivering the SHARE Program at Monash Health were also the researchers investigating the processes undertaken. This has the potential to introduce subjectivity into the evaluations and limit insight if organisational assumptions are accepted without challenge. Extensive stakeholder involvement, transparency of methods and participation of an external evaluator in the role of 'critical friend' [64] were included in the SHARE processes to minimise these limitations.

Many of the findings are the first of their kind; while this provides more information than was previously available, it requires further confirmation or refutation in subsequent studies.

Implications for policy and practice Establishing a disinvestment program in a local

healthcare setting

Several outputs from SHARE activities may assist others seeking to establish similar programs. The proposed organisation-wide framework for disinvestment brings together the definitions, concepts, principles, decisionmaking settings, and steps in the disinvestment process,

	Characteristics of the determinants of effectiveness					
External environment	Organisa	ation	Potential adopters	Potential patients	Evidence-based innovation	Implementation strategy
 Financial Physical Political Community Legislation Regulation Standards Policies Guidelines Conferences Publications 	Levels Health network Site/Campus Program Unit/Department Team Individual Structure Size Relationship to other organisations Internal collaborations Culture Values Beliefs Assumptions Personalities Leadership Management style Hierarchy Priorities Strategic plan Business plan Population needs	Staffing Knowledge and skills Support Capacity Changes Orientation Modelling Role definition Processes General logistics Administration Transparency Access to information Use of information Communication Decision-making Change Adaptability Linking Saturation Willingness	 Demographics Professional group Specialty Level of training Age Time since graduation Size of group Expertise Attitudes Knowledge and skills Self-efficacy Other Perceived support Leadership Team planning 	Demographics Age Gender Ethnicity Other relevant Reason for targeting Clinical problem Risk factor Population group Burden of disease Size of problem Potential benefit Sensitive areas eg children, cancer, etc	 Evidence Research Clinical perspective Patient perspective Procedure Clarity Appeal Relative advantage Compatibility Coordination User involvement Relevance Time Complexity Trialability Observability Cost benefit 	Interventions Tailored to barriers and enablers Based on relevant theory Format Facilitation Purpose Roles Skills and attributes Knowledge Procedure Complexity Compatibility Advantage Trialability Cost benefit Resources Financial Administrative Time Facilities
Char	acteristics of the process of	of change		Outcome	measures	
 Type of intervention: Professional, financial re professional/patient, organisational, patient-oriented, structural, regulatory Type of targeted behaviour change: Preventive service, diagnosis, test ordering, referrals, prescribing, management, patient education, communication, record keeping, resource use, discharge planning Implementer: Professional status, opinion leaders, authority Setting: Reimbursement system, location of care (inpatient, outpatient, community, etc), country, proportion of eligible providers participating Methods/quality: Study design, unit of allocation, unit of analysis, power calculation, concealment of allocation, blinding, follow up, data collection processes Controls used Other: Source of funding, ethical approval 		Degree of implement planned, changes ma Degree of practice of Health practitioners Patient: Health outce events, etc), health so presentation rates, et System changes: Org provision, other Economic: Patient of cost of implementat Timing: Time after in ceiling effect Comparison betwee Sustainability and sp routine practice, org	tation: Target groups ade hange: Attitudes, inte knowledge, skills, se omes (objectives of in service utilisation (att etc), satisfaction ganisational practices osts, health service co ion, reallocation of co nitiation of intervention an intervention and co oread: Continuation a anisational networks,	s reached, activities of entions, behaviours elf-efficacy, satisfaction tervention, quality of endance, admission, , documentation, cha osts, local/global econ osts, reallocation of re on, post-intervention ontrols ofter project completi , replication in other	lelivered as on of life, adverse length of stay, re- anges to service nomic implications, esources saved follow up, possible ion, integration into department/facility	

al [65])

and addresses barriers and enablers when it is possible to do so through systems change (Paper 10). It is broad and theoretical, but may be made more specific and practical in combination with the SHARE models for resource allocation in a local healthcare setting (Paper 5) and integrating consumer views and perspectives into the resource allocation process (Paper 4). Additional information that may be of use includes summaries of issues to consider in development of an organisational program for disinvestment (Paper 2); implications for disinvestment in the local setting (Paper 5); factors that influenced decisions, processes and outcomes in disinvestment projects (Paper 6) and establishing services to support EBP (Papers 7 and 8); key messages from the SHARE Program (Paper 11); and theories proposed or applied in disinvestment-related projects and frameworks, methods and tools developed by others (Paper 10).

Seeking local information

The SHARE Program undertook multiple surveys, interviews and workshops. The protocols and instruments developed may be suitable for replication or adaptation to meet the needs of other settings. The results are provided in summary in the papers and in detail in additional files, and are discussed in the context of the current literature. The topics include local implications

Table 1 Research questions and outputs

Research questions	Outputs
SHARE 2: Identifying opportunities for disinvestment in a local healthcare se	etting
 What concepts, definitions and perspectives underpin disinvestment? What models or methods of disinvestment have been implemented in hospitals or health services? Where are the opportunities for systematic decisions about disinvestment in a local health service network? 	 Framework and detailed discussion of potential settings and methods for disinvestment in the local healthcare context Summary of issues to consider in development of an organisational program for disinvestment Interview protocol for ascertaining local implications for disinvestment
SHARE 3: Examining how resource allocation decisions are made, implement	nted and evaluated in a local healthcare setting
 Where, how and by whom are decisions about resource allocation made, implemented and evaluated at Monash Health? What factors influence these processes? What knowledge or experience of disinvestment exists within Monash Health? 	 Framework of eight components in the research allocation process, the elements of structure and practice for each component, and the relationships between them Classification of decision-makers, decision-making settings, type and scope of decisions, strengths and weaknesses, barriers and enablers Examples of decision-making criteria and types and sources of evaluation data used Interview and workshop protocols for ascertaining local decision-making systems and processes
SHARE 4: Exploring opportunities and methods for consumer engagement	in resource allocation in a local healthcare setting
 How can consumer and community values and preferences be systematically integrated into organisation-wide decision-making for re- source allocation? 	 Model for integrating consumer values and preferences into decision- making for resource allocation Definitions for consumer engagement terminology Examples of sources of consumer information and data Examples of consumer-related activities generating proactive decisions to drive change
SHARE 5: Developing a model for evidence-driven resource allocation in a	local healthcare setting
 What are the implications for disinvestment at Monash Health? What is the most appropriate and effective approach to organisation- wide, systematic, integrated, evidence-driven disinvestment at Monash Health? Can a model for evidence-driven resource allocation in the local healthcare setting be derived from the Monash Health program to enable replication and testing? 	 Model for exploring Sustainability in Health care by Allocating Resources Effectively in the local healthcare setting Definition of four program components, aims and objectives, relationships between components, principles that underpin the program, implementation and evaluation plans, and preconditions for success and sustainability. Summary of implications for disinvestment in the local setting and resulting decisions for program development Summary of factors for program sustainability Evaluation framework and plan
SHARE 6: Investigating methods to identify, prioritise, implement and evalu	ate disinvestment projects in a local healthcare setting
 What methods are available to identify potential disinvestment opportunities in a local health service? What methods are available for prioritisation and decision-making to initiate disinvestment projects in a local health service? What methods are available to develop implement and evaluate 	 Framework for evaluation and explication of a disinvestment project Examples of criteria for selection of disinvestment projects Methods for developing an evidence-based catalogue of potential disinvestment opportunities Algorithm for selecting a disinvestment project from an evidence-

- disinvestment projects in a local health service?
- methods at Monash Health?
- What factors influenced the decisions, processes and outcomes?
- SHARE 7: Supporting staff in evidence-based decision-making, implementation and evaluation in a local healthcare setting
- What is current practice in accessing and using evidence for making, implementing and evaluating decisions at Monash Health?
- · What decisions were made and outcomes achieved in the piloting of support services?
- What factors influenced the decisions, processes and outcomes?
- Matrix of barriers, enablers, additional needs and evidence-based interventions mapped to their corresponding components in four support services to enable evidence-based decision-making,

Summary of barriers and enablers to implementation and evaluation

• Summary of factors related to determinants of effectiveness arising in

- Summary of factors influencing decision-making for development of support services
- Summary of factors influencing the outcomes of the SHARE support services piloting process
- Summaries of current practice, knowledge, skills, confidence and needs in finding, accessing and using evidence for making, implementing

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- What were the processes and outcomes of application of these
- - - implementation and evaluation

based catalogue of potential disinvestment opportunities

SHARE process and disinvestment projects

Table 1 Research questions and outputs (Continued)

and evaluating decisions; and preferred formats for education and training

- Summaries of nature, type and availability of local health service data; data sources; uses and expertise available
- Evaluation framework and plan

SHARE 8: Developing, implementing and evaluating an Evidence Dissemination Service in a local healthcare setting

- What are the potential features of an Evidence Dissemination Service in a local healthcare setting?
- How can high quality synthesised evidence be identified, captured, classified, stored, repackaged and disseminated?
- How can disseminated evidence be used to enhance current practice and how can use of evidence be reported?
- What are the processes and outcomes of disseminating evidence to self-selected and targeted participants in a voluntary framework?
- What are the processes and outcomes of disseminating evidence to designated decision-makers in a mandatory governance framework?
- What factors influenced the decisions, processes and outcomes?

SHARE 9: Conceptualising disinvestment in the local healthcare setting

 Aims: To discuss the current literature on disinvestment from a conceptual perspective, consider the implications for local healthcare settings and propose a new definition and two potential approaches to disinvestment in this context to stimulate further research and discussion.

- Two models for an Evidence Dissemination Service (EDS) in a local
- healthcare service • Methods for identification, capture, classification, storage, repackaging
- and dissemination of evidence
- Methods to facilitate use of disseminated evidence and reporting of outcomes
- Taxonomy for categorising publications
- Framework for evaluation and explication of implementation of health information products and services
- Summaries of factors influencing decisions, processes and outcomes in development and delivery of the EDS
- Discussion of the disinvestment literature in relation to terminology and concepts, motivation and purpose, relationships with other health improvement paradigms, challenges, and implications for policy, practice and research in local healthcare settings

SHARE 10: Operationalising disinvestment in an evidence-based framework for resource allocation

- Aims: To discuss the current literature on disinvestment from an operational perspective, combine it with the experiences of the SHARE Program, and propose a framework for disinvestment in the context of resource allocation in the local healthcare setting.
- Discussion of the disinvestment literature from an operational perspective in local healthcare settings
- Summary of theories, frameworks and models used in disinvestmentrelated activities
- Framework for evidence-based disinvestment in the context of re source allocation
- Standardised definitions and concepts to underpin framework
- Principles for resource allocation decision-making
- Potential activities and settings for disinvestment

Summary of outcomes of the SHARE Program

Implications for research, policy and practice

- Potential prompts and triggers to initiate disinvestment decisions
- Methods and tools for disinvestment
- Barriers to disinvestment

Key messages

SHARE 11: Reporting outcomes of an evidence-driven approach to disinvestment in a local healthcare setting

 Aims: To consolidate the findings, discuss the contribution of the SHARE Program to the knowledge and understanding of disinvestment in the local healthcare setting, and consider the implications for policy, practice and research.

SHARE National Workshop

- Aim: To share knowledge of disinvestment and develop links for future collaborative work opportunities
- Summary of disinvestment activities from health policy, health economics and health service perspectives
- Tools for group activities discussing disinvestment concepts and decision-making
- Tools for individual activities to capture information about current practice and research in disinvestment
- Workshop presentations
- Workshop evaluation tool and findings
- Summary of key messages

of a disinvestment program (Paper 2); current practice, barriers and enablers to making, implementing and evaluating decisions for resource allocation (Paper 3); current practice, knowledge, skills, confidence, barriers, enablers and needs of decision-makers in finding, appraising and using evidence in decisions, implementation and evaluation (Papers 7 and 8); content and format of training programs and support services to facilitate EBP (Papers 7 and 8) and sources, content, utilisation, availability, access and reporting of local health service datasets (Paper 7).

Identifying opportunities and making decisions for disinvestment

At the commencement of the SHARE Program Monash Health leaders did not have a complete or agreed understanding of where, how and by whom organisational decisions for resource allocation were made, implemented or evaluated. There was also a lack of this level of detail in the literature. The outputs of the investigation into decision-making systems and processes for resource allocation at Monash Health are reported in Paper 3 and include a framework for the process of resource allocation; classification of decision-makers, decision-making settings, type and scope of decisions; details of strengths and weaknesses, barriers and enablers; and examples of decision-making criteria used in a local healthcare setting.

A separate investigation, specifically considering disinvestment, evaluated methods for identification, prioritisation and decision-making for disinvestment projects (Paper 6). Outputs from this project include an algorithm for selecting projects from a catalogue of TCPs that were demonstrated to be harmful or ineffective; examples of criteria for selection of disinvestment projects; a summary of barriers and enablers to implementation and evaluation; and a summary of factors influencing the process and outcomes of undertaking disinvestment projects within the SHARE Program.

Implementing and evaluating change initiatives

There is some discussion of implementation strategies in the disinvestment literature, however much of it is theoretical and the authors do not report application or evaluation of these strategies in the local health service context [49]. The need for evaluation of disinvestment projects is highlighted in the literature but little guidance is provided [49]. The SHARE papers provide practical information from actual experiences to guide others in similar situations. These include:

- summaries of barriers and enablers from SHARE activities related to implementing and evaluating health service decisions for resource allocation (Paper 3) and implementing a disinvestment project (Paper 6); and barriers and enablers to disinvestment as reported in the literature (Paper 10).
- summaries of influencing factors and strategies to address them (Papers 2, 5, 6, 7 and 8).
- completed checklists for success and sustainability, characteristics of interventions and/or determinants of effectiveness related to the overall SHARE Program (Papers 5 and 11), process of disinvestment (Paper 6) and establishment of services to support EBP (Papers 7 and 8).

- evaluation frameworks and plans related to the overall SHARE Program (Paper 5) and establishment of support services (Papers 7 and 8).
- a framework for evaluation of implementation of an evidence-based innovation was adapted for use in survey design to investigate decision-making processes for resource allocation (Paper 3) and evaluation design to map evaluation and research activities to the process of change (Paper 5), explore factors that influenced the processes and outcomes of identifying and undertaking disinvestment projects (Paper 6), and evaluate new health information products and services (Paper 8).

Implications for research

The SHARE outputs are described above in the context of policy and practice. The same lists could be repeated for research where the specific products could be trialled and refined, tested in different contexts or used to develop new hypotheses.

The need for frameworks and models for disinvestment is widely acknowledged [26, 29, 30, 32, 34, 39, 68–72]. The SHARE Program has contributed three new conceptual frameworks and three models and adapted existing frameworks.

The frameworks include potential settings and methods to integrate disinvestment decisions into health service systems and processes (Paper 2), components of the resource allocation process (Paper 3), evaluation and explication of implementation of health information products and services (Paper 8), and organisation-wide disinvestment in the context of resource allocation (Paper 10).

The models include integrating consumer values and preferences into decision-making for resource allocation in a local healthcare setting (Paper 4), exploring sustainability in health care by allocating resources effectively in the local healthcare setting (Paper 5) and facilitating use of recently published synthesised evidence in organisational decision-making through an Evidence Dissemination Service (Paper 8).

The frameworks and models can be tested in clinical, management or policy contexts; for disinvestment, resource allocation or other decision-making processes. They are each based on multiple components and the relationships between them. A range of hypotheses could be developed for the components and their relationships which could be tested in a number of ways using various methodologies.

Conclusions

This suite of projects extends the existing literature on disinvestment and addresses some of the notable gaps. The outputs may be as useful as the outcomes for those considering disinvestment in the policy, practice and research contexts.

Abbreviations

CCE: Centre for clinical effectiveness; EBP: Evidence based practice; GDP: Gross domestic product; HTA: Health technology assessment; OECD: Organisation for Economic Co-operation and Development; SHARE: Sustainability in Health care by allocating resources effectively; TCPs: Technologies and clinical practices

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Availability of data and materials

Many of the datasets supporting the conclusions of the articles in the SHARE series are included within the articles and/or the accompanying additional files. Some datasets provide information for more than one article and are only provided once; where they are not included within an article and/or the accompanying additional file, the relevant citations to the articles in which they are provided are included. Datasets have not been made available where it is impossible to de-identify individuals due to the nature of survey or interview responses or where the data is published in confidential internal reports.

Authors' contributions

CH, WR, KA and RK contributed to project design and delivery, decision-making and direction throughout the SHARE Program. CH and SG conceived the design of the paper. CH drafted the initial manuscript. SG provided critical revisions. WR, KA and RK provided later feedback. All authors read and approved the final manuscript.

Authors' information

CH was the Director of the Centre for Clinical Effectiveness and the SHARE Program Director. CH completed the SHARE publications as part of an unfunded PhD. SG is Professorial Fellow in the Monash University School of Public Health and Preventive Medicine and co-supervisor of CH's PhD. WR was Executive Director of Medical Services and Chair of SHARE Steering Committee. KA was the SHARE Project Manager. RK was Director of Medicine Program, member of the SHARE Steering Committee and co-supervisor of CH's PhD.

Competing interests

The authors declare that they have no competing interests.

Consent for publication

Not applicable.

Ethics approval and consent to participate

The Monash Health Human Research and Ethics Committee (HREC) approved the SHARE program as a Quality Assurance activity. Further ethical review was not required as the program met the following criteria [73]:

- "The data being collected and analysed is coincidental to standard operating procedures with standard equipment and/or protocols;
- The data is being collected and analysed expressly for the purpose of maintaining standards or identifying areas for improvement in the environment from which the data was obtained;
- The data being collected and analysed is not linked to individuals; and

• None of the triggers for consideration of ethical review are present." [73] Participation was based on the 'opt-out approach' [73]. "The opt-out approach is a method used in the recruitment of participants into an activity where information is provided to the potential participant regarding the activity and their involvement and where their participation is presumed unless they take action to decline to participate."[73] Consent to participate was approved by the HREC based on the following criteria:

- Health care providers, managers, consumer representatives, and officers within government health departments will be informed about the project and the processes and invited to participate.
- Participation in interviews, workshops and/or surveys will be considered to be implied consent.

These conditions were met.

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Author details

¹School of Public Health and Preventive Medicine, Monash University, Victoria, Australia. ²Centre for Clinical Effectiveness, Monash Health, Victoria, Australia. ³Medical Services and Quality, Monash Health, Victoria, Australia. ⁴Medicine Program, Monash Health, Victoria, Australia.

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Chapter 2. SHARE Phase One

"Adopt a whole systems perspective from the beginning"

Robert et al 2014 [17]

Health services make many decisions within organisation-wide frameworks where processes and decision-making criteria are established and the wider ramifications of change within an individual department can be identified across all programs and campuses. Examples of organisation-wide frameworks include capital expenditure and clinical purchasing, development and authorisation of policies and procedures, introduction of new TCPs and models of care, and delivery of programs and services. Although disinvestment can be considered in all these contexts, most of the published examples describe standalone projects where the target was identified in an isolated process independent of existing decision-making mechanisms. While this approach might be successful in some circumstances, it can potentially produce inconsistent messages, lack of coordination, duplication and change fatigue in the local healthcare setting [18] that result in unsuitable or unsustainable outcomes [7].

Monash Health chose to consider disinvestment from a systematic, integrated, organisation-wide perspective; using current systems and processes to identify disinvestment opportunities or, if new methods were required, incorporating them into existing infrastructure. This approach has been proposed in more recent publications which suggest that disinvestment activities are more likely to be successful if decisions are made at the local level, integrated into everyday decision-making and central to local planning [19-22].

An organisation-wide program for decision-making and implementation of change would be considered a 'complex intervention', composed of multiple components which act both independently and inter-dependently. The UK MRC propose a phased approach to design and evaluation of complex interventions [23]. The first phase involves specifying the context, understanding the problem and defining the components of an optimal intervention (Figure 1, Page 13).

The activities in SHARE Phase One included understanding the implications for disinvestment in the local health service setting and identifying potential mechanisms for a systematic organisationwide approach; discovering where, how and by whom decisions are made, implemented and evaluated at Monash Health; and exploring opportunities and methods for consumer engagement in this process. These are reported in Papers 2, 3 and 4 respectively. A model for an organisationwide program for investigation of disinvestment emerged from the findings of these investigations and is presented in Paper 5.

Papers 3 and 5 are provided in full and key findings from Papers 2 and 4 are noted for completeness.

"Researchers need to understand the context when designing a theoretically based intervention whose mechanism of action can be clearly described and whose validity is supported by empirical data."

Campbell et al 2007 [23]

Paper 2: Identifying opportunities for disinvestment

'Where to start' was the first challenge.

A literature review, survey of national and international researchers working in disinvestment, and interviews and workshops with local informants were undertaken to address the following research questions.

- What concepts, definitions and perspectives underpin disinvestment?
- What models or methods of disinvestment have been implemented in hospitals or health services?
- Where are the opportunities for systematic decisions about disinvestment in a local health service network?

There was a lack of common terminology regarding the definitions and concepts related to disinvestment. The only clear message was that the term 'disinvestment' had strong negative connotations and would be a barrier to effective implementation of change.

No theoretical guidance or practical advice for a systematic approach to disinvestment within existing organisational infrastructure was identified. However many authors noted issues that should be considered in this context (Table 2).

A conceptual framework of potential settings and methods for disinvestment in the local healthcare setting was developed (Figure 2). It is based on three systematic mechanisms that provide opportunities to introduce disinvestment decisions into health service systems and processes. Presented in order of complexity, time to achieve outcomes and resources required they include A) Explicit consideration of potential disinvestment in routine decision-making, particularly procedures for spending money and allocating non-monetary resources, B) Proactive decision-making about disinvestment driven by available evidence from published research and local data, and C) Specific exercises in priority setting and system redesign. Investigation of the elements within this framework is reported in Chapter 3 (Paper 6 [8])

Figure 2. Framework of potential mechanisms to integrate disinvestment into health service systems and processes



Reproduced with permission from SHARE Paper 2 [4]

Table 2. Issues to consider in development of an organisational program for disinvestment

Reproduced with permission from SHARE Paper 2 [4]

Торіс	Issues
Organisational and	 How can a systematic evidence-based approach to disinvestment be implemented in a healthcare organisation?
management	 How can disinvestment decisions be integrated into established Strategic and Business Plans
	Which is the better approach – 'top down', 'bottom up' or both?
	How to engage and get 'buy-in' from clinicians, consumers and other stakeholders?
	What are the relevant organisational change mechanisms?
	 What does leadership for disinvestment involve?
Decision-	Who has the authority, and the will, to make and act upon decisions about disinvestment?
makers	Who are the appropriate decision-makers?
	 Existing decision-making bodies or specially convened groups
	 Composition: policy-makers, managers, clinicians, consumers, technical experts, others
	 In-house or external
	How does the relevant information get to them?
	What other agendas do they bring to the decision-making table?
	Who has the time, relevant skills and adequate resources to identify, implement and evaluate the required practice changes?
Decision-	Are all viewpoints equal?
making	 What criteria should be applied to disinvestment decisions and prioritisation?
	What is the nature and source of information required?
	How do decision-makers become aware of the need to disinvest certain practices?
	How are policies and guidance documents used by local decision-makers to allocate resources?
Assumptions	 Are generally held assumptions true? For example
	 - 'Clinicians are reluctant to disinvest'
	 'Disinvestment is not optimal unless an active intervention is in place'
Skills and resources	 What expertise and training is required to make, communicate, implement and evaluate decisions?
	 What resources are required to source expertise, source information, 'backfill' health service staff when participating, and support decision-making, implementation and evaluation processes?
Professional	 What impact will professional boundaries and 'turf' issues have on disinvestment activities?
and cultural	What are the rights and responsibilities of stakeholders?
	 Different stakeholder views of what is meant by 'little or no health benefit'
	 What is the effect of culture on disinvestment? (authoritative versus consultative, transparent versus hidden)
	What are the motives and incentives for disinvestment?
Financial and	• What funding is required for disinvestment initiatives and where can it be found?
commercial	 How can the difficulties inherent in the complex funding arrangements within health services be
	overcome?
	How can savings be measured?
	How can savings be reinvested?
Values and	 How can transparency of process be ensured?
ethics	 What is a 'fair and reasonable' process?
	What are the access, equity and legal considerations?
	 What is the best way to deal with conflict of interest with commercial entities?
Research and	What effect will the limited evidence base for some practices have on the process?
evaluation	 How can the lack of tested methods for implementation and evaluation be addressed?

"To achieve optimal use of technology, it is necessary to understand the decision-making processes in a system."

Fronsdal et al 2010 [24]

Paper 3: Examining how resource allocation decisions are made, implemented and evaluated

With the exception of the program for introduction of new TCPs, Monash Health did not have any decision-making settings where disinvestment was explicitly considered. While there was broad understanding of where resource allocation decisions were made, detailed knowledge of who made them and how they were made, implemented and evaluated was lacking, and this information was also unavailable in the literature.

Removal or restriction of practices in current use has always occurred in health services, albeit without the label of disinvestment. The experiences and insights of staff members involved in previous disinvestment-type initiatives could inform the new program.

Development and implementation of effective systems and processes for disinvestment decisions would require answers to the following questions.

- Where, how and by whom are decisions about resource allocation made, implemented and evaluated at Monash Health?
- What factors influence these processes?
- > What knowledge or experience of disinvestment exists within Monash Health?

The Additional files for Paper 3 are included in Appendices 2a (Methods) and 2b (Strengths and weaknesses, barriers and enablers).

RESEARCH ARTICLE

Open Access



Sustainability in health care by allocating resources effectively (SHARE) 3: examining how resource allocation decisions are made, implemented and evaluated in a local healthcare setting

Claire Harris^{1,2*}^(b), Kelly Allen^{1,2}, Cara Waller² and Vanessa Brooke²

Abstract

Background: This is the third in a series of papers reporting a program of Sustainability in Health care by Allocating Resources Effectively (SHARE) in a local healthcare setting. Leaders in a large Australian health service planned to establish an organisation-wide, systematic, integrated, evidence-based approach to disinvestment. In order to introduce new systems and processes for disinvestment into existing decision-making infrastructure, we aimed to understand where, how and by whom resource allocation decisions were made, implemented and evaluated. We also sought the knowledge and experience of staff regarding previous disinvestment activities.

Methods: Structured interviews, workshops and document analysis were used to collect information from multiple sources in an environmental scan of decision-making systems and processes. Findings were synthesised using a theoretical framework.

Results: Sixty-eight respondents participated in interviews and workshops. Eight components in the process of resource allocation were identified: Governance, Administration, Stakeholder engagement, Resources, Decision-making, Implementation, Evaluation and, where appropriate, Reinvestment of savings. Elements of structure and practice for each component are described and a new framework was developed to capture the relationships between them. A range of decision-makers, decision-making settings, type and scope of decisions, criteria used, and strengths, weaknesses, barriers and enablers are outlined. The term 'disinvestment' was not used in health service decision-making. Previous projects that involved removal, reduction or restriction of current practices were driven by quality and safety issues, evidence-based practice or a need to find resource savings and not by initiatives where the primary aim was to disinvest. Measuring resource savings is difficult, in some situations impossible. Savings are often only theoretical as resources released may be utilised immediately by patients waiting for beds, clinic appointments or surgery. Decision-making systems and processes for resource allocation are more complex than assumed in previous studies.

Conclusion: There is a wide range of decision-makers, settings, scope and type of decisions, and criteria used for allocating resources within a single institution. To our knowledge, this is the first paper to report this level of detail and to introduce eight components of the resource allocation process identified within a local health service.

Keywords: Disinvestment, Decommission, De-adopt, De-list, Environmental scan, Health technology, TCP, Resource allocation, Decision-making, Implementation

* Correspondence: claire.harris@monash.edu

¹School of Public Health and Preventive Medicine, Monash University, Victoria, Australia

²Centre for Clinical Effectiveness, Monash Health, Victoria, Australia



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About SHARE

This is the third in a series of papers reporting a program of Sustainability in Health care by Allocating Resources Effectively (SHARE). The SHARE Program is an investigation of concepts, opportunities, methods and implications for evidence-based investment and disinvestment in health technologies and clinical practices in a local healthcare setting. The papers in this series are targeted at clinicians, managers, policy makers, health service researchers and implementation scientists working in this context. This paper reports an investigation of decision-making infrastructure in a range of local contexts and ascertains the knowledge and experience of disinvestment in one Australian health service network.

Background

The concept of disinvestment has emerged in response to rising healthcare costs, rapidly expanding use of health technologies and increasing awareness of ineffective practices and systemic waste in health services [1–7]. Although there is no clear single definition, disinvestment is generally understood to be removal, reduction or restriction of technologies and clinical practices (TCPs) that are unsafe or of little benefit [8]. Removal indicates complete cessation, reduction is a decrease in current volume or delivery sites, and restriction is narrowing of current indications or eligible populations.

Leaders at Monash Health (previously Southern Health), a large health service network in Melbourne Australia, planned to implement an organisation-wide, systematic, integrated, evidence-based approach to disinvestment. The focus was on how a health service guides, directs and makes decisions at organisational level, in contrast to the decisions of individuals regarding their personal practices. Two early decisions affected the scope and direction of this initiative. Firstly, based on a review of the literature and consultation with local stakeholders, it was agreed that the word 'disinvestment' should be avoided due to the negative connotations [9]. Secondly, it was felt that undertaking disinvestment in isolation from other decision-making processes was artificial and potentially counterproductive. Hence the 'Disinvestment Project' became the 'Sustainability in Health care by Allocating Resources Effectively' (SHARE) Program and investment and disinvestment were considered together in the context of resource allocation.

Information to guide healthcare networks or individual facilities in how they might take a systematic organisationwide approach to disinvestment is lacking [10–19]. Little is known about how to implement or evaluate effective disinvestment initiatives within a health service or how these activities could be integrated with existing processes of health technology assessment and organisational decision-making [20, 21]. Decisions are made at macro (national, state/provincial and regional), meso (institutional) and micro (individual) levels [22]. Each sector of the health system has a decisionmaking infrastructure within which individuals or groups make decisions on behalf of the jurisdiction or individual facility. However no clear patterns of types of decisions, or where they are made, have been identified for decisions regarding use of health technologies [23, 24]. Lists of criteria for consideration in prioritisation and decisionmaking have been published for disinvestment [2, 24–27], resource allocation [28–30] and general decision-making [22] but there is little information on decision-making settings or participants in these processes [23].

In the absence of guidance from the literature, a twophased process was proposed to identify and then evaluate potential opportunities for disinvestment at Monash Health (Fig. 1). The aim of Phase One was to understand concepts and practices related to disinvestment and the implications for a local health service and, based on this information, to identify potential settings and methods for decision-making. The aim of Phase Two was to implement and evaluate the proposed methods to determine which were sustainable, effective and appropriate at Monash Health.

Preliminary explorations at Monash Health did not find any decision-making settings that had an existing process to consider disinvestment, hence new systems and processes were required. Two areas with potential had been identified: the mechanisms for spending money, such as purchasing and procurement, and the mechanisms for allocating non-monetary resources through guidelines and protocols [9]. The SHARE Program aimed to integrate new systems and processes into existing infrastructure. While there was a broad understanding of where resource allocation decisions were made at Monash Health, detailed knowledge of how they were made, implemented and evaluated was lacking. This lack of information had to be addressed for this aim to be achieved.

In addition to knowing where and how decisions are made, it would also be helpful to understand and learn from local knowledge and experience of disinvestment. Restricting activities to save money or redirecting resources from one area to another to achieve better clinical or corporate outcomes has always occurred in local health services, but has not previously been called 'disinvestment' by healthcare staff. Many staff members could provide insights from previous projects that involved removal, reduction or restriction of resources.

Monash Health is a public network of six acute hospitals, subacute and rehabilitation services, mental health and community health services, and residential aged care [31]. Australian public hospitals operate under a stateallocated activity-based fixed-budget model of financing

Page 3	of 21
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SHARE					
Sustainability in Health care by Allocating Resources Effectively					
PHAS	E ONE	PHASE TWO			
STEP 1 Identify need for change	STEP 2 Develop proposal for change	STEP 3 Implement change proposal Evaluate outcomes of change			
 What concepts, definitions and perspectives underpin disinvestment? What models or methods of disinvestment have been implemented in hospitals or health services? Where are the opportunities for systematic decisions about disinvestment in a local health service? Where, how and by whom are decisions about resource allocation made, implemented and evaluated at Monash Health? What factors influence these processes? What knowledge or experience of disinvestment exists within Monash Health? How can consumer values and preferences be integrated into organisation-wide decision-making? 	 What are the implications for disinvestment at Monash Health? What is the most appropriate and effective approach to enable organisation-wide, systematic, integrated, evidence-driven decisionmaking for disinvestment at Monash Health? Can a model for evidence-driven resource allocation in the local healthcare setting be derived from the Monash Health program to enable replication and testing? 	 Aim 1. Systems and Processes To develop, implement and evaluate systems and processes for organisation-wide systematic, transparent, accountable and evidence-based decision-making Aim 2. Disinvestment Projects To develop, implement and evaluate methods to identify and prioritise potential disinvestment opportunities undertake evidence-based disinvestment projects Aim 3. Support Services To develop, implement and evaluate methods to deliver evidence from research and data to decision-makers build capacity in evidence-based decision-making and implementation and evaluation of evidence-based decisions support staff in project conduct and administration Aim 4. Program Evaluation, Research and Dissemination To undertake evidon to measure outcomes To undertake action research to understand processes To deliver a national workshop to share knowledge and experience of disinvestment and develop links for collaboration To disseminate learning through publications and presentations 			
EVIDENCE-BASED APPROACH					
Each step underpinned by					
a) Evidence from research and local data, b) Experience and expertise of health service staff, c) Values and perspectives of consumers					
Fig. 1 Overview of the SHARE Program					

[32]. Staff are salaried and services are provided free of charge. The SHARE Program was undertaken by the Centre for Clinical Effectiveness (CCE), an inhouse resource to facilitate evidence-based practice. An overview of the SHARE Program, a guide to the SHARE publications and further details about Monash Health and CCE are provided in the first paper in this series [33].

Aims

The aim of this project was to investigate current practice in meso-level decision-making at Monash Health and identify local knowledge and experience of disinvestment.

The aim of this paper is to report and discuss the findings of an environmental scan of organisational infrastructure and mechanisms for resource allocation decisions in a large Australian health service network.

Research questions

Where, how and by whom are decisions about resource allocation made, implemented and evaluated at Monash Health?

What factors influence resource allocation processes? What knowledge or experience of disinvestment exists within Monash Health?

Methods

Case study

The SHARE papers use a case study approach to address the limited understanding of resource allocation processes in health services, particularly regarding disinvestment [34, 35], and the lack of detailed reporting of implementation of change in the literature [36, 37]. Case studies allow in-depth, multi-faceted explorations of complex issues in their real-life settings [38] and facilitate development of theory and

interventions [39]. The case study approach enables examination of the complex behaviours of, and relationships among, actors and agencies; and how those relationships influence change [40]. All three case study approaches are used [41].

- 1. Descriptive: findings are reported in detail to describe events, processes and outcomes to enable replication when successful and avoidance or adaptation when unsuccessful.
- 2. Exploratory: literature reviews, surveys, interviews, workshops and consultation with experts are used to explore what is known and identify actual, preferred and ideal practices.
- 3. Explanatory: theoretical frameworks are used to understand and explain the events, processes and outcomes.

Environmental scan

An environmental scan involves systematic collection, analysis, interpretation and synthesis of information to enable decision-makers to understand current and potential systems, processes, practices and influences in the internal and/or external environment of their organisation to inform future planning [42–44].

In the SHARE Program, these investigations were undertaken using the SEAchange model for Sustainable, Effective and Appropriate change in health services [45]. Each of the four steps in the model (identifying the need for change, developing a proposal to meet the need, implementing the proposal, and evaluating the extent and impact of the change) is underpinned by the principles of evidence-based practice to ensure that the best available evidence from research and local data, the experience and expertise of health service staff and the values and perspectives of consumers are taken into account. In this context, health service consumers are considered to be patients and other users of health services; parents, guardians or carers of patients; organisations representing consumers' interests; and members of the public [46].

The two phases of the SHARE Program, the four steps in the SEAchange model and the three research questions addressed in this paper are outlined in Fig. 1.

This environmental scan follows the 'searching model' which *"scans broadly and comprehensively in order to determine the true state of affairs"* [47]. The methods are summarised below and provided in detail in Additional file 1.

Scanning taxonomy

The scanning taxonomy, specified *a priori*, provides a comprehensive set of categories to organise and store information [44]. A theoretical framework for evaluation

and explication of implementation of evidence-based innovations was used throughout the SHARE Program to capture and understand the processes and outcomes of change [33]. This was adapted for investigation of decision-making by designating the 'innovation' as the decision, the 'organisation' as the decision-maker (group or individual) and the 'external environment' as the environment in which the decision-maker is situated, in this case Monash Health and the wider environment (Fig. 2). These are equivalent to the task, industry and macro environments described in scanning methodology [44].

Scope and sampling

Information regarding the process of allocation of monetary and non-monetary resources for use of TCPs was obtained from interviews, workshops and document analysis.

Purposive, convenience and snowball sampling methods were used, alone or in combination.

Participants were selected to

- cover a wide range of decisions including purchase of capital equipment and clinical consumables; introduction of TCPs in diagnostic and treatment settings; development and/or approval of local protocols and guidelines; implementation of services, programs and models of care; and allocation of staff and organisational capacity in clinics, operating rooms and other facilities; and elicit knowledge and previous experience of disinvestment
- include a range of executives, managers, clinicians and consumers
- represent multiple health professional groups, campuses and clinical specialties

A full description of participants and selection criteria are provided in Additional file 1: Table A.

Data collection

Interviews

Interviews were conducted with representatives of committees and Approved Purchasing Units, managers within a clinical program, and staff with experience in disinvestment projects.

An interview schedule based on the scanning taxonomy was developed, piloted and refined for the committee and program interviews and adapted for the project interviews (Additional file 1: Table B). A less-detailed version was used for the Approved Purchasing Units. In addition, project staff were also asked about the key messages from their experience and what they would do the same way or do differently in future (Additional file 1: Table C). A draft record of interview was sent to interviewees for clarification, comment and/or amendment as required.





Workshops

Three structured workshops were conducted; two with the SHARE Steering Committee and one with clinical decision-makers in a large diagnostic service.

The SHARE Steering Committee workshops were based on the first two steps in the SEAchange model for evidence-based change [45]. The workshops were run by the project team and included a presentation, structured discussion and completion of worksheets. Details of the presentations, structured discussions and worksheet tasks are included in Additional file 1: Table D. Findings and decisions were documented in minutes and verified by participants at the next meeting.

The diagnostic service workshop was developed and delivered by an experienced facilitator with no involvement in the SHARE Program. Participants were asked to describe the ideal process for purchasing large capital equipment. Five domains were identified *a priori* and responses on 'sticky notes' collected using the nominal group technique were collated under these headings. This method was repeated to identify gaps between the ideal process and current practice. Participants also prioritised key areas for improvement. Notes regarding additional discussions were recorded by project team members. A workshop report was produced and participants were invited to comment.

Document analysis

Documents that guided decision-making and/or implementation of resource allocation decisions were sought to provide evidence of the stated positions and methods of administration of the systems and processes at Monash Health and the Victorian Department of Human Services. Documents were identified by key informants and searches within the Policy and Procedure database. Data extraction was based on the scanning taxonomy.

Data analysis

The three steps for data analysis in environmental scans are 1) organisation of the data using categories determined

a priori, 2) determination of strengths and weaknesses, and 3) identification of emergent themes [44, 48].

Organisation of data and determination of strengths and weaknesses were undertaken using directed content analysis [49]. Findings were collated and organised in MS Word and Excel based on the scanning taxonomy for the interviews and document analysis, and the domains specified in the workshop activities. Strengths and weaknesses were classified by the project team based on the nature of the item and/or the sentiment expressed by the respondents, and then tabulated using the scanning taxonomy.

Emergent themes were identified using framework analysis [50].

Synthesis and interpretation

Using the emergent themes, a new framework was developed to provide context for study findings, explain observations, and make the findings meaningful and generalisable. A framework denotes a structure, overview, outline, system or plan consisting of various descriptive categories and the relationships between them [51]. The purpose of a framework is to provide a frame of reference, organise and focus thinking and assist interpretation. Frameworks are descriptive, tend to be high-level and can apply to a wide variety of situations [52, 53].

Development of the new framework

- 1. Identifying concepts and the relationships between them.
 - The principles of framework analysis were applied [50].
 - Familiarisation occurred during organisation of the data.
 - Identification of emergent themes was undertaken in preparation of individual reports for each activity which were used for project decision-making and planning.

Practitioner

outcomes

System outcomes

Economic

outcomes

Sustainability

and Spread
- Indexing and charting of all responses within the emergent themes was undertaken when combining these reports to address the research questions, confirming the concepts within the new framework.
- Mapping and interpretation identified the relationships between the concepts.
- 2. Identifying existing theoretical frameworks that support the new propositions.

A theoretical approach to decision-making within a health service had been proposed by Williams et al. [54]. The findings from the interviews, workshops and document analysis provided additional detail and increased the scope of the existing approach. The two were combined to form the new framework.

3. Developing a visual representation. The concepts and the relationships between them were depicted diagrammatically as the new framework.

This framework was subsequently used to synthesise, interpret and present the findings of the environmental scan in the context of the individual components of the resource allocation process, the elements within each component, and the strengths and weaknesses in the current system.

Results

Sixty-eight respondents, representing all health professional groups in a range of decision-making contexts across multiple campuses and clinical areas, participated. Representatives of 13 committees; managers of five Approved Purchasing Units; nine Program, Department and Unit Heads; and representatives of 10 disinvestment projects were interviewed and 13 members of the Steering Committee and 18 clinical managers from one department attended workshops. Full details of participants, including response rates and representativeness of samples, are provided in Additional file 1: Table A. Some participated more than once if they had multiple roles; for example as a committee chair responding to interview questions about their role in group decision-making and as a clinical department head participating in a workshop from the perspective of their role as an individual decision-maker. The interviews and workshops were seeking different information, hence individuals were not asked the same questions more than once.

Data collected from these activities informed a range of research questions. Findings related to research questions not addressed in this paper are reported in other SHARE publications [46, 55–58].

Documents analysed from the state government included Victorian Government Purchasing Guidelines, Medical Equipment Asset Management Framework, Targeted Equipment Replacement Program and Health Purchasing Victoria Product Management Guidelines. Documents from Monash Health included the Purchasing Policy, Purchasing Policy Guidelines, Authority Delegation Schedule, Code of Conduct, Conflict of Interest Protocol, Guidelines for management of Gifts and Benefits, Terms of Reference for a range of committees, Application forms, Business case templates, Requisition forms and checklists.

Framework for the process of resource allocation in a local health service

Concepts

Multiple themes emerged from the data and it became clear that Monash Health staff considered decisionmaking to be only one of several factors in the resource allocation process. These themes can be viewed as the components of the new framework.

Eight components, including Decision-making, were identified. A program for resource allocation requires a Governance component for oversight, direction and control; an Administration component for management and delivery of activities; Stakeholder engagement to ensure that decisions are underpinned by appropriate knowledge and perspectives; and sufficient appropriate Resources to enable the activities. After a decision is made, Implementation and Evaluation components are required to complete the task. In some cases, Reinvestment of savings can be undertaken.

Relationships

The framework in Fig. 3 presents the relationships between the components. Decision-making, Implementation, Evaluation and Reinvestment (when appropriate) are sequential steps. These four components, plus Stakeholder engagement and Resources, require Governance and Administration. Similarly these four components, plus Governance and Administration, require Stakeholder engagement and Resources. Each component has influence and impact on all of the other components.

Building on existing theory

The theoretical approach reported by Williams and colleagues describes the 'structure' and 'practice' of decision-making in health services [54]. The 'structure' elements are based on allocation of people and resources to 'tasks' and include committees and their membership, coordination of these elements, and reporting relationships. The 'practice' elements include rules and procedures, information gathering and processing, decision processes, performance standards and review.

The findings from Monash Health augment this description by confirming the original elements reported by Williams et al., identifying additional elements and elucidating relationships between them. When combined with the new findings, this theoretical approach, previously focused



only on decision-making, can be expanded to a framework considering the whole 'task' of resource allocation.

Structure can be described in more detail as 'who' and 'what' and includes people, systems, policies, requirements, relationships and coordination. Practice addresses 'how' through processes, procedures, rules, methods, criteria and customs. There are elements of structure and practice within each of the eight components; these are outlined in Table 1.

'Ideal' elements and 'actual' practice at Monash Health for each of the components of the resource allocation process were identified from the responses. The 'ideal' elements of structure and practice are represented using the same format for each of the eight components (Table 1). The need for requirements to address conflict of interest, administration, stakeholder engagement, resources, decision-making and reinvestment were reported by respondents, however they did not specifically mention the need for requirements related to other aspects of governance, implementation or evaluation; these have been added for consistency and are noted in italics. The term 'requirement' is used in the sense of performance stipulated in accordance with policies, regulations, standards or similar rules or obligations.

Where, how and by whom are decisions about resource allocation made, implemented and evaluated at Monash Health?

The main messages were consistent across all sources and most of the findings were proposed by multiple respondents, usually from multiple settings. When only one group reported certain findings, or when there were differences in responses between groups, this is noted in the text.

Findings are presented in the context of the new framework for the process of resource allocation in a local health service.

1. Governance

The elements of governance are oversight, policies and procedures, transparency and accountability, mechanisms to address conflict of interest, quality improvement of systems and processes, reporting, organisational requirements for these elements and the people who govern the systems and processes (Table 1).

One of the strongest messages from Monash Health respondents was the need for transparency and accountability. These two principles apply to all components of resource allocation, at all levels and to both structure and practice. They are included here as they can be built into the whole program as an element of governance.

There were notable contradictions between respondents in the knowledge and practice of accountability in decision-making. Individuals and members of committees at the top of their respective decision-making hierarchies reported that they had a clear understanding of how the processes worked and many reported that all decision-makers in the organisation had the same understanding that they did. However many individual and group decision-makers lower down the same hierarchies admitted they were unsure of the processes, some who said they were sure gave answers that were inconsistent with each other, and some reported that there were ambiguities and inconsistencies in the systems and processes. Senior decision-makers reported

COMPONENTS	STRUCTURE (Who, What)	PRACTICE (How)
1. Governance	 Overseers Policies for decision-making Transparency and accountability in all structures Requirements for addressing conflict of interest^a Requirements for monitoring, evaluation and improvement of systems and processes^b Requirements for reporting 	 Oversight Procedures, guidelines, protocols for decision-making Transparency and accountability in all practices Methods of addressing conflict of interest Methods of monitoring, evaluation and improvement of systems and processes Methods of reporting
2. Administration	 Administrators Requirements for administration Relationships and coordination Communication 	 Methods of administration, coordination, communication and collaboration
3. Stakeholder engagement	 Clinicians, Managers, Consumers, Technical experts, Funders, other relevant parties Requirements for stakeholder engagement 	Methods of identification, recruitment and engagement
4. Resources	 Funding sources Allocation of staff Access to experts or ways to gain expertise Information sources Requirements for resources 	 Provision of appropriate and adequate funding, time, skills/training, information Utilisation of resources
5. Decision-making	 Decision-makers Clinicians Authorised individuals Authorised groups Scope of decisions Type of decisions Requirements for decision-making 	 Methods of decision-making Identification of need/application Decision criteria Ascertainment and use of evidence Reminders and prompts to consider disinvestment Deliberative process Documentation and dissemination
6. Implementation	PurchasersRequirements for purchasing	 Methods of purchasing
	 Policy and guidance developers Requirements for policies and guidance documents 	Methods of policy and guidance development
	 Implementers Requirements for implementation 	Methods of project managementMethods of change management
7. Evaluation	 Evaluators <i>Requirements for evaluation</i> Type and source of data collected 	Methods of evaluation
8. (Reinvestment)	Requirements for reinvestment/reallocation	Methods of reinvestment/reallocation

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Table 1	Structure and	practice elements of	components of	organisational	decision-making	for resource	allocation
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^aRequirement is used in the sense of performance stipulated in accordance with policies, regulations, standards or similar rules or obligations ^bItems in italics were not specified by respondents but have been added for consistency across all components

that they were aware of the differences between recommendations, decisions and authorisation and knew "who did what". Members of higher-level committees saw their role as one of guidance and support in response to robust investigation of decision options which they expected to occur at the lower-level 'decision-making' committees. In contrast, some lower-level committee members admitted to being confused about the concepts of 'decision' and 'recommendation'; some saw their role as 'recommending' a course of action with the 'decision' being made by a higher-level committee, the opposite of the senior decision-makers' perspective. Senior individual decision-makers reported 'authorising' the decisions of their subordinates, while lower-level individual decision-makers did not always know who to report a decision to and whether formal authorisation was required.

Monash Health had specific requirements related to governance of resource allocation. These included policies and procedures for decision-making, a requirement for conflict of interest to be included as a standing item on the agendas of relevant committees, and reporting requirements were outlined in committee Terms of Reference. There was less formal governance of individual decision-makers.

There were no requirements for quality improvement in decision-making systems and processes. At the program level it was noted that *"since there was no formal decision-making process, there was no process of review"*.

2. Administration

The elements of administration are relationships, coordination, communication, collaboration, delivery of the administrative activities, organisational requirements for these elements and the people who undertake them (Table 1).

Another strong message from Monash Health respondents was the potential for duplication and gaps in decision-making and implementation due to a lack of coordination, communication and collaboration. Many committee members reported a lack of awareness of the roles and responsibilities of other committees and a lack of referral and other communication processes. Similarly, many project staff noted the need for coordination between projects and better communication of their activities and subsequent findings within the organisation. Individual decision-makers reported that they communicated with colleagues but also noted failure of others to communicate with them.

Other than reporting structures, there were few formal relationships between decision-making groups and individuals. There were no organisational requirements regarding administration of decision-making.

3. Stakeholder engagement

The elements of stakeholder engagement are identification, recruitment and engagement and the organisational requirements for stakeholder involvement (Table 1). Monash Health had no organisational requirements for stakeholder engagement in these settings.

There were many examples within Monash Health of multidisciplinary representation in decision-making groups and efforts to include representatives from departments, units and sites that would be affected by decisions. However there was also a strong message about the current lack of consultation with the relevant clinical groups when decisions were made by managers. Decision-making *"in isolation"* was noted to be a problem in multiple settings and *"fragmentation"* and a *"silo mentality"* were used to describe decisions made without consideration of the areas they will impact upon or consultation with relevant stakeholders. While inclusion of, or consultation with, all internal stakeholders in decision-making processes was widely supported, there were some difficulties in finding adequate staff time to enable this.

In contrast, the Technology/Clinical Practice Committee (TCPC) responsible for oversight of introduction of new technologies and clinical practices (TCPs) was the only group that included consumer representatives [59]. Although there was support for consumer participation, and several committees were either planning to introduce a consumer representative or became interested during the interview process, several others were unsure about the benefits of consumer participation and some thought that because of the nature of the topics they considered it was inappropriate to include consumers.

Page 9 of 21

4. Resources

The elements of resources are funding sources, allocation of staff time, access to experts or ways to gain expertise, information sources such as evidence from research and local data, and organisational requirements for resources (Table 1).

A lack of resources was reported across all the components, but was particularly emphasised in the context of administration of committee functions.

Monash Health had generic support staff such as librarians and business managers, and also allocated staff with expertise in health technology assessment, data analysis and finance to assist decision-makers. Provision of expertise to support applicants was formalised for the TCPC [59], but there were no other organisational requirements for provision of resources.

The distinction between funding for decision-making, implementation and evaluation processes and funding for equipment purchases was acknowledged; but respondents noted two inherent links. Firstly, effective decision-making and prioritisation for large equipment purchases requires strategic coordinated planning which in turn requires the availability, and knowledge of, "consistent, ongoing, guaranteed capital funding". Secondly, availability of ongoing funding and knowledge of potential funding sources is required in the decision-making process as, in addition to the capital costs of purchasing equipment, decision-makers must also consider costs of training and ongoing costs such as consumables. Respondents noted lack of strategic planning, lack of future funding plans and lack of funding for training and consumables as significant barriers to effective decisionmaking at Monash Health.

5. Decision-making

The elements of decision-making are scope and type of decisions, requirements for and methods of decision-making, and the decision-makers themselves (Table 1). Decision-makers were clearly identified and the scope of their decisions well-documented, however Monash Health had no requirements for any other aspect of decision-making.

5.1 Decision-makers Although clinical decisions about use of TCPs for individual patients at the micro level have major implications for implementation of disinvestment and other resource allocation decisions made at macro and meso levels [60–62], they were beyond the scope of the SHARE Program which was focused in the meso context. Clinical decisions are included in the overview for completeness but were not investigated in this study (Table 2).

At the meso level, decisions are made on behalf of the organisation. At Monash Health, the authority to make

Table 2 Decision-makers and scope and types of decisions for resource allocation

DECISION-MAKERS

Clinicians

Health practitioners delivering patient care.

Authorised individuals

Authorised individuals include Board Members, Executive Directors, Directors and Managers at all levels within the organisation. They are designated by their role in the organisation, for example 'Director of Pharmacy', rather than as a named individual 'John Smith'.

Authorised groups

Authorised groups can be classified into those with

- ongoing roles and responsibilities for decisions such as the Board, Executive Management Team, Standing Committees, Approved Purchasing Units and Profession-specific groups such as the Nursing Executive.
- a specific, often time-limited, purpose such as a project Steering Committee, a Procurement Evaluation Committee to purchase a large piece of equipment and special initiatives like the High Cost Drugs Working Party of the Therapeutics Equivalence Program.

SCOPE OF DECISIONS

Clinicians make decisions for individual patients within the limits of parameters outlined in their position description, relevant professional standards and any local credentialing requirements.

Authorised individuals and groups make decisions on behalf of the organisation which impact on all patients, all staff or identified subgroups.

Individuals are authorised to make decisions on behalf of the organisation within a range of specified parameters outlined in their position description or the Authority Delegation Schedule.

Committees and other groups are authorised to make decisions on behalf of the organisation as stipulated in their Terms of Reference.

Examples of the parameters decision-makers are authorised to work within include, but are not limited to, location (eg South East sites), professional group (eg occupational therapists), specialty area (eg stomal therapy), patient group (eg children), nature of purchase or resource use (eg surgical equipment and consumables) and cost limit (eg up to \$10,000).

TYPES OF DECISIONS

Clinical

• Clinical decisions arise in the encounter between a health practitioner and an individual patient or client. Their purpose is to assess, treat and/ or plan ongoing management of a health issue.

Strategic, operational or professional

- Strategic decisions point the organisation in the direction it wants to go; they are captured in strategic goals and policies which reflect a particular position, priority or plan the organisation wishes to communicate to staff, patients and other stakeholders. Strategic planning is usually undertaken at organisation-level driven by the Board, Executive and Senior Managers but can also be undertaken at any level.
- Operational decisions make the strategic goals happen; they enable day-to-day operations and are undertaken by managers at all levels.
- Professional decisions address standards and methods of practice and are made by senior staff in the discipline to which they are relevant.

Routine, reactive or proactive

- Routine decisions are made on a regular basis; examples include annual budget setting processes, monthly committee meetings and reviews of guidelines or protocols at specified intervals after their introduction.
- Reactive decisions are made in response to situations as they arise; for example new legislation, product alerts and recalls, critical incidents and applications for new drugs to be included in the formulary.
- Proactive decisions are driven by information that was actively sought for this purpose such as accessing newly published research evidence to compare against current practice or interrogating local data to ascertain practices with high costs or high rates of adverse events.

Conditional or unconditional

- Conditional decisions specify requirements to be met before or after their implementation; for example availability of funding, clinical indications (eg disease/condition, severity, patient group), authorised practitioners (eg specific training, named individuals), monitoring of outcomes (eg patient outcomes, adverse events, costs), location (eg ICU, Hospital in the Home), time limitation (eg until 2 year review).
- Unconditional decisions have no requirements.

Allocating funds or non-monetary resources

- Allocating funds involves spending money or putting it aside to purchase specified items later.
- Allocating non-monetary resources can include rostering staff time; specifying health professional groups; providing clinic or operating room time; and developing protocols that direct use of clinical interventions, equipment, drugs, diagnostic tests and referral mechanisms.

Table 2 Decision-makers and scope and types of decisions for resource allocation (Continued)

Whether to buy or what, where and how to buy

- 'Whether to buy' is a decision about what is required, for example a new drug to improve patient outcomes, a new scanner to reduce waiting time, consumables for a piece of equipment in current use. These decisions are undertaken by authorised individuals and some of the authorised groups such as Technology/Clinical Practice Committee, Therapeutics Committee, Falls Prevention Committee, etc.
- 'What, where and how to buy' is a decision about how the requirement is met and considers product and manufacturer reliability, availability of parts and tools, service and maintenance contracts, IT requirements for hardware and software, price negotiations, etc. These decisions are undertaken by the Approved Purchasing Units and groups established for specific purchases.

Purchase of budgeted or unbudgeted items

- Decisions to purchase budgeted items are made by the relevant authorised individual, usually the budget holder or their line manager depending on the purchase price and the designated cost limits of their respective approval levels (eg < \$10,000, <\$50,000).
- Decisions to purchase unbudgeted items can only be approved by specified committees and Executive Directors

decisions on behalf of the organisation was delegated to specified individuals and groups (Table 2). Authorised individuals are designated by their role in the organisation and include Board Members, Executive Directors, Directors and Managers at all levels within the organisation. Authorised groups include the Board, Executive Management Team, Standing Committees, Approved Purchasing Units, profession-specific groups such as the Nursing Executive and specific purpose groups such as project working parties.

5.2 Scope and types of decisions Decisions can be described in a number of ways. The scope and types of resource allocation decisions identified by Monash Health staff are summarised in Table 2.

The scope of decisions that can be made on behalf of the organisation is documented; this is stipulated in position descriptions or the Authority Delegation Schedule for individuals and the Terms of Reference for committees and other groups.

Decisions can be described from many perspectives such as Strategic, operational or professional; Routine, reactive or proactive; Conditional or unconditional; Allocating funds or non-monetary resources; Whether to buy or what, where and how to buy; Purchase of budgeted or unbudgeted items. These are defined in Table 2. A single decision can be more than one type; for example a decision could be 'reactive' in response to a critical incident, 'operational' as it involves day-to-day management activities, and result in 'allocation of non-monetary resources' such as increasing staffing levels in the area of the incident.

5.3 Identification of need/application Resource allocation decisions in all settings were made reactively in response to situations as they arose. These can be described in three main groups.

• Government or externally mandated change such as new legislation, regulation or standards; national or state initiatives; and product alerts and recalls.

- Clinician or management initiatives arising from awareness of successful projects elsewhere, conference presentations, journals and other publications, and drug and equipment manufacturer promotions.
- Problem solving driven by critical incidents, staff or consumer feedback, changing population needs, changing demand for services and budget shortfalls.

Three committees had application processes; the others did not have formal processes but considered issues brought to the attention of committee members.

Two groups used benchmarking against national, state and local audits in their area of practice as a proactive mechanism to identify a need for change. No other proactive approaches to examining evidence from research or data that might direct, prioritise or inform decisionmaking were identified.

Disinvestment was not considered as a reason for change per se but activities to remove, reduce or restrict resources were instigated by factors in the three groups above.

5.4 Decision-making criteria Only one committee (TCPC) and one individual decision-maker used explicitly documented criteria for decision-making. It could be argued that the application forms and business case templates of other committees contained 'proxy' criteria, although the decision-makers were not bound to address them all and applicants did not always complete the whole form. Many respondents reported that they had *"mental checklists"* of criteria they usually considered when making decisions regarding allocation of resources. Examples of criteria used in a range of settings are presented in Table 3.

5.5 Ascertainment and use of evidence All committees and most individual decision-makers identified evidence from research and local data as key elements needed for decision-making; however only the TCPC required

WHETHER TO BUY				WHAT, WHERE AND HC	DW TO BUY	
Organisation-wide Committee	Program Committee	Department	Individual decision-makers	Approved Purchasing Units	Organisation-wide Committee	Department
Introduction of new health technologies and clinical practices	Purchase of capital equipment	Purchase of capital equipment	Determination of clinical practices and purchase of clinical equipment	General purchasing	Purchase of clinical consumables	Purchase of pharmaceuticals
Explicit criteria required for decision-making	Criteria 'usually' considered A weighted ranking is used for prioritisation	Theoretical 'ideal' criteria developed in workshop (different to criteria used in current practice)	Criteria 'usually' considered	Criteria 'usually' considered	Criteria 'usually' considered	Criteria 'usually' considered
 Conflict of interest (Applicant and Committee members) Evidence of safety, effectiveness and cost-effectiveness (quality of evidence, size of effect and applicability addressed) Cost Clinical feasibility (resource implications, training, credentialing and competency assurance addressed) Access and equity Legal and ethical implications Suitable patient information brochure 	 Equipment serviceability and impact Clinical risk Occupational Health and Safety risk and Safety risk Accreditation and requirements Frategic importance to Monash Health Savings in operational cost and/or ability to generate funds Improved access 	 Workload management Clinical evidence Patient benefit Need Prioritisation of patient groups Waiting list Benchmarking Replacement for obsolescence Staff capacity Allocated budget Ongoing costs Funding opportunities Financial benefit to health service Multi-use of expensive capital condination 	 Quality and safety/ clinical risk Reducing complications Ease of use Staff capacity Cost/cost effectiveness Consumer demand Delivery time of machines Brand changes (implications for spare parts, training, etc.) Training needs of staff and consumers Quality of care 	All APU purchase decisions are made with commercial/ financial consideration including Price - Cost-effectiveness orbain efficiencies Chain efficiencies Chain efficiencies Chain efficiencies Chain efficiencies Chain efficiencies Considered - Clinical need - Legal issues including Health Purchasing Victoria contract requirements	 Price Australian standards and regulations for quality and safety Infection control/ Occupational Health and Safety standards Serviceability Business administration such as supply chain and logistics Meets organisation's clinical emphasis and infrastructure requirements Clinical acceptability and effectiveness 	 Labelling Quality Price Pharmaceutical Benefit Scheme status Acceptance

ascertainment of evidence and data in decision-making and explicitly considered the quality and level of evidence used [59]. Research evidence was considered to include assessments of safety, effectiveness or cost-effectiveness. Respondents acknowledged a number of difficulties in accessing and appraising evidence and the frequent lack of evidence for the question being addressed.

Although interviewees were asked whether they used evidence in decision-making and if they assessed the quality of the evidence; these concepts were not defined in the interview process. The responses suggested that their understanding of evidence, evidence-based processes and critical appraisal was not consistent with current research definitions. Respondents did not report using Level 1 research evidence from sources such as systematic reviews or national guidelines. They did not follow any processes to seek the best available evidence. Some mentioned that the committee had "experts who know the evidence" and some individuals noted that department heads "know the research in their areas". Therefore, although we have reported that research evidence was used by most decision-makers, we cannot be sure that it was the best, most appropriate evidence for the decision.

5.6 Reminders and prompts to consider disinvestment The TCPC had an item on the application form asking which current practices could be discontinued when the new TCP was introduced [59]. No other reminders or prompts to consider disinvestment were identified. There was some scepticism about this process: "It's all very well to ask the question but it's very hard to get a clinician to say they will stop doing something".

5.7 Deliberative process Some, but not all, committees required a quorum for decision-making. There was a general sense that committee decisions were achieved through consensus, but many respondents perceived that decisions were often made outside the committee process or were influenced by lobbying. No specific frameworks or methods for deliberation were identified. There were no organisational requirements for these or any other elements of a deliberative process.

5.8 Documentation and dissemination The TCPC published 'Decision Summaries' on the internet and disseminated these through a formal distribution process [59]. One committee did not have any written records of their decisions. The others fell between these extremes, recording minutes or action statements which were not published but could be available on request. The content or

quality of documentation was not investigated in this study.

Methods of dissemination included routine meetings, emails, phone calls, memos, clinical handover sessions, education sessions, newsletters (Pharmacy, Chief Executive, Director of Nursing, Medication Safety), nursing communication book, night shift communication book, department website, committee reporting structures, presentations at Grand Rounds, conference papers and posters. Most of these elements were reported by respondents in all settings.

6. Implementation

The elements of implementation are purchasing, guideline and protocol development, practice change, the requirements and methods for these activities and the purchasers, guideline developers and project teams undertaking them (Table 1). Not all elements are required for each decision, for example a purchase may not be involved or a new guidance document may not be required.

All of the information about implementation came from staff undertaking projects mostly initiated within departments. No committees had processes for active implementation of their decisions, some were unclear about whether they were responsible for implementation and others knew they were responsible but had no resources to implement.

6.1 Purchasing Monash Health mandated 'separation of function' where at least two independent individuals or groups were involved in the purchasing process, one to determine whether to buy, the other to determine what, where and how to buy. Only the Approved Purchasing Units could purchase products and services. Examples of the criteria used in purchasing decisions are outlined in Table 3.

This process generally worked well, however lack of communication was also noted between clinicians and managers making decisions to buy and the purchasers enacting them. Having made a decision to purchase, clinicians and managers did not always consider purchasing requirements and often went directly to manufacturers, resulting in either substandard contract outcomes or duplication of effort when it had to be done again. Purchasers assumed that clinicians and managers had considered all the appropriate evidence and other relevant criteria in their decision-making but had no systematic methods to check this, resulting in purchases of potentially inappropriate or ineffective products.

6.2 Policy and guidance development Some decisions trigger introduction of new, or changes to existing, policies and many, particularly those related to allocation of

non-monetary resources, are implemented through local guidelines and protocols. Use of policy and guidance documents was generally accepted and viewed positively.

6.3 Practice change It was widely acknowledged that projects to implement practice change require skills in project management and change management and that these were generally lacking.

Training and education activities and *"champions"* were routinely used as implementation strategies and were reported to be effective in achieving change and sustainability of the intervention.

7. Evaluation

The elements of evaluation are the type and sources of data collected, requirements and methods of evaluation and the evaluators (Table 1).

Evaluation was highly valued by respondents from all groups, but frequently not undertaken. There were no organisational requirements for evaluation of decisions or projects and only two of the ten projects included evaluation in their project plans. Government funded projects and some committees had their own requirements for evaluation.

Like practice change, it was acknowledged that specific skills were necessary but generally lacking, and lack of resources was reported to be a significant barrier to evaluation.

Analysis of the interview findings identified that there was insufficient information in some of the responses to separate types and sources of data, for example Medication Safety Audits are a source of data but we do not know what types of data were collected using this instrument. Examples of sources of evaluation data used by committees are summarised in Table 4 using the categories from the scanning taxonomy and, where the information is available, details on the types of data collected are also included. In addition to accessing routinely-collected data, some projects collected their own data specific to the project objectives.

8. Reinvestment

Reinvestment of resources was viewed as an incentive for disinvestment; however the lack of transparency and consultation in reinvestment of savings was seen as a barrier.

Respondents noted the need for planning for reinvestment. Although the act of reinvestment occurs at the end of the sequence, decisions about whether savings are the primary objective of the process or anticipated as a secondary outcome, how they will be achieved and measured, and where they will be reinvested must occur at the beginning. Reinvestment must be addressed in the decision-making, implementation and evaluation phases if it is to occur.
 Table 4
 Examples of types and sources of evaluation data used by committees

Process (implementation) and Impact (practice change)

- Progress Reports for new TCPs including number of patients treated, number waiting, new referrals (6 monthly)
- · Medication safety audits (twice yearly)
- Continual Review Evaluation through Australian Council of Healthcare Standards Guide (dates in Nursing Strategic Plan)
- · Established surveillance mechanisms of transfusion practices (ongoing)
- Audits of transfusion practice (random, on behalf of Department of Human Services)
- Incident reports (as they arise, documented in Riskman software)

Practitioner outcomes

- Survey/interview data including user satisfaction and comments (after project implementation)
- Clinical practice audits (quarterly)
- Incident reports (as they arise, documented in Riskman software)

Patient outcomes

- Progress Reports for new TCPs including patient outcomes and adverse events (6 monthly)
- Reports of adverse events related to new TCPs (at the time of occurrence)
- Infection Control surveillance mechanisms (ongoing)
- Incident reports (as they arise, documented in Riskman software)

Economic outcomes

- Clinical Information Management databases of routinely-collected data
 used to assess
- Cost of falls and falls-related injuries (as required)
- Cost of increased length of stay (as required)
- Costs of products (as required)
- Costs of procedures (as required)

System outcomes

- Applications for new TCPs including anticipated implications of new TCP on other areas such as intensive care or pharmacy
- Reports of 2 year review after introduction of new TCP including actual implications of new TCP on other areas

Respondents reported that resource savings are difficult, in some cases impossible, to measure due to health service accounting practices. Budget-holding cost centres are linked to sites, departments, wards, pharmacy, diagnostic services, operating suites, intensive care units and similar entities. Use of a single health technology or clinical practice involves multiple cost centres and the level of detail required to isolate information within a cost centre for an individual TCP is not available.

Approaches to measuring savings were reported to be too superficial and often did not consider lateral impacts: "We don't look far enough for downstream effects; we're too simplistic in assessment of savings". Also "Cost saving measures in one area can result in increased costs *in another area*"; for example a practice change may reduce the length of stay (LOS) but the patients require additional outpatient services. When a project in one department increased costs in another, reallocation of savings to the project department was thought to be unfair.

Financial savings are often theoretical and never become realised. This is particularly evident when the savings are made in bed days, clinic time or operating sessions which are immediately used to treat other patients. Reducing LOS or waiting times for clinic appointments and surgery has considerable benefits, to patients and the health service, but because there are always patients waiting to use the services there are no actual monetary savings. Savings are only realised if the beds, clinics or operating rooms are closed. In addition, the cost per day of a hospital bed is greater at the beginning of an admission than at the end, so reducing the LOS of a group of patients by discharging them a few days earlier is likely to increase total costs if the beds are used for new admissions of higher acuity.

The SHARE Steering Committee was keen to establish and support measurement of savings and methods for reinvestment and proposed flexibility and lateral thinking in development of novel methods and indicators.

What factors influence resource allocation processes?

The findings are collated and classified using categories from the scanning taxonomy (Fig. 2), to which the components of the resource allocation process (Fig. 3) have been added. Full details are provided in Additional file 2.

Strengths and weaknesses

Respondents noted that Monash Health had considerable strengths, but also many opportunities for improvement. One of the main strengths was that decisionmakers recognised the weaknesses and wanted to see improvements in transparency and accountability; standardisation of practice; use of explicit decision-making criteria including evidence; stakeholder consultation; information about "who does what, how the process works and why"; communication, coordination and collaboration between decision-makers; provision of adequate and appropriate resources; and active implementation and evaluation of outcomes. However there were also notable exceptions; some doctors did not want to be restricted by specified criteria or requirements to find evidence for their decisions and several respondents thought that consumer representation on committees was unnecessary or inappropriate.

Barriers and enablers

Interviewees were asked specifically about barriers and enablers that influenced decision-making, implementation and evaluation. Some factors were reported as both a barrier and an enabler; in situations when the factor was present it was reported as a barrier or enabler, and when absent was noted as the reverse. Only the responses received have been recorded, but additional barriers and enablers can be inferred by considering the positive or negative alternatives of those reported.

Many of the barriers and enablers identified by this specific question were also mentioned in response to other questions by interviewees who did not include them in their answer about barriers and enablers. In addition, many other factors that could be considered barriers and enablers emerged from the general responses but not from the specific question. Because of this overlap, separating the factors identified by the specific question about barriers and enablers from the other influencing factors may be a false distinction. To report only the responses to the question about barriers and enablers would not convey all the potential barriers and enablers to resource allocation in this setting, and to add barriers and enablers identified in responses to other questions would require an interpretation from the researchers that may not be appropriate.

Although not synonymous, strengths are aligned with enablers and weaknesses with barriers. The barriers, enablers and other influencing factors have been combined with the strengths and weaknesses in resource allocation at Monash Health (Additional file 2). Specific responses to the barrier and enabler question are identified by italics.

As expected, the well-established generic barriers to effective evidence-based decision-making, implementation and evaluation such as lack of resources, particularly time and skills, lack of evidence and data, clinical autonomy and resistance to change were present at Monash Health, however many new factors specific to resource allocation in the local healthcare setting were identified. Some examples include lack of organisational requirements for rigorous practices in decision-making, implementation or evaluation; lack of support for administration of committees and the high workload involved; perceptions that corporate criteria take preference over evidence of safety, effectiveness and cost-effectiveness: "what the hospital is concerned about – finances, organisational capacity and risk management and what the clinician is concerned about – patients"; difficulty taking off "clinician hat" and replacing it with "manager or decision-maker hat"; lack of funding for training on new equipment; requirement to buy particular items or brands if they are specified in the state government purchasing catalogue although it is not evidence-based; difficulty measuring and simplistic approach to resource savings; difficulty realising financial savings; and lack of planning and consultation for reinvestment.

Differences between medical and nursing decisions

There were notable differences in the decision-making practices of the doctors and nurses interviewed.

There were more levels of accountability and pathways for operational and clinical support and oversight of nursing decisions compared to medical decisions. Nursing staff reported a hierarchy of decision-making and reporting within the program, the site and the organisation. In the clinical program selected, the Medical Program Director gave the medical department heads sole accountability for their decisions as he considered they were the most senior experts in their specialty areas.

Nurses reported making more decisions about changing policies and procedures and fewer decisions regarding large equipment purchases; doctors reported the reverse.

For the individual decision-makers, there was a general feeling among medical interviewees that decisions were made in the best possible way without the use of consistent, explicit, documented criteria and that efforts within the organisation to introduce this encountered resistance. Conversely, some nursing staff welcomed the use of documented criteria for the potential benefits of increasing transparency, standardising practice, decreasing the unintended consequences of some decisions and reducing adverse events.

While research evidence and local data were valued in decision-making for both groups, nursing staff reported the use of local data more often than medical staff. Medical staff noted the use of research evidence in guiding decisions more often than nurses, and also commented on the shortage of research evidence in many of their specialty areas.

What knowledge or experience of disinvestment exists within Monash Health?

Although the term 'disinvestment' was generally unfamiliar, the concept was readily understood by participants. There were multiple settings for explicit and systematic consideration of investment, but no setting was identified that overtly considered disinvestment. Although disinvestment-related decisions to remove, reduce or restrict current practices were undertaken, they were driven by quality and safety proposals, evidence-based practice or a need to find resource savings, and not by initiatives where the primary aim was to disinvest.

Projects involving disinvestment-related activities were easily identified. The ten projects included ranged from small department-level activities to organisation-wide initiatives (Additional file 1: Table A). Most were instigated by department heads and completed within existing departmental budgets.

Interviewees provided a range of reasons for undertaking the projects; these included reducing patient harm, reducing medication error, reducing unnecessary tests, improving communication, standardising care, saving money and saving time. Most projects had more than one of these objectives. Projects were initiated by external mandate, awareness of good practice elsewhere or in response to an internal problem.

Almost all of the responses from project staff regarding implementation would be applicable to any type of change and were not related to the nature of disinvestment. There were only two disinvestment-related references: an expression of frustration arising from the lack of information about how savings were reinvested and an observation that doctors "don't care" about healthcare costs which makes money-saving exercises "hard to sell".

Reflections regarding disinvestment from the committee representatives and individual decision-makers focused on two areas: savings and reinvestment.

Discussion

Limitations

The consistency of messages from respondents in a range of professions, positions and decision-making settings provide triangulation for internal validity, however there are some potential limitations to external generalisability and possibility for bias. Only one organisation is represented, and there may be many points of difference with other health services. However many of the findings are similar to research in other decisionmaking contexts. The details of the 'where, who and how' of decision-making will vary between organisations but most of the principles should be the same; individuals and groups will make decisions under certain conditions which can be elucidated for each institution. Selection bias could affect our conclusions if the lack of central documentation of relevant committees and projects prevented ascertainment of all relevant groups or if the single program and department chosen were not representative of their counterparts. It is reassuring that the main messages were consistent across all settings, there were no inconsistencies between groups, but there was some variation within groups suggesting that a range of opinions were captured. To minimise interview bias, records of interview were sent to interviewees and workshop reports were sent to participants. Some interviewees corrected errors or added factual information.

Because this study investigated how decisions were actually made, and sought information from the decisionmakers themselves, the lack of consumer participation in the process was reflected in their limited involvement in this study. The only contributions were from the two consumer representatives on the SHARE Steering Committee who attended the workshops. Potential methods and opportunities for consumer engagement in organisational decision-making are explored in Paper 4 in this series [46].

Contribution of this study

Systems and processes for resource allocation

Most of the literature on disinvestment and resource allocation concentrates on the process of making decisions. Although decision-making is a key component of resource allocation, this study highlights seven additional components required for achievement of this task. To our knowledge, this is the first paper reporting this level of detail regarding decision-making settings, decisionmakers, scope and type of decisions, strengths and weaknesses, barriers and enablers, and criteria used for allocating resources within a local health service.

Decision-makers

In many studies of decision-making, participants are selected from senior positions such as commissioners, board members, Chief Executives, vice presidents, Finance Directors and other executive and senior management roles [10, 23, 30, 63–68]. At Monash Health, resource allocation decisions were not only made by executives and senior managers, they were also delegated to authorised groups and individuals throughout the organisation. It was also clear in this example that senior staff did not always have a full understanding of processes at lower levels.

In previous research, resource allocation has sometimes been considered to be a homogenous process within an institution; for example survey participants at macro and meso level have been asked whether 'the resource allocation process' in 'their organisation' was fair, whether evidence was considered, or what criteria were used, implying that there was only one decision-making process [10, 63, 64]. However this study found considerable variation in systems and processes within a single health service; criteria varied in nature and scope and ranged from formal documented requirements to "*mental checklists*"; and there were no central sources of information about "*where, who and how*" decisions were made.

These findings suggest that decision-making infrastructure is much more complex than generally portrayed, that there may not be a single way of doing things within large institutions and that we may not be able to generalise from the knowledge and experience of senior respondents.

Types of decisions

There are many types of decisions which have not previously been discussed in the literature in this context (Table 2), all of which offer potential to explore and initiate disinvestment.

It is clearly important to investigate decision-making mechanisms for spending on multi-million dollar equipment purchases, however little attention has been paid to decisions that spend millions of dollars on frequently used low-cost items. Millions of cannulae, catheters, dressings and similar consumables are used every year in large facilities. Consideration of safety, effectiveness, cost-effectiveness, ease of use and amount of staff time required in the use of these items provides further disinvestment opportunities and potential for improved outcomes and significant cost saving.

Decisions can be made about spending or saving money, or about allocating non-monetary resources. Most of the research has been on how funds are distributed but decisions that direct the use of drugs, equipment and diagnostic tests; specify health professional groups and referral mechanisms; and allocate staff time and capacity in clinics, operating rooms and other facilities have major impact on resource use. These decisions are made in different settings and by different decision-makers than those making financial decisions and are often implemented through local guidelines and protocols. There are opportunities for systematic consideration of disinvestment in all of these activities [9].

Criteria for decisions

Lists of criteria for prioritisation and decision-making at macro, meso and micro levels have been published [2, 22, 24–26, 28–30, 66, 69]. This study illustrates the variation in criteria used by meso-level decision-makers in different contexts within the same institution and the differences in criteria between those deciding 'whether to buy' and those deciding 'what, where and how to buy' (Table 3).

Implications for policy and practice Strengths and weaknesses

Monash Health is not unique in the nature or extent of these findings. These issues have also been identified in a range of decision-making contexts [10, 13, 23, 30, 63–68, 70–77]. Current authors reviewing, debating or investigating disinvestment and resource allocation also note similar needs for improvement in decision-making systems and processes [12–14, 16–18, 25, 26, 28, 60, 78–92].

Opportunities for disinvestment

Although there were multiple settings for formal and informal decision-making about resource allocation, with the exception of the TCPC application form, none of these expressly considered disinvestment. The current systems were not sufficiently rigorous or standardised to introduce processes for disinvestment, particularly in situations where there was no precedent for using explicit criteria in decision-making. Addressing the limitations in routine decision-making practices would be required as a first step towards evidence-based consideration of disinvestment.

The new framework for resource allocation provides a scaffold on which to build a systematic approach to disinvestment.

The practice elements of the framework provide opportunities to introduce triggers, prompts or even mandatory requirements to consider disinvestment, for example:

- decision-making contexts such as meeting agendas, strategic planning, budgeting, explicit decisionmaking criteria, application forms, development processes for guidelines and protocols, and authorisation processes
- implementation contexts such as purchase orders, guidelines and protocols, clinical paths, checklists, communication strategies and education programs
- evaluation contexts such as development of performance indicators, audits and reviews

The structural elements within the decision-making component could be used in a similar way, for example:

- decision-makers could be targeted for training to be aware of disinvestment possibilities or provided with examples of successful disinvestment initiatives
- types of decisions could be explored for disinvestment opportunities
- requirements for consideration of disinvestment could be introduced into documents governing scope of decisions such as position descriptions and committee Terms of Reference.

Monitoring, evaluation and improvement of systems and processes

Quality improvement in clinical practice and service delivery is well-established and routinely conducted in healthcare facilities. The same cannot be said for quality improvement in organisational decision-making, although it has significant influence on clinical practice and service delivery. All of the components in this framework can be monitored and evaluated and the findings used for improvement.

Active implementation and evaluation of decisions

There is a large body of research on decision-making for resource allocation, and a substantial volume of literature on implementation of clinical practice change and evaluation practices, but little on implementation and evaluation of resource allocation decisions. This study demonstrates that it was not uncommon for decisions to be made in our health service without any plans for implementation and, in most cases, not to be evaluated at all. There is considerable opportunity for development of policies and practices for implementation and evaluation of resource allocation decisions.

Implications for research

Many of the findings from this study are the first of their kind hence, although they provide more information than was previously available, they require confirmation or refutation in subsequent studies.

Investigation of decision-making processes and methods of stakeholder engagement are established fields of research, and some work has been undertaken in the context of disinvestment and resource allocation, however the new information from this study regarding the settings, scope and type of decisions; variation in criteria used; strengths, weaknesses, barriers and enablers; and the opportunities to integrate systematic consideration of disinvestment into the decision-making infrastructure has opened up new research possibilities in these areas.

Methods for guideline development, implementation and evaluation have all been well-researched, but not in the context of resource allocation, and there has been little, if any, investigation of all the other elements of structure and practice in the eight components of the resource allocation process [12, 13, 23, 67]. These are also potential areas for future research.

Conclusion

Decision-making systems and processes for resource allocation are more complex than previously assumed in many studies. There is a wide range of decision-making settings, decision-makers, scope and type of decisions, and criteria used for allocating resources within a single institution. The level of detail of these and other elements of resource allocation provide opportunities for future research and changes to policy and practice.

Additional files

Additional file 1: Methods. (PDF 328 kb)

Additional file 2: Strengths and weaknesses, barriers and enablers for resource allocation processes (PDF 463 kb)

Abbreviations

APU: Approved Purchasing Unit; CCE: Centre for Clinical Effectiveness; LOS: Length of stay; SHARE: Sustainability in health care by allocating resources effectively; TCPC: Technology/Clinical Practice Committee; TCPs: Technologies and clinical practices

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Availability of data and materials

Many of the datasets supporting the conclusions of the articles in the SHARE series are included within the articles and/or the accompanying additional files. Some datasets provide information for more than one article and are only provided once; where they are not included within an article and/or the accompanying additional file, the relevant citations to the articles in which they are provided are included. Datasets have not been made available where it is impossible to de-identify individuals due to the nature of survey or interview responses or where the data is published in confidential internal reports.

Authors' contributions

CH, KA and CW designed and implemented the methods, undertook the analyses and wrote the initial reports. VB assisted with interviews and reporting. CH drafted the initial manuscript. KA, CW and VB provided feedback. All authors read and approved the final manuscript.

Authors' information

CH was the Director of the Centre for Clinical Effectiveness and the SHARE Program Director. CH completed the SHARE publications as part of an unfunded PhD. KA was the SHARE Project Manager. CW and VB were Project Officers.

Competing interests

The authors declare that they have no competing interests.

Consent for publication

Not applicable.

Ethics approval and consent to participate

The Monash Health Human Research and Ethics Committee (HREC) approved the SHARE program as a Quality Assurance activity. Further ethical review was not required as the program met the following criteria [93]:

- "The data being collected and analysed is coincidental to standard operating procedures with standard equipment and/or protocols;
- The data is being collected and analysed expressly for the purpose of maintaining standards or identifying areas for improvement in the environment from which the data was obtained;
- The data being collected and analysed is not linked to individuals; and

None of the triggers for consideration of ethical review are present." [93]
 Participation was based on the 'opt-out approach' [93]. "The opt-out approach is a method used in the recruitment of participants into an activity where information is provided to the potential participation regarding the activity and their involvement and where their participation is presumed unless they take action to decline to participate." [93] Consent to participate was approved by the HREC based on the following criteria:

- Health care providers, managers, consumer representatives, and officers within government health departments will be informed about the project and the processes and invited to participate.
- Participation in interviews, workshops and/or surveys will be considered to be implied consent.

These conditions were met.

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"Consumers should not only be the focus of the health system, they should be at the centre of decision-making in health. Both at a policy level and an individual level, consumer experiences and preferences should help lead health system reforms, alongside the evidence base."

National Prescribing Service 2008 [25]

Paper 4: Exploring opportunities and methods for consumer engagement in resource allocation

Consumer engagement was integral to the proposed program.

A literature review, interviews and workshop were undertaken to address the research question:

How can consumer and community values and preferences be systematically integrated into organisation-wide decision-making for resource allocation?

No examples of systematic methods to identify, capture and incorporate consumer perspectives into resource allocation decision-making, implementation and evaluation in an organisation-wide approach were found. However results from the literature and local research provided three novel contributions to consumer participation in resource allocation at the local health service level.

Firstly, a model to integrate consumer values and preferences into organisation-wide decisionmaking was developed building on the framework of eight components in the research allocation process proposed in Paper 3 (Figure 3). Definitions for consumer engagement terms are included.

Secondly, the concept of systematic, proactive use of consumer evidence found in publications and data sources to inform health service decisions was introduced. Examples of sources of consumer information and data are provided.

Thirdly, the need for mechanisms within health services to receive and act upon consumerinitiated contributions was identified by Monash Health respondents. This was in contrast to the literature where the focus was in the other direction, on mechanisms for communicating health service initiatives to consumers and community members.

Figure 3. Model for integrating consumer values and preferences into the resource allocation process

Reproduced with permission from SHARE Paper 4 [6]

PRINCIPLES

- Follow guidance in relevant handbooks, toolkits or guidelines for consumer engagement
- Use a combination of engagement techniques; select methods to suit the type of decision being made, the context and who will be affected
- Develop clear and specific aims, objectives and outcomes for all consumerrelated activities
- Evaluate all engagement processes, report findings and utilise outcomes for continuous improvement
- Provide consumers with as much technical and topic-specific information as possible
- Inform consumers in advance about how their contributions will be used and provide them with feedback afterwards about the outcomes

SCOPE

- Corporate, Clinical, Research
- Organisation, Program, Site, Department, Unit, Ward
- $\ensuremath{\,\bullet\,}$ Continuum of decisions from investment to disinvestment
- Routine, reactive and proactive decisions

PRECONDITIONS

- · Organisational commitment to consumer involvement
- Willingness to share power in decision-making
- Culture of mutual trust and respect
- Consumer input is valued and considered
- Accountability for the consumer engagement process

		ACTIVITIES		
Including	CONSUMER consumers and commun	ENGAGEMENT ity members in health service activities	COMPONENTS	USE OF CONSUMER
Communication Imparting or exchanging information	Consultation Seeking consumer and community views	Participation Meaningful involvement of consumers and community members in health service decision-making processes	OF RESOURCE ALLOCATION PROCESS	EVIDENCE Consumer perspectives found in publications and data sources
To consumers Communicate with consumers to advise them of decisions and	Consult with consumers to seek their opinions and advice	Develop policies and procedures Determine requirements and methods for consumer involvement and reimbursement, monitoring and evaluation of the processes	GOVERNANCE	Use consumer evidence to drive and/or inform decisions
outcomes Examples include reports, press	Examples include public meetings,	Develop methods for identifying and recruiting consumers, implementing communication strategies, and establishing relationships	ADMINISTRATION	Examples include: • Research literature
Methods and target audience will depend on the nature and context of the information	healthcare forums, consumer reference groups, focus groups, surveys and feedback forms, social media	Determine requirements to support consumer- related activities such as reimbursement and access to translations and translators Establish access to sources of consumer information Train staff and consumers regarding inclusion of consumers in decision-making processes	RESOURCES	 Consumer publications Routinely- collected data Purposefully- collected data
From consumers Establish mechanisms and designate staff to accept and act upon consumer-initiated	Methods and target audience will depend on the nature and context of the issue under	Embed consumer representation in decision- making infrastructure such as committees, working parties, guideline and protocol development groups	DECISION-MAKING	(new/existing)
contributions, feedback and suggestions	consideration	Embed consumer representation in project teams, steering committees and working groups. Determine consumer-relevant implementation strategies and evaluation measures	IMPLEMENTATION EVALUATION (REINVESTMENT)	

"Healthcare priority-setting processes are located within decision, delivery and performance management systems and this context will have an impact upon the operations and outputs of priority-setting......The risk is that priority-setting is not embedded within the broader organisational (and inter-organisational) systems."

Robinson et al 2012 [19]

Paper 5: Developing a model for evidence-driven resource allocation

The investigations in Phase One identified potential settings and methods where consideration of disinvestment could be systematically integrated into organisational infrastructure; where, how and by whom decisions were made, implemented and evaluated at Monash Health; eight components of the resource allocation process and local strengths, weaknesses, barriers and enablers; and methods to include consumer participation in these processes.

These findings were used to address the following research questions.

- > What are the implications for disinvestment at Monash Health?
- What is the most appropriate and effective approach to organisation-wide, systematic, integrated, evidence-driven disinvestment at Monash Health?
- Can a model for evidence-driven resource allocation in the local healthcare setting be derived from the Monash Health program to enable replication and testing?

The Additional file for Paper 5 is included in Appendix 3.

RESEARCH ARTICLE

Open Access



Sustainability in Health care by Allocating Resources Effectively (SHARE) 5: developing a model for evidence-driven resource allocation in a local healthcare setting

Claire Harris^{1,2*}, Kelly Allen^{1,2}, Cara Waller², Sally Green¹, Richard King³, Wayne Ramsey⁴, Cate Kelly⁵ and Malar Thiagarajan⁶

Abstract

Background: This is the fifth in a series of papers reporting Sustainability in Health care by Allocating Resources Effectively (SHARE) in a local healthcare setting. This paper synthesises the findings from Phase One of the SHARE Program and presents a model to be implemented and evaluated in Phase Two. Monash Health, a large healthcare network in Melbourne Australia, sought to establish an organisation-wide systematic evidence-based program for disinvestment. In the absence of guidance from the literature, the Centre for Clinical Effectiveness, an in-house 'Evidence Based Practice Support Unit', was asked to explore concepts and practices related to disinvestment, consider the implications for a local health service and identify potential settings and methods for decision-making.

Methods: Mixed methods were used to capture the relevant information. These included literature reviews; online questionnaire, interviews and structured workshops with a range of stakeholders; and consultation with experts in disinvestment, health economics and health program evaluation. Using the principles of evidence-based change, the project team worked with health service staff, consumers and external experts to synthesise the findings from published literature and local research and develop proposals, frameworks and plans.

Results: Multiple influencing factors were extracted from these findings. The implications were both positive and negative and addressed aspects of the internal and external environments, human factors, empirical decision-making, and practical applications. These factors were considered in establishment of the new program; decisions reached through consultation with stakeholders were used to define four program components, their aims and objectives, relationships between components, principles that underpin the program, implementation and evaluation plans, and preconditions for success and sustainability. The components were Systems and processes, Disinvestment projects, Support services, and Program evaluation and research. A model for a systematic approach to evidence-based resource allocation in a local health service was developed.

Conclusion: A robust evidence-based investigation of the research literature and local knowledge with a range of stakeholders resulted in rich information with strong consistent messages. At the completion of Phase One, synthesis of the findings enabled development of frameworks and plans and all preconditions for exploration of the four main aims in Phase Two were met.

Keywords: Health technology, TCP, Disinvestment, Decommission, De-adopt, Resource allocation, Decision-making, Implementation, Model, Framework

* Correspondence: claire.harris@monash.edu

²Centre for Clinical Effectiveness, Monash Health, Victoria, Australia





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¹School of Public Health and Preventive Medicine, Monash University, Victoria, Australia

About SHARE

This is the fifth in a series of papers reporting Sustainability in Health care by Allocating Resources Effectively (SHARE). The SHARE Program is an investigation of concepts, opportunities, methods and implications for evidence-based investment and disinvestment in health technologies and clinical practices in a local healthcare setting. The papers in this series are targeted at clinicians, managers, policy makers, health service researchers and implementation scientists working in this context. This paper synthesises the findings from Phase One of the SHARE Program and presents a model to be implemented and evaluated in Phase Two.

Background

Health technologies and clinical practices (TCPs) are defined as therapeutic interventions (including prostheses, implantable devices, vaccines, pharmaceuticals and medical, surgical or other clinical procedures) and diagnostic procedures [1]. Most new TCPs are assessed for safety, effectiveness and cost-effectiveness before they become widespread practice. However there are many longstanding practices that were introduced before rigorous evaluation was required and some recently developed TCPs have been implemented prematurely due to early promise of large benefits, vigorous marketing and patients' and professionals' desire for 'state of the art' care [2]. As new research emerges it has become clear that some TCPs in current practice do not meet contemporary standards of evidence based care, have been superseded or have become obsolete.

Cessation of TCPs that are potentially harmful, shown to be ineffective, or where a more effective or costeffective alternative is available has the dual advantage of improving patient care and allowing for a more efficient use of available resources. This concept has become known as 'disinvestment'. While a lack of common terminology in this area has been noted [3–8], and the multiple definitions for disinvestment are based on different principles [9], the broad concept of removing, reducing or restricting practices that do not work or could be done better or more cheaply is welcome, potentially increasing health benefits without increasing spending.

After implementing a rigorous evidence-based program for assessment of new TCPs prior to their introduction [1], senior leaders at Monash Health (previously Southern Health), a large health service network in Melbourne, Australia, sought to investigate possibilities for a program of disinvestment through the 'Sustainability in Health care by Allocating Resources Effectively' (SHARE) Program. The SHARE Program was undertaken by the Centre for Clinical Effectiveness (CCE), an in-house resource to facilitate Evidence Based Practice. An overview of the SHARE Program, a guide to the SHARE publications and further details about Monash Health and CCE are provided in the first paper in this series [2].

The preliminary proposal was for a systematic approach that would integrate systems and processes for transparent, accountable and evidence-based decision-making across the health service. However there is little evidence to inform development of organisation-wide systematic approaches to disinvestment at the local level [7, 10–16].

In the absence of guidance from the literature, a twophased process was proposed to identify and then evaluate potential opportunities for disinvestment at Monash Health (Fig. 1). The aim of Phase One was to understand concepts and practices related to disinvestment and the implications for a local health service and, based on this information, to identify potential settings and methods for decision-making. The aim of Phase Two was to implement and evaluate the proposed methods to determine which were sustainable, effective and appropriate at Monash Health.

Aims

The aim of this project was to develop a proposal for an organisation-wide, systematic, integrated, transparent, evidence-based approach to disinvestment.

The aims of this paper are to outline how the information was collected, synthesised and developed into a proposal for change and to introduce a model of the program to enable replication and testing.

Research questions

What are the implications for disinvestment at Monash Health?

What is the most appropriate and effective approach to organisation-wide, systematic, integrated, evidencedriven disinvestment at Monash Health?

Can a model for evidence-driven resource allocation in the local healthcare setting be derived from the Monash Health program to enable replication and testing?

Methods

Design

Model for evidence-based change

The SHARE Program was undertaken using the SEAchange model for Sustainable, Effective and Appropriate evidence-based change in health services [17]. The model involves four steps: identifying the need for change, developing a proposal to meet the need, implementing the proposal and evaluating the extent and impact of the change. Each step is underpinned by the principles of evidence-based practice to ensure that the best available evidence from research and local data, the experience and expertise of health service staff and the values and perspectives of consumers are taken into account. Sustainability, avoidance of duplication and

SHARE Sustainability in Health care by Allocating Resources Effectively			
PHAS	E ONE	PHASE	E TWO
STEP 1 Identify need for change	STEP 2 Develop proposal for change	STEP 3 Implement change proposal	STEP 4 Evaluate outcomes of change
 What concepts, definitions and perspectives underpin disinvestment? What models or methods of disinvestment have been implemented in hospitals or health services? Where are the opportunities for systematic decisions about disinvestment in a local health service? Where, how and by whom are decisions about resource allocation made, implemented and evaluated at Monash Health? What factors influence these processes? What knowledge or experience of disinvestment exists within Monash Health? How can consumer values and preferences be integrated into organisation-wide decision-making? Take an evidence-based approact service staff, and Values and personal service staff, and Values and personal service service staff. 	 What are the implications for disinvestment at Monash Health? What is the most appropriate and effective approach to enable organisation-wide, systematic, integrated, evidence-driven decisionmaking for disinvestment at Monash Health? Can a model for evidence-driven resource allocation in the local healthcare setting be derived from the Monash Health program to enable replication and testing? 	Aim 1. Systems and Processes To develop, implement and evaluorganisation-wide systematic, tra evidence-based decision-making Aim 2. Disinvestment Projects To develop, implement and evalue • identify and prioritise potentia • undertake evidence-based disi Aim 3. Support Services To develop, implement and evalue • deliver evidence from research • build capacity in evidence-base implementation and evaluation • support staff in project conduct Aim 4. Program Evaluation, Resear • To undertake evaluation to me • To undertake action research to • To deliver a national workshop experience of disinvestment and • To disseminate learning throug ce from research and local data, Exp	uate systems and processes for insparent, accountable and uate methods to al disinvestment opportunities investment projects uate methods to in and data to decision-makers ed decision-making and in of evidence-based decisions et and administration et and Dissemination easure outcomes to understand processes to understand processes to understand processes to to share knowledge and ind develop links for collaboration gh publications and presentations erience and expertise of health ment; Avoid duplication; and
Use action research methods: Do Fig. 1 Overview of SHARE Program	cument, investigate and learn from	barriers and enablers encountered i	n the change process

integration of new processes within existing systems are also considered at each step. An action research component enables continuous investigation of the change process to improve the current project and inform future work. The research questions for this paper relate to development of a proposal for change (Fig. 1).

Framework for design and evaluation of complex interventions

The two-phased approach taken in SHARE is consistent with the UK Medical Research Council framework for design and evaluation of complex interventions [18]. Phase One involved specifying the context, understanding the problem and defining the components of an optimal intervention. Phase Two was an exploratory trial assessing acceptability and feasibility of the components and identifying methodological issues for implementation and evaluation. These two phases are mapped to the four steps in the model for evidence-based change (Fig. 1).

Data collection methods and sources

Literature reviews, surveys, interviews and workshops were used to capture the relevant information in Step 1 (Fig. 1). An overview is provided in Table 1 and full details of methods and sources are reported in Additional file 1.

Development of proposal for change *Project team reflection*

An action research approach was adopted based on the 'researcher as facilitator for change' model defined by Meyer; researchers working explicitly with and for people rather than undertaking research on them [19,

ladie I summany of data collection methods and sources		
Research Question	Method	Source
What are the concepts, definitions and perspectives that	Literature review	Health databases, Internet
underpin disinvestment? [33] What models or methods of disinvestment have been implemented	Survey of external experts	Researchers and health librarians interested in disinvestment (15 respondents)
in hospitals or health services? Where are the opportunities for systematic decisions about disinvestment	Semi-structured interviews	Executive of the Technology/Clinical Practice Committee representing Executive Directors, Senior Managers, Clinical Directors (4 members)
in a health service? [9]	Structured interviews	Key informants purposefully selected to represent Medicine, Surgery, Nursing, Allied Health, Diagnostic Services, Consumers (6 informants)
	Structured workshops	SHARE Steering Committee: Executive Directors, Senior Managers, Clinical Program Directors, Consumers (20 members)
How are decisions about resource allocation currently made at MH? What factors influence decision-making for resource allocation? [1, 29] What knowledge or experience of disinvestment exists within Monash Health? [29]	Structured interviews	Representatives of committees with mandate to make organisation-wide decisions (13 committees), Managers of Approved Purchasing Units (5 managers), Program Directors, Medical Department Heads, Nurse Unit Managers and a Quality Manager in a clinical program with high use of TCPs (9 managers)
	Structured interviews	Representatives of current or completed projects that involved disinvestment-related activities (10 projects)
	Structured workshops	SHARE Steering Committee: Executive Directors, Senior Managers, Clinical Program Directors, Consumers (20 members)
	Structured workshop	Decision-makers from a large multi-campus diagnostic service (18 participants)
	Document analysis	Victorian Department of Human Services and Monash Health documents
How can consumer values and preferences be integrated into	Literature review	Health databases, Internet
organisation-wide decision-making processes? [30]	Semi-structured workshops	Consumer Working Group (3 experienced health service consumer representatives and project team members)
	Structured interviews	Staff responsible for consumer-related activities (2 managers)
	Structured interviews	Representatives of committees with mandate to make organisation-wide decisions (13 committees); Managers of Approved Purchasing Units (5 managers); Program Directors, Medical Department Heads, Nurse Unit Managers and a Quality Manager in a clinical program with high use of TCPs (9 managers)
What do MH decision-makers need to enable access and utilisation	Literature review	Health databases, Internet
of evidence in decision-making? [31]	Structured interviews	Program Directors, Medical Department Heads, Nurse Unit Managers and a Quality Manager in a clinical program with high use of TCPs (9 managers)
	Electronic survey	Clinicians and senior managers representing all sites, clinical programs and professional groups (141 respondents, 103 surveys fully completed)

20]. In this capacity, CCE staff were both the SHARE project team and the action researchers.

CCE staff had regular and ongoing contact over many years with clinicians and managers involved in projects across Monash Health and were familiar with organisational practices, expertise of project staff, available resources, project methods and outcomes. As the SHARE project team, they were able to contribute this knowledge in discussions and decision-making settings.

Observations and reflections of the project team were used for ongoing improvements to the program components and implementation process. An agenda item for 'Learning' was scheduled at the beginning of every team meeting. Participants were invited to consider anything that had affected the project since the last meeting using the framework 'what worked, what didn't, why and how it could be improved'. Each issue, its effect on the project and potential changes that would build on positive outcomes or remove or minimise future problems were discussed. The learning and actions were documented; actions were assigned, given timeframes and followed up to ensure completion.

Analysis and synthesis

Outcomes of consultations and findings from initial interviews with small numbers of participants were simply documented and collated using MS Word or Excel. Workshop and subsequent interview findings were collated in MS Word, Excel and/or Nvivo [21] and analysed thematically by either content analysis [22] to identify emergent themes, or framework analysis [23] when categories had been specified *a priori*. Details of individual project protocols are provided in Additional file 1.

Using the principles of evidence-based change [17], the project team worked with health service staff, consumers and external experts to collate and summarise the findings from published literature and local research and identify the implications for a disinvestment program at Monash Health from the emergent themes.

Drafting, review and authorisation of components and activities

Emergent themes were developed into components of the proposed program. Draft proposals, frameworks and plans were developed, reviewed and refined with input from local stakeholders and relevant experts via workshops, presentations and discussions with individuals and groups, consultations and informal discussions (Table 2). Details of structured workshops are provided in Additional file 1, Table E. Decisions were made by the SHARE Steering Committee in workshops held at scheduled committee meetings. Discussion papers and background documents were provided beforehand, formal presentations introduced the workshops, and topics for discussion and decisions required were listed on the agenda. Discussion was informal within the structure of the agenda and decisions were based on consensus. The program was endorsed by the Executive Management Team and Monash Health Board.

Assessment of sustainability

A checklist of factors for success and sustainability, adapted from the work of others [24–27] for use in CCE projects, was used to assess whether there was adequate provision of relevant requirements (structure, skills, resources, commitment and leadership) to achieve and maintain the program components and activities (Table 3) [17].

Development of a model

Frameworks and models are derived from a set of concepts and the relationships between the concepts to facilitate the development of propositions. The components of the proposed SHARE Program were used as the concepts within the model. Relationships and propositions were derived from the identified needs and a set of sequential processes that emerged from the literature and local findings.

The robustness and usefulness of the proposed model were analysed using the domains outlined for this purpose by Rycroft-Malone and Bucknall [28].

Results

Results of the literature searches and the response rates and representativeness of participants in surveys, interviews and workshops are included in Additional file 1, Tables A-E. Complete surveys were received from 15 external experts and 118 local respondents, and 90 individuals participated in interviews and workshops. Many participated more than once: as either a representative of more than one role, for example as a committee chair interviewed on one topic and as a clinical department head responding to a survey on another, or to address more than one question, such as a member of the Steering Committee participating in several decision-making workshops.

Data collected from these activities informed a range of research questions. Findings related to research questions not addressed in this paper are reported in other SHARE publications [9, 29–33].

What are the implications for disinvestment at Monash Health?

Multiple factors for consideration in establishment of the new program were identified. Messages from the literature were consistent with the views of experts and local stakeholders. The findings, sources they were ascertained from, decisions resulting from consultation with stakeholders, and relevant program elements are presented in Table 4.

Objective	Method	Stakeholders and/or Experts
To explore, develop and authorise all program elements, documents and proposals	Structured workshops on specific issues and general discussions at routine meetings	SHARE Steering Committee: Executive Directors, Clinical Program Directors, Senior Managers and Consumers.
To discuss findings of literature review and Consumer Working Group, refine draft consumer participation framework and identify additional issues	Structured workshop	Monash Health Community Advisory Committee
To incorporate feedback from Monash Health leaders	Presentations and discussions with individuals and groups	Individuals: All Medical Program Directors and General Manager of Allied Health; Groups: Nursing Executive
To incorporate feedback from Monash Health staff	Invitation to provide contribution	All staff via the 'All Staff' email list; and staff interacting with the project team
To incorporate high level expertise	Consultation	Health Program Evaluator and Health Economist
To determine communication issues and requirements	Consultation	Monash Health Public Affairs and Communication Department
To enhance compatibility and alignment with state health department objectives and funding strategies	Consultation	Victorian Department of Human Services Health Technology Unit
To seek endorsement and support at the highest levels	Presentations and discussions with groups	Executive Management Team; and Monash Health Board

The influencing factors were both positive and negative and addressed aspects of the internal and external environments, human factors, empirical decision-making, and practical applications.

Many of the fundamental decisions in development of the program, such as what to call it and what approach to take, were influenced by both positive and negative factors. For example, respondents felt that the program needed a name that engendered support rather than suspicion and a strong positive image that focused on 'effective application of health resources, which was seen as constructive, rather than on disinvestment which was viewed cynically as a strategy to 'save money'. These findings underpinned the decision to change the name from the 'Disinvestment Project' to the 'Sustainability in Health care by Allocating Resources Effectively' Program. 'SHARE' evoked positive emotions and was compatible with iCARE, a term familiar to all staff as the acronym for the Monash Health values (Integrity, Compassion, Accountability, Respect and Excellence). On a less positive note, respondents perceived significant limitations in organisational decision-making and anticipated that if there was a lack of transparency and accountability in the process of reallocation of resources from disinvestment activities it would be a significant barrier to effective implementation of the program. Based on these findings, transparency and accountability became key principles of the program and all the new systems, processes and decision-making criteria would be made explicit.

Many of the human factors identified are common in health service change initiatives. Although there were a few exceptions, Monash Health staff did not routinely seek evidence for decisions, were generally unaware of best practice in implementation and did not usually evaluate outcomes of decisions. The main barriers to use of evidence and effective implementation and evaluation were lack of time, knowledge, skills and resources. These factors led to proposals for support services to assist staff in making, implementing and evaluating evidencebased decisions.

The lack of information on how to establish organisation-wide systems and processes for disinvestment meant that Monash Health had to rely on empirical reasoning for some decisions. As a result of this approach, two features of the SHARE Program differ significantly from the types of disinvestment activities reported in the literature at the time. Firstly, it was thought that disinvestment should be considered alongside investment in the context of all resource allocation decisions, in contrast to many published examples where it was viewed in isolation. Secondly, a systematic, integrated approach was thought to be better than individual projects that may be driven by ad hoc decisions or individuals 'championing' causes. These concepts are reflected in the principles underpinning the SHARE Program.

A number of practical issues were identified across the range of potential activities. Many of these related to factors for success and sustainability of the program such as endorsement, support and strategic direction from the highest level, links to those with power and influence in the organisation, funding, expertise and stakeholder engagement.

What is the most appropriate and effective approach to organisation-wide, systematic, integrated, evidencedriven disinvestment at Monash Health?

Characteristics of the most appropriate and effective approach for Monash Health were identified from the

Table 3 Factors for success and sustainability

Success: A proposal is more likely to be successfully implemented if it meets the following criteria.

- It is based on sound evidence or expert consensus
- It is presented by a credible organisation
- It can be tested and adapted
- The relative advantage is evident
- It is of low complexity
- It is compatible with the status quo
- It has an attractive and accessible format

Sustainability: A proposal is more likely to be sustainable if it has appropriate and adequate provision in each of the following categories.

- Structure
- Skills
- Resources
- Commitment
- Leadership

published literature and local research. These findings underpinned the decisions that defined the program elements (Table 4). These include program components, their aims and objectives, principles that underpin the program, implementation and evaluation plans, and preconditions for success and sustainability.

Program components, aims and objectives

Systems and processes Aim 1: To develop, implement and evaluate organisation-wide systematic, transparent, accountable and evidence-based decision-making systems and processes for resource allocation related to health technologies and clinical practices.

The original aim of the team driving the SHARE initiative was to consider disinvestment in a systematic way, integrating systems and processes for decisionmaking across the organisation. This was confirmed as the best approach and the earlier aim was refined to replace 'disinvestment' with 'resource allocation'. The proposed objectives involved investigation of six potential settings for decision-making (Fig. 2). Firstly, the nature of the innovations and methods to deliver them would be explored, those thought to be feasible would then be piloted and those found to be sustainable, effective and appropriate would finally be established as ongoing processes.

Disinvestment projects Aim 2: To identify target disinvestment opportunities, establish prioritisation and decision-making processes and develop, implement and evaluate evidence-based disinvestment projects.

It was anticipated that in the longer term the new systems and processes would identify opportunities for disinvestment activities, however the Steering Committee wanted to explore disinvestment projects immediately. This meant that methods to identify and prioritise target TCPs and then implement and evaluate projects to disinvest them must be investigated in parallel to the new organisational systems and processes. These innovations and methods would be explored, piloted and implemented using the approach outlined in Aim 1.

Support services Aim 3: To develop, implement and evaluate support services to provide expertise and facilitate action.

It was clear from the preliminary work that, in order to achieve the first two aims, services to support the proposed activities and build staff capacity and capability would be required. Key areas of need were identified: providing expertise to deliver research evidence and local data to decision-makers, training and supporting staff to use evidence in decision-making and then implement and evaluate their decisions, and training and supporting staff in project methods and administration.

Program evaluation and research Aim 4: To undertake evaluation and research to assess outcomes, understand the process of change and disseminate the findings.

Although each of the first three components included evaluation in the pilot and implementation phases, it was decided to specify a fourth component to highlight the importance of evaluation, research and dissemination in capturing and understanding what happened and sharing this with others interested in developing similar models. Standard health program evaluation methods would be used to assess outcomes, and action research methods would be included to learn about the processes, what worked, what didn't and why. Running a national workshop was proposed so that the Monash Health team could learn from others with experience in related activities, contribute what had been learned at this point in the SHARE Program, and publish the findings to address some of the gaps in the current literature [34, 35].

Principles

A series of principles to underpin the program were identified. These captured the focus of the program (effective application of health resources and decisionmaking across the continuum from investment to disinvestment), the general approach to program initiatives (evidence-driven decisions and evidence-based development, implementation and evaluation of projects), and specific strategies (routine, reactive and proactive decision-making processes; top-down and bottom-up activities; and alignment with organisational goals and business plans).

Preconditions

A number of preconditions were identified to enable this complex multifaceted program to be achieved and maintained. Strategic direction, influence, support and

Table 4 Factors influencing decisions for program development			
Finding	Source	Decision	Program element
Potential benefits of disinvestment identified	Literature	Establish a program exploring disinvestment at Monash Health.	SHARE program
External environment supportive of disinvestment program	Literature & DHS documents		
Internal environment supportive of disinvestment program	Monash Health Staff		
Capacity for leadership in this area demonstrated	Success of new TCP program		
The word 'disinvestment' is associated with negative connotations, high risk of engendering suspicion and distrust and getting stakeholders offside.	Literature Monash Health Staff	Proceed carefully, avoid the term 'disinvestment' and use positive language.	Principles
Top down' approach seen as negative. Needs to be balanced with 'bottom up' strategies and involvement of stakeholders.	Literature Monash Health Staff	Implement 'top down' and 'bottom up' strategies, make stakeholder engagement a priority, and integrate methods for staff to drive change into the new systems and processes.	Principles Preconditions
A systematic integrated approach would be better than ad hoc decisions, individuals 'championing' causes or projects undertaken in isolation.	SHARE leaders International experts	Focus on organisation-wide approach to decision-making that integrates new and current systems and processes.	Principles
Perceived lack of transparency and accountability and suboptimal use of evidence in current decision-making processes. Power struggles and hidden agendas perceived to influence outcomes.	Monash Health Staff Project team	Ensure the new systems and processes are transparent, accountable and evidence-based. Introduce explicit criteria for disinvestment decisions.	Principles
Lack of transparency and accountability in reallocation of funding released through disinvestment would be significant barrier to effective program.			
Lack of consistent terminology, absence of decision-making criteria and no guidance to inform an organisational approach.	Literature International experts	Develop our own frameworks and methods.	Principles
Disinvestment should not be considered in isolation but alongside other decisions. Investment and disinvestment decisions are often linked, disinvestment occurs when something new is introduced.	Monash Health Staff SHARE leaders Project team	Do not focus on 'disinvestment' or 'investment' alone. Consider 'resource allocation'. Establish processes along decision-making continuum from introduction to removal.	Principles
Health service staff perceive management priorities to be focused on saving money. The concepts around 'disinvestment' accentuate this.	Literature Monash Health Staff	Focus on 'effective application of health resources' to facilitate a positive approach.	Principles
The program needs a strong positive image that reflects the new focus on 'effective application of health resources'. Being compatible with 'rCARE', the familiar acronym for Monash Health values would be beneficial.	Monash Health Staff SHARE leaders Project team	Change the name from 'Disinvestment Project' to 'SHARE' (Sustainability in Health care by Allocating Resources Effectively)	Name
Six potential opportunities to integrate disinvestment decisions into organisational infrastructure, systems and processes were identified.	Literature SHARE leaders	Investigate methods to implement disinvestment decisions in the six settings identified.	Systems and Processes
Undertaking disinvestment projects was a key element of the original proposal. Waiting for investigation of the six settings is too long to delay pilot projects. Some 'quick wins' would be valuable.	SHARE leaders Monash Health Staff	Develop methods to identify and prioritise potential target TCPs in parallel with the investigation of the six settings. Undertake pilot projects to disinvest them.	Disinvestment projects
Current decisions are made 'routinely' or 'reactively'. Introduction of TCPs is based on applications from clinicians or managers and removal of TCPs is based on emerging problems or product alerts and recalls. Research literature and local data could be used 'proactively' to drive health service practice.	Monash Health Staff SHARE leaders Project team	Build on current 'routine/reactive' processes that are done well. Develop new processes to use evidence 'proactively' to drive decisions and/or priority setting. Make these explicit elements of the new program.	Principles
Using evidence 'proactively' requires time and attention from decision-makers. The information provided must be trustworthy, applicable and sufficiently important to warrant adding to their workload.	Monash Health Staff SHARE leaders	Develop methods to identify appropriate high-quality information, process and package it for ease of use and deliver it to the relevant decision-makers.	Systems and Processes

Table 4 Factors influencing decisions for program development (Continu	ed)		
Decisions for resource allocation are delegated to committees and individuals. There are opportunities for improvement in the governance of these processes and to introduce routine consideration of 'disinvestment'.	Monash Health Staff SHARE leaders Project team	Review processes and governance of decision-making by committees and the authority delegation schedule	Systems and Processes
There is no guidance on consumer participation in disinvestment activities.	Literature	Develop methods to capture and utilise consumer	Systems and
With a few exceptions, committees and project teams do not routinely involve consumers in making or implementing decisions and the organisation does not have a framework for engaging consumers.	Monash Health Staff Project team	perspectives and integrate them into the new program.	Processes
The systems and processes for evidence-based decision-making cannot be delivered without appropriate and adequate skills and support	Literature Monash Health Staff	Develop support services that enable capacity-building and provide expertise and practical assistance	Support Services
With a few exceptions, staff do not routinely seek evidence for decisions, are unaware of best practice in implementation and do not evaluate outcomes.	Monash Health Staff Project team	Provide expertise, training and support in accessing and utilising evidence in decisions.	Support Services
The main barriers to use of evidence and effective implementation are lack of time, knowledge, skills and resources.	Literature Monash Health Staff	Provide expertise, training and support in implementing and evaluating evidence-based change.	
Health service projects are not usually well supported. It is common for funding to be insufficient, timelines inadequate and staff lacking in knowledge and skills in project management, data collection and analysis.	Monash Health Staff Project team	Influence planning of disinvestment projects to ensure adequate resources and appropriate timelines. Provide expertise, training and support in project methods and administration	Support Services
Disinvestment projects are generally based on health economic principles	Literature	Utilise in-house expertise and take an 'evidence-driven',	Principles
Monash Health does not have expertise in health economics and does not intend to fund this in the foreseeable future	Monash Health Leaders	rather than 'economics-driven', approach to investigation of disinvestment in the health service context.	
Safety, effectiveness, local health service utilisation and benchmarking parameters are possible alternative considerations for disinvestment.	SHARE leaders Monash Health Staff		
Monash Health has high-level expertise in accessing and using research evidence and health service data to inform decisions.	Project team		
Monash Health does not have the level of expertise in health program evaluation required for SHARE and has no expertise in health economics.	Project team	Engage consultants in health program evaluation and health economics to assist in development and evaluation	Preconditions
There is no guidance to inform a systematic organisational approach.	Literature	Undertake action research to investigate the process of	Evaluation and
In addition to detailed program and economic evaluation, understanding what happened in the process of investigation, what worked, what didn't work and why is required.	SHARE leaders Project team	change in addition to program and economic evaluations. Run a national workshop to learn and share information. Disseminate all findings.	Research
This large program will need funds. It is consistent with the disinvestment agenda of the Victorian DHS who are sympathetic to a funding application.	DHS documents DHS staff	Seek funding from the state health department.	Preconditions
To be successful this ambitious proposal will need endorsement, support and strategic direction from the highest level and links to those with power and influence in the organisation.	Literature SHARE leaders Project team	Increase membership of the Steering Committee to reflect those best able to provide the appropriate influence, direction and support.	Preconditions
All projects should be aligned to the Monash Health Strategic Goals. Program activities will be facilitated if integrated into the organisation Business Plan.	SHARE leaders Project team	Align SHARE with the Monash Health Strategic Goals and include program activities in the annual Business Plans	Principles





endorsement would be provided by expanding the Steering Committee. Adequate funding was allocated by Monash Health and the Victorian Department of Human Services (DHS). Expertise was sourced in-house and gaps were filled through engagement of expert consultants in health program evaluation and health economics. Organisational readiness for change had been demonstrated and ongoing stakeholder engagement was specified as a priority.

Assessment of sustainability

A formal review using the checklist for sustainability developed by CCE was undertaken to assess factors related to structure, skills, resources, commitment and leadership (Table 5). A proposal is more likely to be sustainable if it has appropriate and adequate provision in each category. The SHARE Program met all the requirements adequately.

Implementation

The SHARE Program emerged as a series of projects within each of the four components. Individual implementation plans were developed for each project with strategies based on assessment of barriers and enablers in the relevant context. The interventions were piloted and refined prior to final implementation. These details are published separately [29–32, 36, 37].

The overall program had a general implementation plan couched in terms of timelines and deliverables [38]. Broad consideration of barriers and enablers at the program level was undertaken in the analysis of 'implications for disinvestment at Monash Health' and these were addressed in development of the 'most appropriate model'.

Evaluation

A formal Evaluation Framework and Plan was created and included evaluation domains, audience, scope, evaluation questions, sources of data, methods of collection and analysis, reporting and timelines [38]. This was considered to be a dynamic document that could be revised during the program.

An external health program evaluator consulted to the SHARE Program in the role of 'critical friend' [38] and a health economist provided expertise and advice for economic evaluations.

A theoretical framework for evaluation of implementation of an evidence-based innovation was used [2] and an outcomes hierarchy based on the SHARE Program components was developed and included in the Evaluation Framework [38].

Due to the size and complexity of SHARE, and its interconnectedness with other Monash Health activities, advice from the SHARE health economist was that an economic evaluation of the overall program would not be possible. Economic evaluation would be limited to the disinvestment pilot projects.

Each of the individual projects in the second phase of SHARE had their own evaluation plans which are reported separately [31, 32, 36].

Can a model for evidence-driven resource allocation in the local healthcare setting be derived from the SHARE Program to enable replication and testing? *Framework*

Framework

The purpose of a framework is to provide a frame of reference, organise and focus thinking and assist interpretation. Frameworks are descriptive, tend to be high-level and can apply to a wide variety of situations [28, 39].

A framework for SHARE was developed and revised. It was used to clarify thinking; inform purpose, direction and planning; and act as a communication tool.

The initial draft was created to facilitate discussion by the project team and Steering Committee to establish the nature and direction of the program (Table 6). It introduced three main concepts.

Table 5 Assessment of sustainability

Structure

- A Steering Committee is in place with appropriate Terms of Reference and members that can deliver the required strategic direction, influence and support
- A Project Team is in place with clear timelines and deliverables
- Areas of responsibility are defined and lines of reporting and
- accountability are clear

Skills

- The Steering Committee has expertise in clinical practice, management, finances, operations, legal, ethics, research, information technology, procurement and biomedical engineering
- The Project Team has expertise in evidence based practice, knowledge brokerage, implementation and evaluation of change
- Additional expertise is available
 - Collection and analysis of health service utilisation and cost data (Monash Health Clinical Information Management unit)
 - Program evaluation and health economics (Consultants)

Resources

- Appropriate funding has been obtained from Monash Health and Victorian Department of Human Services
- Accommodation and infrastructure for project team provided within the Centre for Clinical Effectiveness

Commitment

- Monash Health has committed significant funding and program activities are included in the Business Plan
- The Board and Executive Management Team have endorsed the program
- Three Executive Directors are on the Steering Committee
- The Centre for Clinical Effectiveness has prioritised development of organisational infrastructure to support evidence-based practice as a key element in its workplan

Leadership

- The same team that developed the award-winning new technology program are leading the SHARE program
- Monash Health has expressed a wish to be leaders in disinvestment
- The Victorian Department of Human Services has expressed a wish to be leaders in disinvestment
- The Centre for Clinical Effectiveness is a leader in enabling evidencebased decision-making
- The Steering Committee carries influence (Executive Directors, Program Directors, Senior Management)
- The original plan for a project about 'disinvestment' was reframed to a program addressing the spectrum of decisions from investment to disinvestment across the organisation.
- There are existing processes at Monash Health for introduction of new TCPs and removal of TCPs in current use, but these are usually 'reactive' decisions made in response to internal applications or external notifications.

• Evidence from published research and local data could be used 'proactively' to drive decision-making.

A revised draft was developed to reflect subsequent decisions and was used for presentations to the Executive Management Team and the Board to seek endorsement and to the Victorian DHS for funding (Fig. 3). It retained the key concepts noted above and introduced another two.

- •The six settings identified as potential opportunities for decision-making in a systematic, integrated organisation-wide program should be explored across the continuum from investment to disinvestment and should address routine, reactive and proactive decisionmaking processes.
- A 'program' of integrated systems and processes identifying TCPs for introduction, restriction or removal would initiate and direct a series of methodologically rigorous 'projects' implementing the desired changes.

Model

A model is more precise and more prescriptive than a framework. It is narrower in scope, the concepts are well defined and the relationships between them are specific. Models are representations of the real thing [28, 39].

The final representation of the SHARE Program, created for this paper, captures all the program elements and their relationships (Fig. 4). It is precise, prescriptive and provides sufficient detail to be a model for a systematic approach to evidence-based resource allocation in a local health service.

Concepts The components of the proposed SHARE Program (aims and objectives, underpinning principles, preconditions for success and sustainability) are the concepts within the model.

Relationships The initial proposal had two aims, to develop systems and processes for decision-making and to undertake disinvestment projects. The systems and processes would lead to identification of target TCPs to be disinvested in individual projects. This sequential process is represented by an arrow from Aim 1 to Aim 2.

Based on information from the literature and stakeholder feedback it was clear that these two aims would

Table 6 Initial draft of SHARE framework

Introduction of safe, effective, cost-effective TCPs	Removal of harmful, ineffective, inefficient TCPs
Reactive (current)	Reactive (current)
• Application process	• Drug alerts, product withdrawals
Proactive (potential)	Proactive (potential)
• Identification of evidence regarding new TCPs that are safer,	• Identification of evidence regarding TCPs in current practice that are less
more effective or more cost-effective	safe, less effective or less cost-effective

	1. Control and an and all strategies in a
	 Capital procurement and clinical purchasing
PROGRAM	2. Guidelines and protocols
Integrated systems	3. Proactive use of published research
and processes	4. Proactive use of local data
organisation	5. Priority setting exercises
	6. System redesign
	Routine / Reactive / Proactive
	 Identify change required
\sim	 Approval/prioritisation
PROJECTS	 Project ownership/planning
Individual projects	 Implementation
remove TCPs	 Evaluation
	 Reporting

not be successful without provision of expertise and support to facilitate decision-making (systems and processes) and implementation of change (projects). These needs are represented by arrows from Aim 3 to Aims 1 and 2.

Detailed program evaluation and research to measure and understand the change process were considered to be a vital fourth component and would be applied to the other three components. The double headed arrows between Aim 4 and Aims 1, 2 and 3 indicate that evaluation and research inform further development of the components which in turn would be evaluated and researched.

The Principles and Preconditions sit above and below the four aims indicating that they apply to the whole program.

Propositions A series of propositions can be derived from the components and their relationships.

- Systems and processes will be required for systematic, integrated, transparent, accountable, evidence-based decision-making in an organisationwide approach to identification of potential disinvestment opportunities.
- Projects arising from these decisions will be undertaken to confirm potential benefits, harms and the priorities for disinvestment of identified targets, and implement and evaluate disinvestment where appropriate.
- Support services that provide expertise, training and support to decision-makers and project staff in finding and using evidence from research and local data in decision-making, implementation, evaluation and project management will be required for the systems, processes and projects to be successful.
- Evaluation and research of the systems, processes, projects and support services will inform and enable

quality improvement, organisational learning and development, and will add to the body of knowledge on disinvestment.

Characteristics of the model The model is primarily descriptive to enable application in a local healthcare service and allow replication and testing. It was developed using both deductive and inductive methods. Although not based on a specific theory, it has potential to facilitate future theory development and/or testing. Specific characteristics of the model and potential for its use, as discussed in the sections above, are summarised in Table 7 using domains and criteria developed to assess the robustness and utility of proposed models and frameworks [28]. This overview enables potential users to identify whether the model will meet their aims and be applicable to their situation.

Discussion

Strengths

The main strengths of this process arise from the evidence-based and explicit approach. Decisions were based on information from the research literature and local data collected for this purpose, integrated with the views of experts in the field and local health service staff and consumers. This approach facilitates development of strategies that are more likely to be sustainable, effective and appropriate [17, 40]. The broad stakeholder involvement enables local ownership and the transparency of the process leads to trust.

A rigorous evidence-based approach was possible due to the provision of adequate resources. CCE staff had appropriate skills for this work and adequate time was allocated to undertake it.

The timing of the project was opportune as internal and external environments were both amenable to exploration of disinvestment. The international literature on methods of disinvesting individual TCPs was building, the Victorian DHS was exploring the role of disinvestment at state level and all the staff and consumers approached were constructive in their responses. Monash Health had already demonstrated commitment and leadership to evidence-based decision-making with the new Technology/Clinical Practice Program [1]. The preliminary work for SHARE was able to capitalise on this momentum.

Staff and consumers were in agreement in their responses. Themes regarding current practice, proposals for change and barriers and enablers were strong and consistent across all participant groups.

The key messages arising from local responses were consistent with the literature at the time and remain consistent with current publications [41, 42].



One aspect of the proposed model initially appeared to be a limitation, but when considered in light of the current literature may be seen as a strength. The available research in disinvestment was predominantly focused in health economics but Monash Health had no expertise in this area and did not intend to employ a health economist. The decision to take an 'evidencedriven' approach to disinvestment was based on the available in-house expertise. The proposed 'evidencedriven' model is novel and untested, however there are some encouraging findings in more recent research that indicate it might be well-suited to health service decision-making. Access to robust evidence, rather than an emphasis on cost saving, is thought to improve disinvestment decision-making and disinvestment is reported as more likely to be accepted by both clinicians and consumers if the focus is on quality and safety [40, 43]. Surveys indicate that most decision-makers in the health sector do not routinely use economic evaluations in their decisions [14, 44]. Two large international surveys on use of evidence in decision-making have been conducted recently. Ninety-nine per cent of respondents from 15 countries indicated that systematic consideration of the available evidence would improve health system decisionmaking [45]. The second survey found that clinicians and policy-makers from 23 countries considered clinical effectiveness, safety, quality of evidence, disease severity and impact on healthcare costs to be the most relevant criteria [46]. A systematic review of decision criteria for resource allocation summarised the frequency of criteria cited by 40 studies: equity/fairness (n = 32), efficacy/effectiveness (n =29), stakeholder interests and pressures (n = 28), costeffectiveness (n = 23), strength of evidence (n = 20), safety (n = 19), mission and mandate of health system (n = 19), organizational requirements and capacity (n = 17), patientreported outcomes (n = 17) and need (n = 16) [47]. The proposed Monash Health 'evidence-driven' model and the suite of criteria used in the Technology/Clinical Practice Program [1] capture all these criteria so is likely to be compatible with current attitudes and behaviours of decision-makers.

Limitations

As there was no guidance on how to approach disinvestment from an organisation-wide perspective, the SHARE model was developed de novo by integrating theoretical and generic principles with staff and consumer experiences and perspectives. There is still a lack of information related to most of the strategies in the SHARE proposal and a

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Domain	SHARE features
Purpose • descriptive, explanatory or predictive	The model is primarily descriptive to enable replication and testing in other settings. There are also some explanatory elements addressed in the relationships between components, for example the systems, processes and projects are thought to require input from the four support services to ensure successful implementation
Development - deductive or inductive - supporting evidence	Methods used in development were both deductive and inductive. Evidence from the research literature and other publications, health service staff, consumers and external experts was used.
Theoretical underpinning • explicit or implicit	No specific theory was used to underpin the model. A theoretical framework for evaluation of implementation of an evidence-based innovation was used to design questionnaires for data collection to inform program development.
Conceptual clarity well-described, coherent language for identification of elements strengths and weaknesses of theories potential to stimulate new theoretical developments 	Four components are outlined in the model. The relationships between them are delineated in a simple diagram. The details of each component, the aims and objectives, are provided in the surrounding boxes. The principles that underpin the program and the preconditions for success and sustainability are also detailed in surrounding boxes. No specific theories were used so no comparisons are made. There is potential for new theoretical developments if: • specific theories are tested in development and implementation of the components • components are removed or the relationships changed • principles or preconditions are varied • the model is applied in contexts other than resource allocation for technologies and clinical practices • the model is applied in settings other than local health service networks
Level • individual, team, unit, organisation, policy	The program was developed for organisation-wide implementation in a local health service. This approach could also be used at a higher (regional, state/provincial, national) or lower (single facility, department or unit) level, however is unlikely to be applicable to individual decision-makers.
Situation • hypothetical, real	The model represents actual settings and contexts in health service decision-making and implementation of change. However it could also be used for teaching or capacity building through hypothetical classroom discussions or simulation exercises.
Users • nursing, medical, allied health, policy makers, multidisciplinary	SHARE focuses on decision-makers at the organisation-wide level in a local health service. This includes senior clinicians, managers and policy makers across all professional disciplines, all clinical settings and some areas of corporate practice (eg finance, procurement, legal, ethics, IT, biomedical engineering); and health service consumers.
Function • barrier analysis • intervention development • selection of outcome measures • process evaluation	The main function is to enable replication and testing of the SHARE program by capturing the components and their relationships, principles and preconditions. The principle of an evidence-based approach to change requires assessment of barriers and enablers but the model itself does not specifically facilitate this process. The model would assist in development of an intervention for systematic evidence-based decision-making and implementation of change. Evaluation of change. Evaluation of process and outcomes is a key element, however selection of variables and outcome measures is not facilitated by the model per se, but an evaluation framework and plan has been developed [38].
Testable hypothesis generation supported by empirical data suitable for different methodologies 	The model describes settings and opportunities, systems and processes, and structures to support decision-making, implementation of change and evaluation of process and outcomes. A range of hypotheses could be developed for each of these elements and the relationships between them which could be tested in a number of ways using various methodologies.

Table 7 Features of a model for systematic approach to resource allocation in a local health service

number of recent systematic reviews and discussion papers on disinvestment call for research in these areas [4-7, 11-15, 40, 48-56].

The only clear advice was to avoid the term 'disinvestment' due to the negative connotations and lack of common understanding. Although the name and general approach of SHARE was positive and steered away from the concept of 'disinvestment,' a more appropriate term to describe the 'Disinvestment Projects' in Aim 2 proved elusive.

SHARE is about systems and processes in a health service, a complex dynamic organisation with a myriad of context-specific factors. The external validity of the proposed model and generalisability of the SHARE outcomes may be limited as a result. Health services in developed countries are very similar in many ways, but quite diverse in others. The diversity often lies in funding models and organisational culture, both of which may have a considerable impact on decision-making systems and processes for resource allocation. Health services in developing and resource-poor settings may be different in many additional ways that significantly reduce the applicability of findings from an Australian program. Other context-specific factors at local, regional or national level likely to affect generalisability are strategic direction, priorities, infrastructure, available project funding and leadership.

A wide group of stakeholders were engaged to represent consumers and all professional groups, at all relevant levels of seniority, across all campuses. Their responses were overwhelmingly similar with messages that were strong and consistent, which adds confidence to the validity of the process. However it should be kept in mind that those who agreed to participate are potentially more sympathetic to the ideas proposed and may not represent all views.

The project team responsible for delivering the SHARE Program at Monash Health were also the researchers investigating the processes undertaken. This has the potential to introduce subjectivity into the evaluations and limit insight if organisational assumptions are accepted without challenge. Extensive stakeholder involvement, transparency of methods and participation of an external evaluator in the role of 'critical friend' [38] were included in the SHARE processes to minimise these limitations.

The SHARE model utilises the in-house expertise of staff in evidence-based practice, knowledge brokerage and data analysis. Health services that do not have high-level skills in these areas may not be able to replicate this model without adaptation. The systematic approach could still be undertaken but with alternative drivers for change. Those with access to health economists in-house or in partnership with a local university could focus on economic principles, an option not available to Monash Health. Those without access to expertise in health economics or evidence-based decision-making may develop other methods such as a consensus-driven approach.

Implications for policy and practice

Local research identified a number of weaknesses in organisational decision-making such as lack of explicit criteria; limited use of evidence; staff under-skilled and underresourced to make, implement and evaluate evidencebased decisions; and minimal consumer involvement [29, 31]. Monash Health is not unique and these issues are commonplace in health services around the world [8, 40, 44, 51, 57–60]. This indicates enormous opportunities for improvement through strategies that address these limitations.

The importance of allowing adequate time for development, implementation and evaluation of innovations is well established. Yet this is a constant tension in health services where a common response to an emerging problem is often urgent and reactive, delivered by staff with no experience in project management or change strategies, with inadequate resources and inappropriate timelines, which is not implemented or evaluated effectively [29, 40]. It is anticipated that a systematic integrated approach to organisational decision-making for resource allocation will require considerable time, skills, resources and support, all of which are traditional challenges for health services, however once established the model will allow more timely reaction to future challenges.

Implications for research

SHARE is a suite of integrated initiatives to improve health service decision-making. Although the evaluation design is rigorous and an action research process is built around the program components to understand the process of change, the primary objective is quality improvement rather than research. As an exploratory study in the UK Medical Research Council framework for developing complex interventions [18], SHARE illustrates concepts, issues, barriers and enablers to evidence-based disinvestment in a local health service. These findings can be tested in controlled studies in a range of contexts to enable recommendations for effective practice.

The findings and decisions that underpinned program development are outlined (Table 4) and the model describes settings and opportunities, systems and processes, and structures to support decision-making, implementation of change, and evaluation of process and outcomes (Fig. 4). These details will enable replication of the program, testing of assumptions and comparison of characteristics of the environment, stakeholders and intervention.

There is potential for new theoretical developments if, for example:

 specific theories are tested in development and implementation of the components

- components are removed or the relationships changed
- principles or preconditions are varied
- the model is applied in contexts other than resource allocation for TCPs
- the model is applied in settings other than local health service networks

Conclusion

A robust evidence-based investigation of the research literature and local knowledge with a range of stakeholders resulted in rich information with strong consistent messages. The process was made possible by provision of appropriate resources, expertise, time and support. The implications for disinvestment in the local healthcare setting were many and varied. The influencing factors were both positive and negative and addressed aspects of the internal and external environments, human factors, empirical decision-making, and practical applications. At the completion of Phase One, synthesis of the findings enabled development of frameworks and plans, and all preconditions for exploration of the four main aims in Phase Two were met. The model for sustainability in health care by allocating resources effectively can be replicated or adapted by health services wishing to establish a program for disinvestment and tested by researchers to confirm, refute or understand the processes involved.

Additional file

Additional file 1: Details of methods (PDF 366 kb)

Abbreviations

CCE: Centre for Clinical Effectiveness; DHS: Department of Human Services; iCARE: Compassion, Accountability, Respect, Excellence (Monash Health values); SHARE: Sustainability in Health care by Allocating Resources Effectively; TCPs: Technologies and clinical practices

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Availability of data and materials

Many of the datasets supporting the conclusions of the articles in the SHARE series are included within the articles and/or the accompanying additional files. Some datasets provide information for more than one article and are only provided once; where they are not included within an article and/or the accompanying additional file, the relevant citations to the articles in which they are provided are included. Datasets have not been made available where it is

impossible to de-identify individuals due to the nature of survey or interview responses or where the data is published in confidential internal reports.

Authors' contributions

CH, KA and CW designed and implemented the methods and developed the proposal for change. CH developed the early frameworks, CH and SG conceived and developed the model. RK initiated the project. RK, WR, CK and MT provided guidance and direction for project decisions. CH drafted the initial manuscript. SG and CW provided critical revisions. KA, RK, WR, CK and MT provided later feedback. All authors read and approved the final manuscript.

Authors' information

CH was the Director of the Centre for Clinical Effectiveness and the SHARE Program Director. CH completed the SHARE publications as part of an unfunded PhD. KA was the SHARE Project Manager and CW was the Project Officer. SG is Professorial Fellow in the Monash University School of Public Health and Preventive Medicine and co-supervisor of CH's PhD. RK was Director of Medical Program, member of the SHARE Steering Committee and co-supervisor of CH's PhD. WR was Executive Director of Medical Services and Chair of SHARE Steering Committee. CK was Director of Medical Services. MT was Legal Counsel for Research and Ethics. RK, CK and MT were all members of the SHARE Steering Committee.

Competing interests

The authors declare that they have no competing interests.

Consent for publication

Not applicable

Ethics approval and consent to participate

The Monash Health Human Research and Ethics Committee (HREC) approved the SHARE program as a Quality Assurance activity. Further ethical review was not required as the program met the following criteria [61]:

- "The data being collected and analysed is coincidental to standard operating procedures with standard equipment and/or protocols;
- The data is being collected and analysed expressly for the purpose of maintaining standards or identifying areas for improvement in the environment from which the data was obtained;
- The data being collected and analysed is not linked to individuals; and

• None of the triggers for consideration of ethical review are present." [61] Participation was based on the 'opt-out approach' [61]. "The opt-out approach is a method used in the recruitment of participants into an activity where information is provided to the potential participant regarding the activity and their involvement and where their participation is presumed unless they take action to decline to participate."[61] Consent to participate was approved by the HREC based on the following criteria:

- Health care providers, managers, consumer representatives, and officers within government health departments will be informed about the project and the processes and invited to participate.
- Participation in interviews, workshops and/or surveys will be considered to be implied consent.

These conditions were met.

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Author details

¹School of Public Health and Preventive Medicine, Monash University, Victoria, Australia. ²Centre for Clinical Effectiveness, Monash Health, Victoria, Australia. ³Medicine Program, Monash Health, Victoria, Australia. ⁴Medical Services and Quality, Monash Health, Victoria, Australia. ⁵Medical Services, Melbourne Health, Victoria, Australia. ⁶Ageing and Aged Care Branch, Department of Health and Human Services, Victoria, Australia.

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Chapter 3. SHARE Phase Two

"Best practice is to develop interventions systematically, using the best available evidence and appropriate theory, then to test them using a carefully phased approach, starting with a series of pilot studies targeted at each of the key uncertainties in the design, and moving on to an exploratory and then a definitive evaluation."

Craig et al 2008 [26]

At the end of Phase One, four program components, their aims and objectives, relationships between the components, principles to underpin the program, and preconditions for success and sustainability were defined (Figure 4). The principles were agreed upon, the preconditions were established, and implementation and evaluation plans were developed.

The next steps in the UK MRC framework for design and evaluation of complex interventions include exploratory trials assessing acceptability and feasibility of the components and identifying methodological issues for implementation and evaluation (Figure 1) [23]. Hence, Phase Two involved development, implementation and evaluation of the initiatives proposed in the four program components to determine which would be sustainable, effective and appropriate at Monash Health.

Aims 1 and 2 proposed exploration of systems and processes for identifying disinvestment opportunities and undertaking pilot disinvestment projects. These investigations are reported in Paper 6.

Aim 3 planned to develop, implement and evaluate four support services to facilitate the activities in Aims 1 and 2. Investigation of the Data, Capacity Building and Project Support Services are reported in Paper 7 and the Evidence Dissemination Service is reported in Paper 8.

Papers 6 and 8 are provided in full and key findings from Paper 7 are presented for completeness.

Although each of the first three aims included evaluation in their pilot and implementation phases, Aim 4 was included to highlight the importance of evaluation, research and dissemination in capturing and understanding what happened and sharing this with others.

An evaluation framework and plan was developed for the overall SHARE Program which included evaluation domains, audience, scope, evaluation questions, outcomes hierarchy, sources of data, methods of collection and analysis, reporting and timelines [27]. More detailed evaluation plans were developed for individual projects.

Factors that influenced decisions, processes and outcomes of individual projects were identified using four adaptations of an existing framework and taxonomy for evaluation and explication of evidence-based innovations [28] (Appendix 8, Figure 12).

Action research was undertaken based on the "researcher as facilitator for change" model defined by Meyer [29, 30]. In this capacity, the SHARE project team were also the action researchers. An agenda item for 'Learnings' was scheduled at the beginning of every team meeting. Participants were invited to consider anything that had affected the project since the previous meeting using the framework 'what worked, what didn't, why and how it could be improved'. Each issue, its effect on the project, and potential changes that would build on positive outcomes or remove or minimise future problems were discussed. The learnings and actions were documented; actions were assigned, given timeframes and followed up to ensure completion. Project team observations and reflections were used for ongoing improvements to the program components and implementation and evaluation processes.

The first Australian national workshop on disinvestment was conducted to share knowledge and develop links for future collaboration. Disinvestment was considered from three perspectives: health policy researchers, health economists and health service decision-makers [31, 32].

Figure 4. Model for exploring Sustainability in Health care by Allocating Resources Effectively in the local healthcare setting

Reproduced with permission from SHARE Paper 5 [7]



"A challenge with disinvestment is the identification and prioritization of candidate health technologies."

Polisena et al 2013 [33]

Paper 6: Investigating methods to identify, prioritise, implement and evaluate disinvestment projects

The focus of Aim 1 was to explore the six mechanisms with potential to systematically identify opportunities for disinvestment within organisational systems and processes which were proposed in Paper 2. Given that it might take some time for these mechanisms to be established, a seventh method was also investigated. Staff were invited to submit an 'Expression of Interest' to receive support to disinvest a 'low value' TCP they had identified in their area.

Aim 2 was to undertake pilot disinvestment projects to understand the processes involved, assess the resources required, provide practical guidance for future projects and, if successful, be used as positive examples to promote subsequent disinvestment activities.

These aims led to the following research questions.

- What methods are available to identify potential disinvestment opportunities in a local health service?
- What methods are available for prioritisation and decision-making to initiate disinvestment projects in a local health service?
- What methods are available to develop, implement and evaluate disinvestment projects in a local health service?
- > What were the processes and outcomes of application of these methods at Monash Health?
- What factors influenced the decisions, processes and outcomes?

The Additional file for Paper 6 is included in Appendix 4.

RESEARCH ARTICLE

Open Acc<u>ess</u>



Sustainability in Health care by Allocating Resources Effectively (SHARE) 6: investigating methods to identify, prioritise, implement and evaluate disinvestment projects in a local healthcare setting

Claire Harris^{1,2*}, Kelly Allen^{1,2}, Vanessa Brooke², Tim Dyer², Cara Waller², Richard King³, Wayne Ramsey⁴ and Duncan Mortimer⁵

Abstract

Background: This is the sixth in a series of papers reporting Sustainability in Health care by Allocating Resources Effectively (SHARE) in a local healthcare setting. The SHARE program was established to investigate a systematic, integrated, evidence-based approach to disinvestment within a large Australian health service. This paper describes the methods employed in undertaking pilot disinvestment projects. It draws a number of lessons regarding the strengths and weaknesses of these methods; particularly regarding the crucial first step of identifying targets for disinvestment.

Methods: Literature reviews, survey, interviews, consultation and workshops were used to capture and process the relevant information. A theoretical framework was adapted for evaluation and explication of disinvestment projects, including a taxonomy for the determinants of effectiveness, process of change and outcome measures. Implementation, evaluation and costing plans were developed.

Results: Four literature reviews were completed, surveys were received from 15 external experts, 65 interviews were conducted, 18 senior decision-makers attended a data gathering workshop, 22 experts and local informants were consulted, and four decision-making workshops were undertaken. Mechanisms to identify disinvestment targets and criteria for prioritisation and decision-making were investigated. A catalogue containing 184 evidence-based opportunities for disinvestment and an algorithm to identify disinvestment projects were developed. An Expression of Interest process identified two potential disinvestment projects. Seventeen additional projects were proposed through a non-systematic nomination process. Four of the 19 proposals were selected as pilot projects but only one reached the implementation stage. Factors with potential influence on the outcomes of disinvestment projects are discussed and barriers and enablers in the pilot projects are summarised.

Conclusion: This study provides an in-depth insight into the experience of disinvestment in one local healthcare service. To our knowledge, this is the first paper to report the process of disinvestment from identification, through prioritisation and decision-making, to implementation and evaluation, and finally explication of the processes and outcomes.

Keywords: Disinvestment, Decommission, De-adopt, De-list, De-implement, Health technology, TCP, Resource allocation, Decision-making, Implementation

* Correspondence: claire.harris@monash.edu

²Centre for Clinical Effectiveness, Monash Health, Melbourne, VIC, Australia Full list of author information is available at the end of the article



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¹School of Public Health and Preventive Medicine, Monash University, Melbourne, VIC, Australia

About SHARE

This is the sixth in a series of papers reporting Sustainability in Health care by Allocating Resources Effectively (SHARE). The SHARE Program is an investigation of concepts, opportunities, methods and implications for evidence-based investment and disinvestment in health technologies and clinical practices in a local healthcare setting. The papers in this series are targeted at clinicians, managers, policy makers, health service researchers and implementation scientists working in this context. This paper reports the exploration of methods to identify health technologies and clinical practices suitable for disinvestment; establish prioritisation and decision-making processes; and develop, implement and evaluate evidence-based disinvestment projects.

Background

The need for disinvestment has emerged in response to increasing costs and a growing awareness of ineffective practices and systemic waste in healthcare services. Although there is no clear single definition, disinvestment is generally understood to be removal, reduction or restriction of health technologies and clinical practices (TCPs) that are unsafe or of little benefit, seeking to improve patient outcomes and use available resources more efficiently [1].

Following successful implementation of a rigorous evidence-based program for introduction of new TCPs [2], leaders at Monash Health (previously Southern Health), a large health service network in Melbourne Australia, sought to establish a similar program for disinvestment. However, there is a lack of information to guide local healthcare services regarding an organisational approach to disinvestment [3–12].

The 'Sustainability in Health care by Allocating Resources Effectively' (SHARE) Program was established to investigate an organisation-wide, systematic, transparent, integrated, evidence-based approach to disinvestment. The SHARE Program was funded as a 3-year demonstration project by the Victorian Department of Human Services (DHS) and Monash Health, and was undertaken by the Centre for Clinical Effectiveness (CCE), an in-house resource to facilitate Evidence Based Practice (EBP). An overview of the SHARE Program, a guide to the SHARE publications and further details about Monash Health and CCE are provided in the first paper in this series [13].

Following preliminary investigations to understand the concepts related to disinvestment, identify current decision-making practices at Monash Health, learn from local experiences of disinvestment and consider the implications of the proposed changes, a plan for the SHARE Program was created [14]. This included aims and objectives, principles to underpin the program, preconditions for success and sustainability, and implementation and evaluation plans. The program components and the relationships between them are outlined in Fig. 1.

The first aim of the SHARE Program was to explore systems and processes for decision-making that could proactively and systematically identify opportunities for disinvestment. The second aim was to investigate pilot disinvestment projects to gain detailed insight into the change processes involved, assess the resources required to deliver effective projects, provide practical guidance for future projects and, if successful, be used as positive examples to promote subsequent disinvestment activities.

The preliminary work also identified that if the first two aims were to be achieved, services to support the proposed activities and build staff capacity would be required [14]. Four support services were proposed: an Evidence Service, Data Service, Capacity Building Service and Project Support Service. Piloting of these services became the third aim of the SHARE Program [15, 16].

The need to investigate methods to identify and prioritise potential target TCPs and undertake projects to disinvest them is noted in the literature [5, 9–11, 17–24]. It is also acknowledged that there is little information about implementation of disinvestment decisions, a lack of understanding about the factors that influence resource allocation processes, and under-reporting of the perspectives and experiences of healthcare staff undertaking disinvestment [11, 18, 21–23]. It has been proposed that in-depth research using longitudinal approaches from inception to implementation of disinvestment decisions at the health service level are needed to fill these gaps and contribute to both the theory and practice of disinvestment [18–21]. The fourth aim of the SHARE Program sought to address this.

Aims

The aim of this aspect of the SHARE Program was to undertake disinvestment pilot projects. This would be achieved via three objectives: identifying potential disinvestment opportunities; establishing prioritisation and decision-making processes; and developing, implementing and evaluating disinvestment projects.

The aim of this paper is to describe, explore and explain the processes and outcomes of undertaking these objectives and the factors that influenced them.

Research questions

What methods are available to identify potential disinvestment opportunities in a local health service?

What methods are available for prioritisation and decision-making to initiate disinvestment projects in a local health service?

What methods are available to develop, implement and evaluate disinvestment projects in a local health service?



What were the processes and outcomes of application of these methods at Monash Health?

What factors influenced the decisions, processes and outcomes?

Methods

Design

Case study

The SHARE papers use a case study approach to address the limited understanding of resource allocation processes in health services, particularly regarding disinvestment [18, 21], and the lack of detailed reporting of implementation of change in the literature [25, 26]. Case studies allow in-depth, multi-faceted explorations of complex issues in their real-life settings [27] and facilitate development of theory and interventions [28]. The case study approach enables examination of the complex behaviours of, and relationships among, actors and agencies; and how those relationships influence change [29]. All these issues are intrinsic to the SHARE Program research questions.

All three case study approaches are used [30].

- 1. Descriptive: findings are reported in detail to describe events, processes and outcomes to enable replication when successful and avoidance or adaptation when unsuccessful
- 2. Exploratory: literature reviews, surveys, interviews, workshops and consultation with experts are used to explore what is known and identify actual, preferred and ideal practices
- 3. Explanatory: theoretical frameworks are used to understand and explain the events, processes and outcomes

Case studies are characterised by multiple sources of quantitative and qualitative evidence [27]. An overview of the activities undertaken in relation to the objectives is provided in Fig. 2.

Model for evidence-based change

The SHARE Program was undertaken using the SEAchange model for Sustainable, Effective and Appropriate change in health services [31]. The model involves four steps: identifying the need for change, developing a proposal to meet the need, implementing the proposal and



evaluating the extent and impact of the change. Each step is underpinned by the principles of evidence-based practice to ensure that the best available evidence from research and local data, the experience and expertise of health service staff and the values and perspectives of consumers are taken into account. Sustainability, avoidance of duplication and integration of new processes within existing systems are considered at each step, and an action research component continues throughout the project.

Action research

Action research was undertaken based on the 'researcher as facilitator for change' model defined by Meyer: researchers working explicitly with and for people rather than undertaking research on them [32, 33]. In this capacity, CCE staff were both the SHARE project team and the action researchers. Observations and reflections of the project team were used for ongoing improvements to the program components and implementation process. An agenda item for 'Learnings' was scheduled at the beginning of every team meeting. Participants were invited to consider anything that had affected the project since the last meeting using the framework 'what worked, what didn't, why and how it could be improved'. Each issue, its effect on the project, and potential changes that would build on positive outcomes or remove or minimise future problems were discussed. The learnings and actions were documented; actions were assigned, given timeframes and followed up to ensure completion.

Development of methods

Several of the activities reported in this paper were to develop methods that would be undertaken in subsequent activities. The methods reported in this section are those determined *a priori*. Methods developed during the course of the investigation are reported in the Results and discussion section.

Data collection

Mixed methods were used to capture frameworks, methods and tools, and stakeholder perspectives and experiences. These included literature reviews, a survey, interviews, workshops, consultations, and document analysis. Participant validation for factual accuracy was undertaken following interviews and workshops. An overview is provided in Fig. 2 and full details of methods and sources are reported in Additional file 1: Tables A–D.

Data analysis and synthesis

Outcomes of consultations and findings from initial interviews with small numbers of participants were documented and collated using MS Word or Excel. Workshop and subsequent interview findings were collated in MS Word, Excel and/or Nvivo [34] and analysed thematically by either content analysis [35] to identify emergent themes, or framework analysis [36] when categories had been specified *a priori*. Details of individual project protocols are provided in Additional file 1: Tables A–D.

Using the principles of evidence-based change, the SHARE team worked with stakeholders and external experts to synthesise the findings from the literature and local research into discussion papers and workshop presentations.

Deliberative process

Decisions were made by the SHARE Steering Committee composed of executive directors, committee chairs, clinical program directors, legal counsel, support service managers and consumer representatives (Additional file 1: Table E). Decision-making workshops were held at scheduled committee meetings. Discussion papers and background documents were provided beforehand, formal presentations introduced the workshops, and topics for discussion and decisions required were listed on the agenda. Discussion was informal within the structure of the agenda and decisions were based on consensus.

Delivery of disinvestment projects Investigation and selection of proposals

The SHARE team and Monash Health data analysts worked with proposers and the staff members responsible for practice in the nominated areas, usually department heads or committee chairs, to identify relevant research evidence and local data. Findings were presented to Steering Committee members for decision-making.

Implementation

Based on the SEAchange model of evidence-based change, planned implementation activities included engaging all stakeholders, identifying what is already known about practice change in the topic area from the literature and local knowledge, undertaking an analysis of local barriers and enablers, developing an implementation plan using strategies to minimise barriers and build on enablers, piloting and revising as required, and implementing in full.

A Capacity Building Service was developed to provide training to the pilot project teams in implementation methods and a Project Support Service was established to provide assistance in project management, administration, ascertainment of barriers and enablers, and development of project plans.

Evaluation

An Evaluation Framework and Plan was developed for the overall SHARE Program and included evaluation domains, audience, scope, evaluation questions, outcomes hierarchy, sources of data, methods of collection and analysis, reporting and timelines [37].

Individual evaluation plans for the pilot projects were developed based on the project objectives and an economic evaluation was developed in consultation with the SHARE health economist. Planned activities based on the SEAchange model included evaluation of process (Was the intervention implemented as planned?), impact (Did this achieve a change in practice?) and outcome (Did the practice change address the original problem?). These were not all undertaken due to reduced funding in the final year of the program.

Training in evaluation methods was provided to the pilot project teams through the Capacity Building Service and assistance in data collection and analysis was provided through the Project Support Service.

Explication of processes and outcomes

Factors that influenced outcomes of the piloting process were identified using a framework for evaluation and explication of evidence-based innovations [13]. Based on findings from the literature and surveys and interviews with Monash Health staff, the framework and taxonomy were adapted specifically for use in the context of disinvestment (Figs. 3a and 4). Details of barriers and enablers, observable characteristics of the determinants of effectiveness, perceptions of participants and adopters, the process of change, findings from the action research process and other project team reflections were documented in minutes, reports, spreadsheets and templates for this purpose (Fig. 3b).

Results and discussion

Some of the planned implementation and evaluation activities were not completed due to reduction of funding in the final year by the program funder and changes in requirements for the pilot project by the project funder; details and impact are discussed below.

Results of the literature reviews and the response rates and representativeness of participants in the survey, interviews and workshops are included in Additional file 1: Tables A–D. Surveys were received from 15 external experts, 65 individuals participated in interviews, 18 senior decision-makers attended a data gathering workshop, 22 experts and local informants were consulted and the members of the SHARE Steering Committee participated in four decision-making workshops.

Data collected from these activities informed a range of research questions. Findings related to the research questions in this paper are presented and discussed below; findings related to topics not addressed here are reported in other SHARE publications [14–16, 38–40].

Although Monash Health staff were not aware of the term 'disinvestment', they were familiar with the concept



Fig. 3 a, b Framework for evaluation and explication of disinvestment projects (adapted from Harris et al. [163] with permission)

of removal, reduction or restriction of current practices. Surveys and interviews with a range of decision-makers and project staff who had undertaken these and other resource allocation activities provided details of strengths, weaknesses, barriers and enablers in these processes. These have been combined into positive and negative influences to remove duplication; they are collated in Table 1 using the determinants of effectiveness for disinvestment projects (Fig. 3) and discussed within the research questions below.

The investigation of potential methods for identification, prioritisation and decision-making, and implementation and evaluation of disinvestment projects are summarised in Fig. 2. Multiple projects are reported in this paper. To avoid repetition, the Results and discussion sections are combined for each research question.

What methods are available to identify potential disinvestment opportunities in a local health service? What were the processes and outcomes of application of these methods at Monash Health?

Seven methods to identify disinvestment opportunities in a local health service were investigated. The focus of Aim 1 was to explore methods that could be integrated into organisational infrastructure for systematic consideration of disinvestment in routine health service decisions. Six potential mechanisms were identified (Fig. 1) [38]. Given that it might take some time to identify disinvestment targets from these approaches, a supplementary method was required to find suitable TCPs for immediate implementation in pilot projects in Aim 2. An 'Expression of Interest' process was introduced to achieve this.

In addition to the methods noted above, a range of other potential systematic approaches to identify disinvestment opportunities emerged from informal discussions during SHARE activities. These were recorded but not investigated and are listed in Table 2.

A non-systematic process of *ad hoc* submissions also emerged during the project and details are reported below.

1. Purchasing and procurement processes

Initial interviews and workshops with key stakeholders identified that systems and processes for purchasing drugs and clinical consumables and capital procurement for building and equipment were potential methods for systematic identification of disinvestment opportunities.

External Environment	Orga	inisation	Proposal for chan	e Potential adopters	Identification process	Implementation plan	
 Financial 	Levels	Staffing	TCP, service or prog	am Demographics	Principles	Strategies	
 Physical 	 Health network 	 Knowledge and skills 	 Level and quality or 	 Professional group 	 Top down/bottom up 	 Tailored to barriers 	
Political	 Site/Campus 	 Support 	supporting evidence	 Specialty 	 Systematic/ad hoc 	and enablers	
Community	 Program 	 Capacity 	from research	 Level of training 	Methods and tools	 Based on relevant 	
Legislation	 Unit/Department 	 Changes 	 Quality of supporti 	g Age	 Sources of information 	theory	
Regulation	 Team 	 Orientation 	data	 Time since graduation 	 Nomination/application process 	 Format 	
Standards	 Individual 	 Modelling 	 Nature of problem 	g Size of group	 Nominator's relationship to 	Facilitation	
Policies	Structure	 Role definition 	lack of ovidence	Expertise	TCP/service/program pathway	 Purpose 	
Guidelines	 Size 	Processes	Complete /partial	 Attitudes 	 External to pathway 	 Roles 	
Conferences	 Relationship to 	 General logistics 	- complete/partial	 Knowledge and skills 	 Stakeholder within pathway 	 Knowledge and skill 	
Publications	other	 Administrative 	Broposal	 Self-efficacy 	 Potential adopter of change 		
Potential patients	organisations	 Transparency 	Proposal	Other			
Demographics	 Internal 	 Access to 	 Clarity of purpose Change of purpose 	 Perceived support 	Prioritisation and decision-	Implementation	
Age	collaborations	information	 SIVIART ODJECTIVES Deletive educates 	 Leadership 	making process	resources	
Gender	Culture	 Use of information 	 Relative advantage 	 Team planning 	 Standardised process 	Financial	
Ethnicity	 Values 	 Communication 	Champions	Pationale and motivation	Transparent and accountable	 Administrative 	
Other relevant	 Beliefs 	 Decision-making 	 Champions Endorsement by 		 Authority to direct change 	Time	
eason for targeting	 Assumptions 	 Change 	 Endorsement by influencers 	 Remove, restrict or replace 	Explicit criteria	 Facilities 	
Clinical problem	 Personalities 	 Adaptability 	Opportunity for	 Save money 	 Use of research and data 	Expertise	
Risk factor	Leadership	– Linking	- Opportunity for	 Release resources 	Weighting	 Access to informativ 	
Population group	 Management 	- Saturation	Compatibility with	 Reduce harm 	 Stakeholder representation 	 Access to methods 	
urden of disease	style	– Willingness	- compatibility with	 Improve patient outcomes 	Technical experts	and tools	
Size of problem	 Hierarchy 	Priorities	 Impact on other or 	 Improve service efficiency 	Deliberative process		
Detential bonefit		 Strategic plan 	 Impact on other an Complexity 	 Reduce waste 	Deliberative process Pick assessment		
		 Business plan 	 Trialability 	 Meet changing population 	Conflict of interest		
children cancer etc.		 Population needs 	 Inalability Cost honofit 	needs	Connect of Interest		
children, cancer, etc		ropulation needs	- Cost benefit	 Meet changing priorities 	 Appeals process 		
				 Meet external requirements 			
	Details of pro	cess of change			Outcome measures		
ype of intervention: Pr	rofessional, financial re	professional/patient, orga	nisational, patient-	Degree of implementation: Target gro	ups reached, activities delivered as pla	nned, changes made	
nented, structural, reg	ulatory			Degree of practice change: Attitudes, i	ntentions, behaviours		
ype of targeted behav	iour change: Preventive	e service, diagnosis, test or	dering, referrals,	Health practitioners: knowledge, skills,	self-efficacy, satisfaction		
brescribing, managemer	nt, patient education, c	ommunication, record kee	ping, resource use,	Patient: Health outcomes (objectives o	f intervention, quality of life, adverse e	events, etc), health servic	
iischarge planning	and states and day land	and the state of t		utilisation (eg attendance, admission, l	ength of stay, re-presentation rates, et	c), satisfaction	
nplementer: Protessio	nai status, opinion lead	ers, authority		System changes: Organisational practic	ces, documentation, changes to service	provision, other	
etting: Reimbursement ountry, proportion of e	t system, location of ca ligible providers partici	re (eg inpatient, outpatien pating	t, community, etc),	Economic: Patient costs, health service implementation, reallocation of costs,	costs, local/global economic implication reallocation of resources saved	ons, cost of	
Nethods/quality: Study oncealment of allocation	design, unit of allocation, blinding, follow up,	on, unit of analysis, power data collection processes	calculation,	Timing: Time after initiation of interver	ntion, post-intervention follow up, pos controls	sible ceiling effect	
Controls used				Sustainability and enready Continuation	n after project completion integration	into routine practico	
Other: Source of fundin	g, ethical approval			ouscainability and spread: Continuation after project completion, integration into routine practice,			

Methods to encourage those making decisions about expenditure to consider disinvestment could be integrated into current processes. Prompts, triggers and even mandatory requirements to consider disinvestment could be included in algorithms, protocols, checklists, specific directions within purchase orders, explicit decision-making criteria for committees, or steps in application processes that require authorisation. Incorporating considerations for disinvestment into existing decision-making infrastructure might be achieved quickly and, once established, delivered with no additional costs.

Interviews with staff and analysis of health service documents found that Monash Health had very clear procedures for purchasing but less clear processes for capital expenditure. Only one prompt to consider disinvestment was identified in the wide range of decision-making contexts investigated. The application form for introduction of new TCPs asked applicants to identify current practices that could be discontinued when the new TCP was introduced.

Meetings were held with procurement staff to discuss evidence-based resource allocation processes and consideration of disinvestment. Positive outcomes included participation of the Procurement Manager in the Technology/Clinical Practice Committee (TCPC) meetings regarding introduction of new TCPs, clarification of authorisation processes for new equipment or consumables prior to purchase, and inclusion of a CCE staff member on the Clinical Purchasing Committee to facilitate evidence-based decision-making. However no changes regarding identification of opportunities for disinvestment were implemented. The Purchasing Policy Guidelines were due for routine review and those responsible welcomed participation of the SHARE team to address these issues; however the review was not undertaken during the life of the SHARE Program. *Discussion*

There are discussions in the current literature about smart, innovative and evidence-based purchasing [41, 42] and the need to consider economic evaluations in purchasing decisions [43], but we were unable to find mention of purchasing or procurement processes being used to identify local disinvestment opportunities.

2. Guideline and protocol development

In addition to processes that allocate funding, systematic mechanisms for allocating non-monetary resources

Table 1 Factors influencing resource allocation at Monash Health

Positive	Negative
External environment	
 Legislation, regulations, national and international standards, and professional standards must be followed. This provides clarity and certainty for some decisions International bodies and national agencies of other countries provide evidence-based recommendations for use of health technologies, clinical practices, models of care, etc. Systematic reviews and Health Technology Assessments are also available. The Australian government provides evidence-based recommendations for use of medical and surgical procedures and drugs Monitoring, evaluation and reporting of outcomes was required for government funded projects Department of Treasury is interested in supporting disinvestment initiatives but requires details of savings. If savings or reinvestments can be quantified the department may provide more funding 	 Some decision-makers are unaware of mandatory requirements Decision-makers are frequently unaware of evidence-based resources. Due to lack of time, knowledge and skills decision-makers do not actively seek these resources when making decisions and do not differentiate between high and low quality resources. Not all medical and surgical procedures and drugs are covered by national policies; nursing and allied health practices, models of care and clinical consumables are not covered Cost-effectiveness data is often based on modelling which is perceived not to reflect reality It is hard to measure savings; savings are rarely realised because they are absorbed and used to treat more patients
Organisational environment (Monash Health)	
 Enthusiastic and dedicated staff; staff commitment to quality improvement Organisational support from the Executive Management Team (EMT) and Directors of Nursing The Board, EMT and Senior Managers have expressed 'patient-centred care' as a priority. Involvement of people who are outside of, or uninterested in, the politics of the organisation Transparency and accountability in decision-making was highly valued and improved transparency and accountability at Monash Health was desired At site level there is good 'buy-in' for change and people are keen to make things work 	 Organisational culture is difficult to change Organisational politics gets in the way Considerable pressures on the health service to reduce costs. Lack of processes for project development, implementation, responsibility and accountability Lack of transparency in all aspects Lack of transparency and accountability in decision-making reduces confidence; inadequate transparency and accountability was one of the strongest messages No systematic processes to link projects across the organisation
Identification process	
 Projects were identified reactively based on Government or externally mandated change such as new legislation, regulation or standards; national or state initiatives; and product alerts and recalls. Clinician or management initiatives arising from awareness of successful projects elsewhere, conference presentations, journals and other publications, and drug and equipment manufacturer promotions. Problem solving driven by critical incidents, staff or consumer feedback, changing population needs, changing demand for services and budget shortfalls. Monash Health had well-documented processes for purchasing and procurement and guideline and protocol development and high level expertise in evidence synthesis and utilisation, data analysis and utilisation, and system redesign 	 General perceptions that financial drivers stronger than clinical drivers, 'Sound practice is not always affordable practice' impetus for change was ad hoc, there was no systematic or proactive approach internal bureaucracy and red tape stifled ideas People by-pass the system and just make changes, usually not deliberate but due to lack of awareness of processes Some applications for change are driven by pharmaceutical or equipment manufacturers No examples of using purchasing and procurement, guideline and protocol development, evidence from research or local data, health economic approaches or system redesign to identify potential opportunities for disinvestment were identified
Prioritisation and decision-making process	
 Using research evidence and local data in decision making was considered to be important. All respondents reported using research evidence and data in decision-making to some extent. Many examples of cross-unit/department consultation and collaboration for policy and protocol development and implementation. Conflict of Interest was required as a standing item on the agendas of relevant committees. Most committees had a process for conflict of interest for committee members, and some of those with an application process had a similar procedure for applicants. 	 Only one committee and one individual used explicit, documented decision-making criteria Only one committee required explicit inclusion of research and local data and considered the quality and applicability of this evidence. Only one of the ten projects appraised the evidence used. The other committees had no process to seek evidence from research. When evidence from research and data was used it was not usually appraised for quality or applicability. Barriers to using research evidence include no uninterrupted blocks of time, slow computers, lack of skills in finding and analysing evidence Appropriate local data was frequently reported to be lacking, unavailable and 'manipulated' Decision-making 'in isolation', 'fragmentation' and a 'silo mentality' were reported in relation to decisions made without consideration of the areas they would impact upon or consultation with relevant stakeholders.

Table 1 Factors influencing resource allocation at Monash Health (Continued)

Rationale and motivation

 Reasons for previous 'disinvestment-type' projects to remove, restrict or replace current practices include reducing patient harm, reducing medication error, reducing unnecessary tests, improving communication, standardising care, saving money and saving time. Most projects had more than one of these objectives

Proposal for change

- When the benefits of the proposed practice change are clear and observable
- When there is clarity, relevance, credibility and reliablity of research findings
- Availability of quality and timely local data
- Sustainability more likely if a range of staff involved, 'bottom-up' approaches to change used and monitoring of outcomes undertaken

Potential adopters

- Having the appropriate profession engaging others in change process, for example nurses should be implementing projects with nurses, not pharmacists
- Flexible and adaptable staff

Potential patients

• Many respondents supported increased consumer participation and were planning to act upon this

Implementation plan

- Decisions made at program level that involve multiple wards, departments or sites are usually implemented by multidisciplinary teams
- Allowing wards to nominate themselves for participation in projects
- 'Bottom up' approach to develop individual implementation plan in each ward
- Those with project 'champions' unanimously considered champions important to the success of the project.
- Lots of preparation including training and communication with all stakeholders
- Bottom up' training to gain staff 'buy in' combined with 'top down' supportive strategy
- Training or education included passive methods using posters and memos, interactive learning on new equipment and participatory approaches involving staff in design and implementation.

Evaluation plan

- Evaluation and monitoring were considered important and had broad support
- Routine clinical audits and monitoring of adverse events undertaken for hospital accreditation purposes provided indirect evaluation of decisions in some situations.

Implementation and evaluation resources

- Finding others who have done the same work for support, advice and information
- Establishing Working Parties and Steering Committees for support, endorsement, troubleshooting
- Project leader whose primary role is 'at the coal face'
- CCE was establishing an in-house Evaluation Service at the time of these interviews
- Use of pre-existing, pre-tested tools from other organisations eg audit tools
- Provision of extra staff

- Perceived distinction between 'what the hospital is concerned about (finances, organisational capacity and risk management) and what the clinician is concerned about (patients)'.
- Lack of baseline data meant that potential adopters were unable to see the benefit or relevance to their situation resulting in less 'buy in' and poor uptake.
- Resistance to change
- Staff cynicism about the importance of changes and relevance to them
- Some clinicians insist on autonomy in their areas of expertise
- Only one committee included consumer representation in decision-making.
 Several respondents thought that consumer representation on their committees would be inappropriate or that consumers had insufficient technical understanding to participate.
- Things take a long time to implement, to the point that they 'fall off the agenda'
- Variability in current practice and lack of standardisation increases number of practices to change
- Large size, nature and diversity of the organisation increases complexity of implementation across departments with different needsLack of effective implementation pathways
- Lack of infrastructure, technical support and resources
- High staff turnover in the organisation, particularly agency nurses and junior staff, increases difficulty in communication and implementation
- Organisational culture is difficult to change
- Organisational politics
- High staff turnover in projects diminishes organisational knowledge and expertise and increases training requirements
- Competing priorities
- · Lack of time, undertaking projects while continuing normal clinical duties
- One project had no implementation plan
- Education and training is not well provided for part-time and night staff
- No requirements for evaluation of outcomes of decisions or projects.
- Most committees had no planned evaluation of outcomes of decisions or implementation projects.
- Quality and Risk Managers are not included at the beginning to help with collection of baseline data and evaluation design
- Unrealistic project timelines
- Lack of knowledge, skills and confidence in project management, change management, evaluation methods and tools, and use of information technology. These barriers were exacerbated when interventions were complex and required high levels of training
- Lack of/inadequate project management and communication resulted in multiple people making inconsistent changes
- Some project staff felt isolated and would have liked support from others who had done the same or similar work
- It was not always clear who was responsible for project management
- Staffing issues, including leave, mean that a lot of projects are on hold

Tab	le 1	Factors	inf	luencing	resource a	allocation	at I	Monash	Healt	:h (i	Continued)

 Availability of extra funds enhanced implementation and evaluation, eg introduction of the National Inpatients Medication Chart had external funding specifically for implementation and evaluation Some clinical pathways involve no additional costs Some projects were provided with adequate resources for implementation and evaluation Some wards had additional staffing for education support and clinical nurse support. These were invaluable resources for practice change, protocol development and implementation. Some projects had external funding from DHS, universities, etc. for staff or infrastructure costs CCE ran training programs in finding and using evidence, implementation and evaluation Six of 10 projects had training for project staff in change management, leadership or IT skills. 	 High staff turnover in projects diminishes organisational knowledge and expertise and increases training requirements No specified evaluators with appropriate training or expertise had been utilised by the respondents A lack of data was seen to contribute to the current state of 'little or no process of evaluation'. Lack of/inadequate funding, lack of information about available funding Funding for new equipment frequently did not include funding for training staff to use it or the consumables required. Many projects were to be carried out 'within existing resources'. Respondents noted that they either diu upaid overtime or aspects of the project were not undertaken. Staff dissatisfaction with the expectation of their superiors that they will do more work within existing resources
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were also recognised by repondents as potential methods to identify disinvestment opportunities. Local guidelines and protocols determine allocation of resources for specific conditions, patient groups or clinical procedures by stipulating use of drugs or equipment, recommending diagnostic tests, selecting health professional groups, prioritising staff time, specifying referral mechanisms and allocating capacity in clinics, operating rooms and other facilities. There are potential opportunities for disinvestment in all of these activities. Prompts, triggers and mandatory requirements to consider disinvestment could be introduced into document development and authorisation processes. Requirements for local guidance to be based on the best available evidence would ensure that harmful, ineffective or inefficient TCPs would be identified in the systematic review process and steps to discontinue these practices could be included in the resulting guidance document. Evaluation, audit and review of guidelines and

Table 2 Additional systematic methods to identify potential disinvestment opportunities in a local health service

- Consider disinvestment explicitly in long term planning exercises
- Discuss principles of disinvestment and examples of successful projects at department/unit meetings, educational events, etc
- Assign member of decision-making committees to look for disinvestment opportunities in their decisions
- Add a disinvestment question to the Leadership Walkround protocol
- Identify clinical champions interested in disinvestment in each program/department/unit who would look out for opportunities
- Encourage support staff who have undertaken a disinvestment project to look for more opportunities
- · Have disinvestment as a high priority in medication safety reviews
- Encourage or require projects that are introducing something new to have a component of disinvestment
- Review projects that are being conducted for other reasons and identify and focus on any disinvestment elements
- Introduce thinking about disinvestment into quality improvement training programs

protocols may also identify opportunities for disinvestment. Mechanisms involving local guidelines and protocols could be implemented quickly and, once established, delivered with no additional costs.

The CCE staff members involved in SHARE were simultaneously developing a new Policy and Procedure Framework for Monash Health. No examples of using local guideline and protocol development to identify disinvestment opportunities were identified from the literature or local consultations in this process.

A prompt to consider whether any current practices could be discontinued was included in the instructions to developers of guidance documents. *"If the procedure involves introduction of new practices, identify the current practices that are being replaced. Cessation or restriction of specific activities in current practice must be addressed with active interventions in the same way as introduction of new practices."* [44]. A requirement that a systematic review process was followed and a checklist recording the steps undertaken were also included.

After developing the new framework, CCE staff handed it over to the department that had responsibility for organisational documents for implementation and ongoing governance. The disinvestment prompts and requirement for systematic reviews, along with other instructions, were removed by the implementers with the intention of making the process less onerous for document developers.

Discussion

Several authors refer to the potential to use guidelines for implementation of disinvestment recommendations [45–49] but we have not found any discussion of local guideline and protocol development being used as a method to identify disinvestment opportunities.

3. Proactive use of published research

Scoping searches of the health databases in preparation for the literature review revealed a growing body of evidence about practices that are harmful, of little or no clinical benefit, or where a more effective or costeffective alternative is available. Searches for evidencebased disinvestment opportunities could be undertaken and the findings delivered directly to decision-makers. Workshops with the Steering Committee determined that to avoid wasting time and resources considering information that does not represent the best available evidence, only high quality synthesised information such as systematic reviews, health technology assessments and evidence-based guidelines should be used proactively to drive decisions.

It was clear from interviews with decision-makers that Monash Health had no mechanisms to use research evidence proactively. The SHARE team developed a catalogue of disinvestment opportunities to enable this (Additional file 1: Table B). Searches were undertaken in known sources of high quality synthesised evidence to identify TCPs which were demonstrated to be unsafe, not effective or not cost-effective [50-54]. This was supplemented with information from evidence-based publications specifically focusing on disinvestment [55, 56]. A taxonomy was developed to classify publications by Bibliographic Source, Type of technology/practice, Disease group, Age, Gender, Healthcare setting, Professional group, Specialty, Outcomes, Author's recommendations and Links to original documents. Classifications were based on existing definitions from the National Library of Medicine Medical Subject Headings (MeSH) [57]; International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM) [58]; McMaster Evidence Updates [59]; and Academy Health Glossary of Terms Commonly Used in Health Care [60]. When suitable definitions were unavailable, additional classifications were created and defined to meet Monash Health needs. Potential disinvestment targets were also captured opportunistically by SHARE participants from conferences, journal articles, email bulletins and awareness of practice elsewhere. The project team reviewed research evidence to validate the claims and, if appropriate, add them to the catalogue, bringing the total to 184 TCPs. An algorithm for identifying disinvestment projects from a catalogue of potential TCPs was developed, based on an algorithm previously developed for introduction of new TCPs [2]. To prevent unnecessary resource use, the information is requested in stages, each stage predicated on a positive decision at the stage before (Fig. 5). To minimise the impact on busy clinicians and managers, work that does not require high level skills is undertaken by a project officer. To facilitate objective and trustworthy decisions, work that does require high level skills is undertaken by independent experts proficient in evidence appraisal and analysis of health service data, and transparent criteria are used in deliberation. Local information from policies and procedures, in-house knowledge and experience regarding applicability, and routinely-collected health service utilisation data, are used to inform the decision to proceed with a disinvestment project.

The planned activities were not undertaken. The *ad hoc* approach to identifying disinvestment opportunities discussed below dominated the selection process, leaving no time to develop or apply the proposed systematic methods. The transparent criteria for decision-making were not developed, the catalogue of disinvestment opportunities was not used to identify a potential disinvestment project, and none of the TCPs demonstrated to be harmful, ineffective or inefficient from the research literature were considered by the Steering Committee. *Discussion*

The concept of a catalogue of disinvestment opportunities has been discussed widely in the literature under the more recently coined term 'low value' lists. Lists are being developed by governments and health agencies [55, 61, 62], commissioners of health services [63], professional bodies [47, 64, 65] and researchers [66-68]. Some of these lists are derived from research evidence, some are based on expert opinion and others from a combination of the two. Although removing practices of little or no value clearly has merit, the definition of 'low value' is not always explicit and the validity and appropriateness of some of the lists and the ethics of their application have been questioned [67, 69-73]. Duckett and colleagues separate them into 'top down' and 'bottom up' approaches, noting that each has benefits and drawbacks [74]. The 'top down' approaches, such as the UK National Institute for Health and Clinical Excellence 'Do Not Do' Recommendations [55], are described as providing the most consistent, objective, transparent and relevant evaluations. The 'bottom up' approaches, such as the Choosing Wisely program being replicated in national campaigns across the world [75], highlight potentially 'low value' treatments and tests so that clinicians and consumers can consider the relative benefits in their specific situations. Potential users of 'low value' lists may wish to confirm the basis for claims made, in particular the definition being used and the use of systematic review evidence in the inclusion process.

4. Proactive use of local data

Respondents in the interviews and workshops to identify potential settings and methods for disinvestment noted that hospitals and other health facilities routinely collect large amounts of data. Three approaches to targeted analysis of routinely-collected data to discover opportunities for disinvestment were identified.

1. To identify areas where disinvestment might have the greatest impact, such as TCPs associated with





high volume, high cost, extended length of stay or high rates of adverse events, readmission or reoperation.

- 2. To investigate variations in practice between organisations, departments and individuals, or over time, that might indicate overuse or inappropriate practices.
- 3. To explore less commonly used data sources such as complaints registers or patient satisfaction surveys for emerging themes related to inappropriate or undesirable practices.

Interviews with Monash Health decision-makers found that they often used local data to understand problems or develop solutions, but they did not use it proactively to review current practice, seek opportunities for improvement or drive priority setting. While Monash Health was reported to be very responsive to incident reports and complaints on an individual case basis, there were no processes to consider this body of data, seek out patterns or identify areas of concern for further action.

The first two approaches were to be explored within the activities of the proposed Data Service (Aim 3 Fig. 1), but unfortunately this could not be established, mainly due to limited staff capacity and problems with local data access and coordination [15]. The third approach was to be considered in a consumer engagement framework [40], however the incident reporting software and consumer information available from other sources was thought to be inadequate for aggregation and meaningful interpretation, problems that have since been resolved but which prevented exploration at the time. Due to these local barriers, proactive use of health service data was not employed to identify disinvestment targets for pilot projects.

Discussion

There is a large body of literature on examination of practice variation [76]. Two recent studies have used practice variation in national and regional settings specifically to identify ineffective practices and note the potential to do so within local health services, or for health services to benchmark against their counterparts [21, 74]. Hollingworth et al. note that many procedures with the highest variability are often not on the 'low value lists, indicating additional possibilities to identify disinvestment opportunities from this approach [21]. Use of local data clearly has potential but problems with data validity, reliability, comprehensiveness and degree of sensitivity to disinvestment requirements remain significant barriers [5, 7, 21, 48, 77, 78]. In the same way that the algorithm described above uses local data to substantiate a decision to disinvest a TCP arising from research evidence, research evidence would inform a decision arising from local data by identifying best practice in the relevant area and confirming whether change is needed and what the appropriate alternatives are [38].

5. Economic approaches to priority setting

The literature review exploring the concepts and implications of disinvestment in a local health service found that economic approaches had been used to identify disinvestment opportunities and had potential to do so at Monash Health. Priority setting exercises use economic principles to determine which practices, programs or services to introduce, maintain or remove. Decision-makers weigh up options for investment and disinvestment and select their preferred alternatives using pre-determined criteria established by the stakeholders.

Local respondents were not familiar with health economic methods for priority setting. The subsequent literature review focused on identifying examples of economic methods found two existing reviews that analysed and compared priority setting exercises [79, 80]. Four methods met the criteria of economic analysis applicable at the local health service level; however all of these have limitations in their ability to identify disinvestment opportunities in this context. Health Sector Wide (HsW) Priority Setting, Quality Adjusted Life Year (QALY) league tables and Generalised Cost-Effectiveness Analysis (GCEA) rely on economic evaluation data, making them unsuitable for decisions involving TCPs which do not have any available published economic evaluations [80-82]. GCEA is generally used to make shifts within departmental budgets, rather than across departments or programs [82], also limiting application in the local setting. HsW is designed to shift the focus away from program budgets towards well-defined target populations with particular health problems [81], however health service funding allocation is not based on condition-specific populations. Program Budgeting and Marginal Analysis (PBMA) is the most widely used method; the process is well-tested and guidance is available [79, 83]. It applies the principles of opportunity cost and marginal analysis to determine priorities for health program budgets in the context of limited resources [84]. PBMA has been proposed as a method of 'rational disinvestment' [85].

These findings were summarised in a discussion paper and debated at a workshop with the SHARE Steering Committee. Although a health economist had been engaged as a consultant to the SHARE Program, Monash Health had no plans to establish in-house expertise in health economics. The lack of ongoing health economics capability was the key factor in the decision that priority setting exercises were not feasible at Monash Health. *Discussion*

Although decision-makers acknowledge the usefulness of PBMA, it remains quite difficult to achieve in practice [5, 77, 84]. The major limitations for all priority setting approaches include lack of standardisation in cost-accounting, lack of sufficient high quality data to inform decision-making, and lack of time and skills to undertake the process and implement the decisions [5, 9, 77, 78, 83–85].

6. System redesign

The early scoping searches of the health literature also identified system redesign as another potential method. It is a familiar process in health services and offers a well-accepted context to introduce practice change. System redesign describes a range of methods and tools that have been adapted for use in health care including Lean thinking [86], Clinical process redesign [87], Program Logic mapping [88], Plan Do Study Act quality cycle [89] and Failure Mode Effect Analysis [90]. System redesign could be integrated into a systematic organisational approach to disinvestment.

Information was gathered from another focused literature review to identify examples of system redesign, methods, tools and resources required; and from interviews to investigate system redesign within Monash Health. The literature review was unable to identify examples of system redesign that specifically related to resource allocation decisions for TCPs and, although there was extensive expertise in system redesign at Monash Health, none of the respondents could recall any projects driven by decisions related to resource allocation. However, some of the reported reasons and motivation for system redesign are consistent with principles of disinvestment, for example better use of existing resources, maximising value and eliminating waste, increasing efficiency and reducing duplication of services [91–93]. Monash Health respondents noted that, although disinvestment is not usually an aim of redesign processes, it may be an outcome.

These findings were summarised in a discussion paper and debated at a workshop with the SHARE Steering Committee. The committee decided that system redesign methods would not be used specifically to identify opportunities for disinvestment, but they may be useful in implementing decisions to disinvest and this should be considered for future projects.

Discussion

The potential for system redesign as a useful approach to implementing disinvestment has been confirmed in more recent literature [9, 18, 62] and also suggested as a method to quantify disinvestment [62]. Applying the terminology of 'system redesign' has also been advocated as a strategy to increase the likelihood of implementation by avoiding the negative connotations of the word 'disinvestment' [18, 94].

7. Expression of Interest

A method of rapidly identifying disinvestment opportunities for pilot projects was needed. The Steering Committee proposed that an Expression of Interest (EOI) process where health service staff nominated their own projects could potentially provide quick results.

Monash Health staff were invited to submit applications to receive training and support from the SHARE Program for a disinvestment project. An EOI form was drafted to include criteria agreed by the SHARE Steering Committee. To facilitate completion of the new document, the content and format of existing Monash Health templates familiar to the applicants were adapted to address the EOI requirements. A disinvestment project was defined as one that removes a TCP that is unsafe or ineffective, restricts a TCP to more appropriate patient groups, or replaces a TCP with an equally safe and effective but more cost-effective option. Training in implementation and evaluation methods was provided by the Capacity Building Service. Support available from the Project Support Service included administration; project planning and implementation advice including analysis of barriers and enablers; evaluation advice including establishing systems to monitor and evaluate change and identify sources of data; and economic evaluation or cost comparison study (methodology determined by SHARE health economist). Clinical trials and projects already underway were excluded.

Invitations to submit an EOI were distributed via the Clinical Program Directors. Two applications were received.

Discussion

Three more-recently published frameworks for disinvestment also propose applications from stakeholders in the identification process [95–97]; however the effectiveness of this approach has not been established [21, 98].

8. Ad hoc submission process

Many *ad hoc* proposals for potential disinvestment projects were received. At each meeting, members of the Steering Committee nominated TCPs which the SHARE team were asked to investigate. This process was given priority over development of criteria to ascertain suitable TCPs from the catalogue of evidence-based project opportunities. Each proposed TCP had one or more attributes that made it seem promising, but no assessment using explicit criteria was undertaken. Seventeen TCPs were nominated in this way.

Including the two EOIs, 19 TCPs were investigated as potential pilot disinvestment projects. The nature of the change and reason for nomination are summarised in Table 3.

Discussion

Proposals based on individual's observations or local knowledge have been referred to as *"soft intelligence"* [21]; this has been described in attempts at disinvestment by others and noted to be unsustainable [21, 23, 99].

What methods are available for prioritisation and decision-making to initiate disinvestment projects in a local health service? What were the processes and outcomes of application of these methods at Monash Health? *Prioritisation framework and tool*

The priority setting exercises described above clearly include a prioritisation process, however initiatives that identify disinvestment targets by other means may need a specific prioritisation process to choose between the available options.

A literature review to identify frameworks and tools for prioritisation found a Spanish guideline and assessment tool specifically for disinvestment [100], a framework for priority setting in the Australian context [101, 102], a guidance document for prioritisation of new or existing technologies [103], and two systematic reviews and an overview of international practice in prioritisation of new technologies [104-106]. Consultation with local informants identified that replacement of high cost medical equipment had to meet the requirements of the state government Medical Equipment Asset Management Framework (MEAMF). Interviews with local decision-makers identified that there were no decision-making settings at Monash Health where disinvestment was explicitly considered, hence nowhere to pilot prioritisation tools. The Steering Committee directed the SHARE team to develop a tool that could apply to both investment and disinvestment and pilot it in the annual capital expenditure funding round.

The Australian priority setting framework [101, 102] was adapted for use as a local template and the Spanish

Table 3 Potential disinvestment projects

Potential projects and reason for nomination	Source	Result of investigation
1. Reduce ordering of 'routine' diagnostic tests in specific setting as thought to be unnecessary and result in increase risk of adverse events and increased costs to hospital and/or patient	Committee member	Not investigated: Further clarification of problem postponed in favour of subsequent proposals
2. Reduce ordering of diagnostic tests in specified setting due to lack of evidence of benefit and concern about validity, reliability and performance of equipment	Committee member	Not investigated: Further clarification of problem postponed in favour of subsequent proposals
3. Reduce ordering of diagnostic tests in specified setting as thought to be of little diagnostic value	Committee member	Not investigated: Further clarification of problem postponed in favour of subsequent proposals
 Replace equipment with alternative to reduce adverse events and improve patient outcomes in specified patient group resulting in cost savings 	Project champion	Not investigated: Project identified too late to be completed within SHARE timelines
5. Replace diagnostic test in specified patient group for one thought to be more appropriate	Committee member	Investigation not completed: Directed by Steering Committee to pursue Therapeutic Equivalence projects
6. Reduce admission of specified patient group as thought to be unnecessary in many cases	Committee member	Investigation not completed: Directed by steering committee to pursue Therapeutic Equivalence projects
7. Replace drug with lower cost but equally effective alternative in appropriate cases as project being undertaken anyway and it would be good way to learn about the change process	Therapeutic Equivalence project	Rejected: Project was already underway
8. Replace drug with lower cost but equally effective alternative in appropriate cases as project being undertaken anyway and it would be good way to learn about the change process	Therapeutic Equivalence project	Rejected: Project was already underway
9. Reduce use of therapeutic intervention due to concerns about safety and effectiveness	Committee member	Rejected: Lack of clarity regarding explicit problem, patient groups, etc.
10. Reduce use of therapeutic intervention as thought to have no evidence of benefit	Committee member	Rejected: Evidence for change unclear
11. Reduce use of therapeutic intervention as thought to have no benefit over less expensive alternative	Committee member	Rejected: Preference to wait until large RCT underway at the time provided conclusive evidence
12. Reduce ordering of 'routine' diagnostic tests in specified setting as thought to be unnecessary, result in increase risk of adverse events and increased costs to hospital and/or patient	Committee member	Rejected: Specific setting already planned to be investigated by others in organisational review but timing was unspecified
13. Cease use of therapeutic intervention in specified patient group due to published debate questioning effectiveness	Committee member	Rejected: Evidence not relevant to local patient population
 Reduce ordering of 'routine' diagnostic tests in specified patient group as thought to have no evidence of benefit 	Committee member	Rejected: Department could not provide backfill to replace project champion who would undertake project
15. Reduce use of therapeutic intervention in specified patient group due to concerns about patient safety, not recommended in clinical guidelines used elsewhere	Committee member	Decision postponed: While proposer confirmed evidence Rejected: When discovered that project had commenced
16. Replace therapeutic intervention in specified patient group with one considered to be safer, more effective and more cost-effective and funded by state health department	VPACT project	Accepted then Withdrawn: Clinicians became aware of additional evidence and elected to undertake RCT
17. Restrict use of therapeutic intervention in specified patient group as local practice thought to be inconsistent with	Expression of interest	Accepted then Withdrawn: Clinicians not convinced by evidence, local practice found not to be inconsistent

recently published national guidelines 18. Reduce ordering of diagnostic tests considered to be Expression of interest Accepted then Rejected: Inopportune timing due to external accreditation process and introduction of new inappropriate in certain unspecified situations computer database and electronic ordering system VPACT project 19. Replace therapeutic intervention in specified patient group Accepted: Project undertaken with SHARE support but with one considered to be safer, more effective and more evaluation incomplete due to loss of funding prior to cost-effective and funded by state health department completion of implementation

PriTec prioritisation tool [100] was modified to address MEAMF requirements and include relevant elements from the TCPC application forms [2]. Equivalent criteria for comparison of non-clinical technologies such as information technology and building works were developed as they are considered alongside health technologies in the capital expenditure process. The tool included methods of establishing criteria, a suite of domains from which criteria could be selected, potential questions that can be asked within each domain, scoring systems, processes for weighting criteria and a template to record decisions. These were workshopped with the Steering Committee and members of the Capital Expenditure Committee and refined based on their feedback. The tool was not tested; the capital expenditure process was cancelled in that year as Monash Health had no spare capital.

Discussion

Subsequently, lists of criteria for consideration in prioritisation and decision-making have been published for disinvestment [22, 107–110], resource allocation [111, 112] and general decision-making [113], and software applications are now available to facilitate prioritisation processes [83, 114]. Other more recent publications have noted that, like Monash Health, most decision-makers use their own prioritisation matrix based on simple spreadsheets or business case templates and that this variety of tools makes it difficult to compare costs and outcomes within and between agencies [9, 77, 94].

Decision-making to proceed with a disinvestment project

Prioritisation tools primarily focus on characteristics intrinsic to the TCP. However additional criteria may influence whether a TCP is selected to be the focus of a practice change initiative. These might be factors that affect the outcome of a project such as likelihood of success or sustainability and potential usefulness of the evaluation, or pragmatic features that enhance initiatives chosen specifically as pilot or demonstration projects such as opportunities for 'quick wins'.

Criteria for the EOI process were developed based on information from the literature and stakeholder consultations, and refined in consultation with the SHARE Steering Committee. The EOI criteria stipulated that the project must be based on high-quality evidence, be endorsed by Program and Department Heads, have appropriate resources allocated to undertake the project, have a documented clinical pathway and clear measurable outcomes. These and additional criteria that emerged in general discussion during SHARE meetings are outlined in Table 4. However no explicit decision-making criteria were established to prioritise or make final decisions regarding pilot projects.

The decisions made were pragmatic, based on likelihood of 'quick wins' and unspecified factors related to the proposed TCP. Prioritisation did occur, but the reasoning was not transparent. The final outcomes and reasons for the decisions are summarised in Table 3. Of the 19 proposed TCPs, four were not investigated as the Steering Committee directed the SHARE team to disregard them in favour of subsequent proposals which were thought to have greater potential; two had incomplete investigations for the same reason; and nine were rejected for a range of issues. Four applications were accepted. The first was withdrawn almost immediately by the clinical project leaders who became aware of additional evidence that reduced their confidence in the original decision and elected to undertake a randomised controlled trial (RCT) instead. The second had moved into the development and planning phase when the clinical project leaders initially questioned the evidence underpinning the guideline recommendation they were implementing, and subsequently decided that the practice to be disinvested was not routinely performed at Monash Health. The third had potential as a disinvestment activity but was not well defined. The SHARE team worked with the clinical project leaders to identify and quantify the problem and clarify the proposed practice change; however the project was withdrawn when it became clear that external factors would prevent it from being achieved within the original SHARE timelines (this decision was made prior to reduction of funding in the final year of the program). The fourth project went ahead. Two of the four projects accepted were from the EOI process and the other two had external funding from the Victorian Policy Advisory Committee on Technology (VPACT). VPACT funding was provided to implement new technologies, however both projects had an element of disinvestment as the new TCPs were replacing a clearly identified current practice.

Discussion

Deciding between several alternatives can be a complex process requiring consideration of multiple factors. This has been addressed in more recently developed tools. Multi-criteria decision analysis (MCDA) allows consideration of all factors simultaneously [115, 116] and Accountability for Reasonableness (A4R) is based on four principles ensuring that decisions are relevant, transparent and able to be enforced and appealed [117]. MCDA is the foundation for the Star model (socio-technical allocation of resources) [118-120] and the EVIDEM framework (Evidence and Value: Impact on DEcision Making) [121]; both of which have been piloted, revised and produced resources to aid implementation. A4R is the basis for the 6-STEPPPs tool (Systematic Tool for Evaluating Pharmaceutical Products for Public Funding Decisions) [122] and A4R and MCDA have been combined in other decision-making applications [115, 123].

Table 4 Examples of criteria for selection of disinvestment

 projects considered in the SHARE Program

Criteria in the SHARE Expression of Interest application

- The project must aim to remove, restrict or replace a technology or clinical practice
- There must be high-quality evidence for the proposed change (as indicated by existing systematic review or body of evidence from peer reviewed articles)
- Department and Program heads endorse the proposed change
- Department or Program agrees to provide EFT/project leader to implement the proposed change
- The current clinical pathway is documented or a commitment is given to document this pathway before the project begins
- There are clear, measurable outcomes and ability to collect baseline and comparison data

Criteria that may increase the likelihood of project success or sustainability

- Project leaders who have the power to make change happen in their area of responsibility such as Unit Managers or Department Heads
- Project champions who are respected and trusted by the potential adopters
- Interested, engaged clinicians working in the topic area
- Available funding
- Projects that propose reallocation of resource savings

Criteria that may be useful for selection of pilot or demonstration projects in disinvestment

- Projects that are already planned for another reason that also contain an element of disinvestment
- Projects to introduce a new TCP where disinvestment of an existing practice can be made a focus of the project
- Opportunity for a 'quick win'

Criteria that may increase the usefulness of a pilot or demonstration projects in disinvestment

- Projects that are required to collect detailed data, for example reporting requirements of external funders
- Projects with robust data at baseline

What methods are available to develop, implement and evaluate disinvestment projects in a local health service? What were the processes and outcomes of application of these methods at Monash Health?

The initial literature review and survey of external experts did not identify any information to guide development, implementation or evaluation of disinvestment projects in the local health service context. Interviews and workshops with Monash Health staff found that, although they did not use the specific term, they had experience of 'disinvestment' processes and other resource allocation activities. Most of the issues they identified (Table 1) were consistent with well-recognised factors such as the effect of organisational culture, value of stakeholder involvement, and lack of time, skills and resources. Others were less well-known such as unrealistic project timelines, the importance of support from colleagues who had done similar work, and lack of organisational processes for project development, implementation, evaluation and governance. Respondents also identified needs for assistance including capacity-building, provision of expertise, practical support tailored to needs of individual units and health professional groups, and incentives for change.

Only one of the proposed pilot disinvestment projects reached the implementation stage (Table 3). Nursing and allied health staff were introducing a non-surgical technique in a subset of patients currently being treated with a surgical procedure. The surgeons were happy to relinquish these cases to reduce the waiting time for their other patients.

The clinical project team attended workshops on evidence-based change, implementation and evaluation and worked with SHARE staff to develop project, implementation, evaluation, reporting and cost-comparison plans. The funding agency required Monash Health to include four other health services in this project but no additional time or resources were provided. Many of the activities in the planning and development phase of the project were not undertaken as this time was spent liaising with the other health services. Analysis of barriers and enablers was delayed until midway through the implementation process which precluded development of strategies to avoid or minimise problems before they arose; however identifying actual, rather than anticipated, influencing factors provides more accurate information for future use (Table 5). The Project Support Service provided assistance in identifying indicators to meet reporting requirements; designing and developing a data collection tool and purpose-built database; training in data entry and analysis; liaising with data providers, statisticians and the SHARE health economist; and ongoing problem solving.

As the SHARE Program concluded earlier than expected, the implementation phase had not been completed and the planned evaluation was not undertaken. While we understand that the new technology was implemented and the transition from the old procedure to the new procedure was generally successful, final outcomes were not measured. The clinical project team agreed to complete the same template used by the SHARE project team to capture their experiences: 'what worked, what didn't work, how could it be improved?' There is considerable overlap between these findings and the barriers and enablers. They have been combined and collated under the headings of the determinants of effectiveness in Table 5. Many of these are context-specific relating to the clinical procedure, requirements of the funding body, and relationships between stakeholders; however others identify issues likely to be common to local healthcare settings such as impact on other departments, difficulties moving between sites or finding new clinical accommodation, and one health professional group not accepting the role of another. The benefits of in-house expertise and support provided for development, implementation and evaluation were highlighted.

Discussion

The current literature acknowledges generic needs for implementation strategies and methods for monitoring and evaluation of disinvestment outcomes. In concert with the responses from Monash Health staff, several authors call for dedicated resources and in-house "resource centres" to provide expertise, access to relevant methods and tools, and education, training and capacitybuilding [9, 11, 95, 124, 125]. A guideline for disinvestment details eight steps in an Action Plan [96], some authors note principles for implementation and others discuss barriers and enablers [98]. A range of theoretical approaches to facilitate implementation of disinvestment decisions has been proposed but the authors do not report application or evaluation of these strategies in the disinvestment context. These include communication and educational materials [6, 7, 63, 70, 107, 109]; financial incentives and pay-forperformance [46, 70, 109, 126, 127]; reinvestment of resources saved [8, 18, 107, 128]; clinical champions [18, 77]; clinical pharmacists to monitor and advise prescribers [129]; quality standards [70, 127]; professional standards, maintenance-of-certification activities and practice audit [70]; prompts through guidelines, protocols, clinical pathways and decision support systems [6, 7, 24, 48, 109, 126, 127]; requirements to report variations from mandatory guidelines [127]; monitoring and reporting of outcomes [107, 109, 126]; public reporting of provider performance [70, 109, 126, 127]; training and re-organisation of staffing and equipment [107]; and "picking low hanging fruit" before tackling more difficult projects [18]. The Schmidt framework for disinvestment notes that both process and outcome evaluations should be undertaken but provides no other details [95]. Others propose measures for both procedure aspects and outcomes in priority setting projects [130] and list evaluation tools linked to specific project/program goals [131]. A systematic review summarises a range of performance measures to assess use of low value TCPs [132]. The deficiencies in available economic and usage data and lack of methods for quantifying savings are considered to be significant limitations to evaluation [11, 24, 48, 78, 133].

What factors influenced the decisions, processes and outcomes?

The factors identified in relation to the determinants of effectiveness are summarised in Table 5 (pilot project) and Table 6 (SHARE process). Due to the shortened timelines our ability to draw conclusions is limited, but we can describe and discuss key findings related to process and impact in the context of known influencing factors from the current literature.

Difficulty identifying disinvestment projects

The challenges in identifying suitable disinvestment projects are well documented. Decision-makers find it difficult to identify appropriate disinvestment opportunities [5], even when provided with evidence-based lists of appropriate options [48, 134]. Having made a decision, they are often uncertain about whether it is correct [5] and some prefer to avoid the decision and *"invest to save"* as an alternative to disinvestment [18]. Decision-makers can be enthusiastic supporters of disinvestment in theory, but unable to select TCPs for disinvestment in practice [21].

The experiences at Monash Health are consistent with these. Only one suitable project emerged from 19 nominations. Three factors played a significant role in this lack of success: dominance of an *ad hoc* process to select targets for disinvestment, local barriers beyond the scope of the SHARE Program, and lack of clarity and substance in proposals for change. These are discussed below.

Non-systematic approach

The absence of standardised methods for disinvestment decision-making is well-recognised [11, 18, 19, 23, 99]. Lack of transparency was reported in the earlier explorations of decision-making at Monash Health [39] and is also discussed in the literature in relation to disinvestment processes [7, 23, 62, 77, 83, 99, 135].

Ad hoc approaches to disinvestment decisions have been reported as "non-sustainable, reliant on chance or not conducive to independently identifying local opportunities for disinvestment" [21], compromising transparency and leading to uncertainty [23]. The gap between rhetoric and reality is described as the heart of the challenge related to disinvestment in healthcare policy and practice [99]. The experience that "a lot of decisions are taken on gut feeling" and the problematic "tendency to adopt a short term perspective whilst searching for a 'quick fix' instead of taking a whole systems perspective based on consideration of long-term sustainability" [99] reflects the SHARE experience.

Although the SHARE Program was underpinned by a commitment to systematic, transparent, accountable and evidence-based systems and processes, this was not achieved in the process of delivering pilot disinvestment projects. Potential target TCPs in the evidence-based catalogue were not considered and nominations were accepted and pursued in an *ad hoc* manner.

SHARE had all the recognised enablers to systematic use of synthesised evidence in decision-making [136–140]. The decision-makers understood the usefulness of systematic reviews, the program was committed to EBP, and the organisational culture was supportive. The CCE team had the appropriate skills and were sufficiently resourced to identify and access the evidence, ensure its applicability, highlight the relevant message and deliver it directly to decision-makers. Yet the planned systematic approach using synthesised evidence was not followed. The shortened timelines prevented exploration of the reasons for this unexpected outcome.

	Table	5	Factors	influ	Jencing	the	SHARE	pilot	disinvestment	pro	iect
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Table 5 Factors influencing the SHAKE pilot disinvestment project	t
Positive	Negative
External environment	
 The project funders had significant impact on the project Political support for new technology The other health services in the consortium also had significant impact Collaboration with some of the other health services in writing pathway and documents and developing database and implementation strategies was helpful Manufacturer's information was useful Manufacturer's technical representative was helpful 	 The project funders had significant impact on the project Monash Health informed that they had to lead a consortium of health services in implementing the new technology, adding complexity to the original application Lack of consultation in choice of partner health services Requirements for data collection and reporting changed during the project The other health services in the consortium also had significant impact Slow and difficult to coordinate when working with other health services Lack of accountability in some of the other health services Lack of 'buy-in' from other health services through the entire process
Organisational environment (Monash Health)	
 Monash Health's reputation as a leader will facilitate new technology support Monash Health encourages innovation Support from Centre for Clinical Effectiveness (CCE) Support from Clinical Program Directors Support from Finance Department and having someone who can translate the finance jargon Clinical Resource Nurse monthly meetings Nursing/Allied Health collaboration Although staff leave and secondments are difficult there can also be an advantage of working with replacement staff who become familiar with the project 	 Organisational processes appear to be changing regularly Lack of clarity around organisational structures and processes eg who to go to for what, when etc. Lack of communication eg machine delivered to a corridor on a Friday afternoon and left unsecured over the weekend. A component was lost and a new component had to be purchased. Relevant patient group and clinical expertise in this area located at site A and new machine is at site B. Patients usually scheduled for surgery at A will have to transfer to B. Sites have different cultures and processes and patients and staff will have to adapt Impact on other departments eg Sterilisation department has to learn new procedure Staff secondments and/or leave
Identification process (VPACT application process for introduction of new 7	ГСР)
 Proposed by potential adopters (nursing/allied health and surgeons) Support from CCE to provide supporting evidence Support from Clinical Information Management to provide supporting data 	 Application form is really long and a lot of work Lack of awareness of the workload prior to commencing work on application
Prioritisation and decision-making process (SHARE process to determine di	isinvestment project)
 VPACT funding and endorsement Clinical project team keen to access CCE expertise and support for project delivery 	
Rationale and motivation	
• To reduce harm, improve patient outcomes, improve service efficiency, save money	Emphasis on financial/economic outcomes
Proposal for change	
 There is good evidence to support the new technology Data on patient group, burden of disease, impact of new technology provided in detail New technology does not cause long lasting/irreversible damage Easy to use Proposal for change is clear Relative advantage is clear: improved outcomes for both patients and health service Endorsed by clinical leaders, good local engagement, clinical champions Surgeons allowed to keep the theatre time and reduce their own waiting lists (rather than reallocating to other surgical specialties or closing theatres to realise savings) 	 Longer time to set up than other treatment options Lots of protective clothing which can be uncomfortable Mentally and physically tiring The whole process of change including administration, training, support, etc. is a lot of work
Potential adopters (Nursing and Allied Health staff to undertake new proce patients appropriately	edure, surgeons to reduce old procedure, junior medical staff to refer

- Most surgeons happy to relinquish old procedure to allow them to undertake other procedures
- Surgeons involved in VPACT application have become an authority on the new technology
- One group of surgeons less likely to refer patients for new procedure, do not appreciate role of podiatrist in patient care, lack of understanding of treatment options
- Some surgeons/medical staff have issues with territorialism and ego

Table 5 Factors influencing the SHARE pilot disinvestment project (Continued)

- Senior clinical staff read up on new technology as they don't want to lose face
- Registrars (referrers) are supportive of/have an interest in new technologies
 General interest among staff
- Nursing/Allied Health team look professional, able to build credibility and trust with patients

Potential patients

Patients with chronic conditions are more open to trying new treatments

Implementation plan

- Small training workshops with medical teams
- Support from CCE
- Support from Clinical Program Directors
- Maintenance of a booking system
- Quarterly meetings with all participating health services

Evaluation plan

- Support from CCE in development of evaluation plan

Having a person in charge of data entry
Implementation and evaluation resources

- Other clinical staff voluntarily take up extra workload (both barrier
- and enabler)Support from CCE in design of a database, assistance with data entry and reporting
- Support from SHARE health economist in development of costcomparison plan
- Monash Health 'Scope of practice' processes and documents were helpful

- This group of patients are less likely to be comfortable travelling to different hospitals
- Lack of English language can be a problem
- Should have performed barriers and enablers analysis earlier in process
- Involvement of other hospitals with staff who are not dedicated/ committed (eg disputes among doctors from another site)
- Having to repeat training every 3-6 months due to staff rotations
- Attrition of podiatrists and Clinical Nurse Consultants as they are often young women who leave or work part-time to have or care for children
 Keeping the team motivated is hard
- VPACT did not meet costs stipulated in application; fewer machines, limited consumables, etc.
- Lack of dedicated treatment room increases time for preparation and cleaning. Clinical time is small in comparison to set up/clean up time. Inadequate ventilation (aerosols are created with treatments)
- 'Shifting the goal posts' by VPACT regarding data collection and reporting
- Inadequate funding for clinical staff to implement and evaluate change process
- Other clinical staff voluntarily take up extra workload (both barrier and enabler)
- Time needed to write up new scope of practice documents

The non-systematic approach also led to a lack of transparency. All discussions were documented in minutes of the meetings and there were no attempts to be covert, however in the absence of a specified process and explicit criteria, it was not always clear how decisions had been made. The decisions themselves were transparent but the methods to reach them were not.

There were four exceptions to the *ad hoc* approach: two projects were based on a systematic, explicit EOI process and two had been through a rigorous application process for VPACT funding. These were the four projects finally accepted.

Nominations by 'outsiders'

"Understanding how the technology got on the agenda, where it came from and who was pushing for it" have been reported as important factors for senior health decision-makers [135]. When invited to nominate candidates for disinvestment, clinicians frequently identified the practices of other professional groups rather than their own [21, 70]. This is also true of the SHARE process. Eight proposals were made by people who had no connection with the TCP pathway. In addition, two were proposed because they were proceeding anyway (Therapeutic Equivalence Program) and two were proposed by the state health department unit (VPACT) providing funding to implement new TCPs (Table 3). In total, 12 were proposed by 'outsiders'. Five proposers were participants in the TCP pathway but were not the clinicians whose practice was nominated for change. Only three nominations were made by the potential adopters; one was the pilot project accepted and implemented, one was accepted as a pilot project but was subsequently withdrawn by the applicants and the other was nominated too late to be included in the SHARE timeframe.

Authority and ownership

Noted barriers to EBP include lack of authority to make the change [78, 84, 137, 139–142] and lack of ownership by key stakeholders [84, 143–145].

Positive	Negative
External environment	
 The SHARE program was adequately funded (until the final phase of the program) Two proposals that received state health department funding and endorsement were considered favourably. Two proposals were triggered by new national guidelines, one by an editorial in the Medical Journal of Australia, and others by journal articles, email bulletins, attendance at conferences and proposers awareness of practice elsewhere. 	 The state health department withdrew funding for the final phase of the SHARE program resulting in reduction of the proposed evaluation activities. One project was rejected due to difficulties implementing change during the national accreditation process for this department's services.
Organisational environment (Monash Health)	
 Monash Health encourages and supports innovation High level expertise was available from CCE and Clinical Information Management 	 Waiting for responses to email correspondence and requests for appointments to meet with key personnel; time lags due to annual and long service leave and decisions by committees that only meet monthly delayed the processes of identification, prioritisation, decision-making and project development. Delays in deciding that unsuitable projects would not go ahead prevented other potentially suitable projects from being investigated. The proposer of one project was unaware of an existing organisational review into the problem. Delays related to introduction of a new computer database and electronic ordering system contributed to one project being rejected.
Identification process	
 The 'bottom up' Expression of Interest process was the only systematic approach used, resulting in two projects being received and accepted (but both later rejected). 	 The 'top down' evidence-based catalogue of disinvestment opportunities was not utilised in identifying potential projects. The 'ad hoc' process of nominations and decision-making dominated Most proposals were made by 'outsiders' not involved in the nominated clinical pathway. Only two proposals were made by the potential adopters, although one subsequently withdrew their application.
Prioritisation and decision-making process	
 All discussions were held within meetings and documented in the minutes; there were no attempts to be covert or follow hidden agendas. Conflict of interest was addressed as a routine agenda item. All clinical programs, health professional disciplines, consumers and technical experts in evidence, data, legal, ethics, finance, purchasing, biomedical engineering and information technology were represented in decision-making. 	 There were no explicit processes for risk assessment, deliberation or appeal. It was not always clear how decisions had been made. The SHARE Steering Committee did not have authority to direct change. Proposals were put to department heads who declined to follow them up (based on reasoned arguments that they should not to go ahead).
Rationale and motivation	
• Safety and effectiveness were the primary reasons for nominating TCPs for disinvestment, cost-savings were a secondary benefit	
Proposal for change	
 Six proposals were submitted based on guidelines, systematic reviews or health technology assessments; the four accepted projects were in this group. Four proposals had supporting data, two regarding unnecessary diagnostic imaging tests and the two VPACT projects. The two VPACT projects presented defined objectives. One project had a clear reinvestment plan which allowed operating theatre time previously used by patients now undergoing the new non-surgical procedure to be used by other patients on the waiting lists, this was the implemented pilot project. 	 In 13 proposals, the nominator did not provide supporting evidence. Many of the proposals did not clearly define the TCP, patient population group, circumstances of restriction, etc. This is difficult to quantify as clarification may have been forthcoming but the proposals were not investigated further
Potential adopters	
 Three nominations were made by the potential adopters; one was the pilot project accepted and implemented, one was accepted as a pilot project but was subsequently withdrawn by the applicants and the other was nominated too late to be included in the SHARE timeframe 	 Decisions regarding eight proposals were declined by heads of the departments responsible for the proposed TCP. Reasons included lack of clarity of the problem, lack of supporting evidence, or the evidence was not relevant to local patient groups. In two of the accepted projects, the key adopters reversed their decisions about the supporting evidence and withdrew.

Table 6 Factors influencing the SHARE process of selecting disinvestment projects (Continued)

Potential patients

Implementation and evaluation plans and resources

- of methods and tools for implementation and evaluation
- The CCE team provided access to research literature and liaised on behalf of the clinical project teams with the Clinical Information Management (CIM) unit who were happy to provide access to data and assistance with analysis
- All implementation activities within the control of the SHARE project team were completed
- Detailed evaluation plans were developed in consultation with an external health program evaluator and health economist
- One proposal had assistance of a research fellow to undertake the project work (but this did not go ahead for other reasons).
- The clinical project leads of two accepted projects attended workshops in evidence-based change, implementation and evaluation

Most of the SHARE activities were either within the remit of CCE or the portfolios of the executives and senior managers on the Steering Committee. However the SHARE team did not have ownership of the data services, purchasing and procurement processes, and guideline and protocol documentation, or authority to make decisions in these departments. Although managers in these areas were generally supportive, their heavy workloads and competing priorities unrelated to SHARE activities prevented successful implementation of change in these areas.

Rationale and motivation

Disinvestment has been associated with a perceived focus on 'cost cutting' and 'taking away' in preference to 'evidence-based care' [21, 23, 62, 146], even to the extent that alternative terms have been introduced to avoid this [18, 62]. Improving the quality of care while reducing costs is one of the key arguments for 'value for money' achieved through disinvestment, highlighting the tension created by the implication that health services can deliver better care while saving money [48, 62, 134, 147-149].

Monash Health staff also perceived that "financial drivers were stronger than clinical drivers" in previous decision-making processes (Table 1).

In contrast, this was not a notable feature in the SHARE process. Only two projects were explicitly initiated to save money; the Therapeutic Equivalence process aimed to replace high cost drugs with lower cost but equally effective alternatives. These projects were included as potential pilot projects as they were already going ahead. All nominations arising directly from the SHARE process related to safety and effectiveness of the drugs, clinical procedures or diagnostic tests proposed for disinvestment. In five cases, cost-savings to the hospital and/or patients was noted as a secondary outcome

- Two proposals were rejected when it became clear that the evidence did not apply to the Monash Health population.
- The CCE/SHARE support staff had appropriate expertise and knowledge Lack of evaluation funding precluded understanding of the barriers that prevented implementation of the planned systematic evidence-based processes
 - · Lack of evaluation funding limited evaluation activities in the last year of the program
 - One project was rejected by the department head because they could not provide backfill for the clinical duties of the project leader.

arising from reduced adverse events or improved patient outcomes. Although disinvestment of most of the proposed TCPs was likely to result in cost-savings this was not mentioned as a priority in the nomination or decision-making processes.

Eleven proposals were to reduce use of a TCP, six were to replace an existing TCP with a better alternative, one was to restrict practice in a defined patient population and one was to cease practice altogether. Seven proposals were for inappropriate or overuse of diagnostic tests.

Proposal for change

Clarity of aims and objectives and a clear proposal for change are significant factors in successful disinvestment [99].

Lack of clarity in the proposal for change is the reason that proposed TCPs did not proceed to guidance for disinvestment; specific issues include insufficient information on the population, intervention, comparators and outcomes; harms and benefits not clearly summarised; evidence that the intervention was effective or promising for some groups, and therefore potentially not 'low-value' for all patients; variation in the conclusions reached in similar scenarios; and uncertainty due to a lack of evidence, low quality or no evidence, and lack of clinical or statistical significance [134].

These findings are very similar to the SHARE experience. Only four of the proposals clearly defined the TCP, patient population, clinical indications and supporting evidence at the time of nomination. Three went on to be accepted as pilot projects and the fourth was discovered not to be applicable in the Monash Health context. Of the 13 proposals investigated, five were rejected or withdrawn due to insufficient evidence to support the proposed change (Table 3).

The pilot project was the exception, with many favourable factors in the proposal for change (Table 7). Proposals are more likely to be successful if they have certain characteristics [150-152] and new initiatives are more likely to be sustainable if there is appropriate and adequate provision of critical factors to achieve and maintain the proposed components and activities [153]. These characteristics are summarised in the checklist for success and sustainability used in the SHARE Program [14]. The factors that make a project likely to be successful as a disinvestment initiative in a local health service are unknown, however the pilot project had many factors considered favourable by decision-makers in the SHARE Program (Table 4). In particular, there was good evidence of better patient and health service outcomes, strong local ownership and clinical champions, a 'win-win' scenario for adopters where nursing and allied health staff were keen to take on new procedural skills and surgeons were happy to relinquish these cases to make operating theatre time available for other patients, and surgeons were allowed to keep the theatre time and reduce their own waiting lists (rather than reallocation to other surgical specialties or closing theatres to realise savings).

Provision of support

Lack of knowledge and skills in project management, implementation and evaluation and lack of time to carry out the related activities are widely recognised as barriers to effective change in health care generally and resource allocation in particular [5, 7, 9, 18, 43, 77, 84, 95, 96, 124, 125, 135, 139, 154]. Dedicated resources and in-house "*resource centres*" have been proposed as potential solutions [9, 11, 95, 124, 125, 155, 156]. These findings were confirmed in local surveys and interviews at Monash Health [15, 39].

To address these issues, the SHARE Program implemented services to provide expertise and support to decision-makers and project teams [15]. A Capacity Building Service provided training in implementation and evaluation methods and a Project Support Service provided assistance in project management and delivery. All aspects of these support services were valued highly by participants.

Limitations

The findings come from one organisation and there may be many differences with other health services which limit generalisability. However many of the results are similar to existing reports.

Funding was reduced in the final year of the program; hence the pilot project was not fully implemented and some of the planned evaluation activities were not completed when the program concluded, limiting our ability to draw conclusions based on final outcomes. Several of the nominated projects were not fully investigated prior to being rejected; so we can comment on factors that were noted in these cases but cannot say that factors we did not observe were not present.

The project team responsible for delivering the SHARE Program at Monash Health were also the researchers investigating the processes undertaken. This has the potential to introduce subjectivity into the evaluations and limit insight if organisational assumptions are accepted without challenge. Detailed exploration and documentation of 'learnings' throughout the project, extensive stakeholder involvement, transparency of methods and participation of an external evaluator in the role of 'critical friend' [14] were included in the SHARE processes to minimise these limitations.

Contribution of this study

This study provides an in-depth insight into the experience of a systematic approach to disinvestment in one local health service. To our knowledge, it is the first paper to report the process of disinvestment from identification, through prioritisation and decision-making, to implementation and evaluation, and finally explication of the positive and negative factors influencing the processes and outcomes in a local healthcare setting. This contributes in part to addressing the acknowledged gaps in the current literature [5, 9–11, 18–21].

A range of novel methods not previously discussed in the disinvestment literature were identified and investigated. They provide a range of 'top down' directive approaches and 'bottom up' invitation strategies.

This study also addresses the lack of models and frameworks noted in the disinvestment literature [4, 5, 8, 10, 11, 19, 149, 157–159]. Firstly, a framework and taxonomy for evaluation and explication of implementation of change have been adapted specifically for use in disinvestment projects. They were used to describe, explore and explain the characteristics of the determinants of effectiveness that influenced the process and outcomes and identify potential influencing factors that have not previously been reported in the context of disinvestment. Secondly, methods to create an evidence-based catalogue of disinvestment opportunities and an algorithm to identify potential projects from the catalogue have been developed.

Implications for policy and practice

The main messages from this paper may be about 'what not to do'.

Firstly, seeking out targets with the specific aim 'to disinvest' did not work in the SHARE Program, or as reported by others [5, 18, 48, 77, 134]. There are many specific challenges to the concept of disinvestment that may account for this [1]. Although we were unable to Table 7 Factors for success, sustainability and suitability for disinvestment in the SHARE pilot project

SUCCESS
A proposal is more likely to be successful if it meets the following criteria
Based on sound evidence or expert consensus
\checkmark Systematic review of multiple RCTs; surgeons, nurses and allied health staff in agreement with findings
Presented by credible organisation
 Review undertaken by the Australian Safety and Efficiency Register of New Interventional Procedures – Surgical (Royal Australasian College of Surgeons)
Able to be tested and adapted
$oldsymbol{x}$ There was limited opportunity to test and adapt as the VPACT funding required complete roll out
Relative advantage is evident
\checkmark Clear evidence of multiple improved patient and health service outcomes; increased safety and effectiveness, reduced costs
Low complexity
\checkmark The new technology is easy to use
Compatible with status quo
Referrers use the same referral process but divide patients into those eligible for the new procedure and those who should still undergo the old procedure
$oldsymbol{x}$ The new service was provided at a different campus and patients and staff had to adapt
$oldsymbol{X}$ There is some impact on other departments that also have to adapt
Attractive and accessible format
\checkmark The new procedure is attractive to patients as it replaces surgery with an outpatient/bedside procedure
SUSTAINABILITY
A proposal is more likely to be sustainable if it has appropriate and adequate provision in each category
Structure
\checkmark The new procedure is carried out within existing nursing and allied health structures with appropriate governance and supports
Skills
\checkmark Nursing and allied health staff were upskilled in the new procedure; changes in scope of practice were documented and approved
 Nursing and allied health staff were upskilled in the new procedure; changes in scope of practice were documented and approved Clinical project team leaders attended training and welcomed support and direction in project management, implementation and evaluation
 Nursing and allied health staff were upskilled in the new procedure; changes in scope of practice were documented and approved Clinical project team leaders attended training and welcomed support and direction in project management, implementation and evaluation Resources
 ✓ Nursing and allied health staff were upskilled in the new procedure; changes in scope of practice were documented and approved ✓ Clinical project team leaders attended training and welcomed support and direction in project management, implementation and evaluation Resources ✓ Funding was provided for staffing, equipment and consumables
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- $\boldsymbol{\checkmark}$ The proposal for change was clear with clear objectives
- \checkmark Department and Program heads endorsed the change
- \checkmark External funding was available
- \checkmark The clinical pathway and referral process were documented

Table 7 Factors for success, sustainability and suitability for disinvestment in the SHARE pilot project (Continued)

- ✓ Detailed data collection and reporting was a requirement of the external funding
- ✓ Baseline data had been collected and supporting data on patient group, burden of disease and impact of the new technology was available
- ✓ There was strong local ownership and clinical champions
- Win-win' scenario for adopters where nursing and allied health staff were keen to take on new procedural skills and surgeons were happy to
 relinquish these cases to make operating theatre time available for other patients
- ✓ Surgeons were allowed to keep the theatre time released by the changes and reduce their own waiting lists (rather than reallocation to other surgical specialties or closing theatres to realise savings)
- Potential 'quick win' scenario for a disinvestment demonstration project as the proposal was already fully developed, funding had been approved, and deadlines were in place.

Key: ✓ Positive factors ✗ Negative factors

capture the stakeholder's perspectives of the processes used to identify TCPs suitable for disinvestment, we know from previous work at Monash Health and the literature in this area that the word 'disinvestment' is associated with negative connotations, risk of engendering suspicion and distrust, and getting stakeholders offside [7, 14, 62, 146, 157, 160]. Yet successful removal, reduction or restriction of healthcare practices and services are commonplace. In these cases the impetus for change is not 'to disinvest' but to meet more constructive aims such as to improve patient safety, implement evidencebased practices, address changing population needs or redirect resources to more pressing priorities [39]. In fact, the only successful SHARE disinvestment project was one that aimed to introduce a new technology; disinvestment was only a component of the change process, not the purpose of the project.

Secondly, if health service decision-makers seek to identify TCPs that are not safe, effective or cost-effective (rather than seeking 'to disinvest'), an *ad hoc* process of accepting proposals may not be the most effective approach. It did not work here, or as reported by others [21, 70, 99]. There is a lack of information about effective systematic methods, however the seven approaches discussed above and other methods identified but not explored hold potential.

There are also positive messages from this work. Although the objective to deliver disinvestment pilot projects was largely unsuccessful, there is much to learn from these experiences and the findings contribute in part to addressing the paucity of information about the disinvestment process. The single project undertaken was underpinned by a rich list of enabling factors, also contributing to the knowledge base in this area.

It has been argued, within the SHARE Program and by others, that disinvestment would be more successful when considered in conjunction with investment decisions [1, 14, 85, 161]. Principles for a decision-making program [98] and incentives for more effective disinvestment [161] have been proposed in this context.

Implications for research

While it may not be productive to specifically seek 'to disinvest', it is appropriate and worthwhile to remove practices that are harmful, ineffective and inefficient. There are many potential sources of information and decision-making mechanisms to identify these practices. The opportunities for research lie in development of proactive methods and systematic prompts and triggers to utilise these resources.

Seven potential methods of identifying disinvestment opportunities were investigated. While system redesign and PBMA were not feasible as methods of identifying disinvestment targets at Monash Health, both approaches are now well-researched, including their role in disinvestment [9, 18, 62, 83-85, 94]. The other five methods still hold promise and, to our knowledge, have not been explored elsewhere. Since local factors were responsible for their lack of success in the SHARE Program, further investigation of the potential within existing health service infrastructure for purchasing and procurement systems and guideline and protocol development to identify disinvestment opportunities, and development of new processes to drive disinvestment decisions proactively with evidence from research and local data or proposals from health service stakeholders is warranted. In other situations, or with other methods of investigation and implementation, they may prove to be effective tools.

The framework and taxonomy for evaluation and explication of disinvestment projects, and the algorithm for identifying disinvestment projects from a catalogue of potential TCPs, can be tested and refined for use in this context or extended into other decision-making settings.

Conclusion

Local barriers were responsible for the limited success in applying the novel methods in this project. Further exploration of proactive methods to identify suitable disinvestment targets, systematic prompts and triggers to initiate disinvestment decisions, and strategies for project development, implementation and evaluation is warranted. Detailed documentation of the processes undertaken and the factors influencing them provide insight into elements to build upon and others to be avoided in future investigation of disinvestment in the local healthcare setting.

Additional file

Abbreviations

A4R: Accountability for Reasonableness; CCE: Centre for Clinical Effectiveness; CGEA: Generalised Cost-Effectiveness Analysis; EOI: Expression of Interest; EVIDEM: Evidence and Value: Impact on DEcision Making; HsW: Health Sector Wide; MCDA: Multi-criteria decision analysis; MEAMF: Medical Equipment Asset Management Framework; NICE: National Institute of Health and Clinical Excellence; PBMA: Program Budgeting and Marginal Analysis; QALY: Quality Adjusted Life Year; RCT: Randomised controlled trial; SHARE: Sustainability in Health care by Allocating Resources Effectively; STEPPP: Systematic Tool for Evaluating Pharmaceutical Products for Public Funding Decisions; TCP: Technology or clinical practice; TCPC: Technology/Clinical Practice Committee; VPACT: Victorian Policy Advisory Committee on Technology

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Availability of data and materials

Many of the datasets supporting the conclusions of the articles in the SHARE series are included within the articles and/or the accompanying additional files. Some datasets provide information for more than one article and are only provided once; where they are not included within an article and/or the accompanying additional file, the relevant citations to the articles in which they are provided are included. Datasets have not been made available where it is impossible to de-identify individuals due to the nature of survey or interview responses or where the data is published in confidential internal reports.

Authors' contributions

CH, KA, VB, TD and CW contributed to design and implementation of the study. RK and WR provided direction and decisions. DM provided advice on health economics. CH drafted the initial manuscript, the other authors provided feedback. All authors read and approved the final manuscript.

Authors' information

CH was the Director of the Centre for Clinical Effectiveness and the SHARE Program Director. CH completed the SHARE publications as part of an unfunded PhD. KA was the SHARE Project Manager. VB, TD and CW were SHARE Project Officers. RK was Director of Medicine Program, member of the SHARE Steering Committee and co-supervisor of CH's PhD. WR was Executive Director of Medical Services and Chair of SHARE Steering Committee Chair. DM was consultant health economist.

Competing interests

The authors declare that they have no competing interests.

Consent for publication

Not applicable.

Ethics approval and consent to participate

The Monash Health Human Research and Ethics Committee (HREC) approved the SHARE program as a Quality Assurance activity. Further ethical review was not required as the program met the following criteria [162]:

- "The data being collected and analysed is coincidental to standard operating procedures with standard equipment and/or protocols;
- The data is being collected and analysed expressly for the purpose of maintaining standards or identifying areas for improvement in the environment from which the data was obtained;
- The data being collected and analysed is not linked to individuals; and

None of the triggers for consideration of ethical review are present." [162]
 Participation was based on the 'opt-out approach' [162]. "The opt-out approach is a method used in the recruitment of participants into an activity where information is provided to the potential participant regarding the activity and their involvement and where their participation is presumed unless they take action to decline to participate." [162] Consent to participate was approved by the HREC based on the following criteria:

- Health care providers, managers, consumer representatives, and officers within government health departments will be informed about the project and the processes and invited to participate.
- Participation in interviews, workshops and/or surveys will be considered to be implied consent.

These conditions were met.

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Author details

¹School of Public Health and Preventive Medicine, Monash University, Melbourne, VIC, Australia. ²Centre for Clinical Effectiveness, Monash Health, Melbourne, VIC, Australia. ³Medicine Program, Monash Health, Melbourne, VIC, Australia. ⁴Medical Services and Quality, Monash Health, Melbourne, VIC, Australia. ⁵Centre for Health Economics, Monash University, Melbourne, VIC, Australia.

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"Attention must be given to infrastructure development and creating contexts that promote evidence-informed decision-making as routine practice"

Peirson 2012 [34]

Paper 7: Supporting staff in evidence-based decision-making, implementation and evaluation

The investigations in Phase One confirmed the findings of other studies that evidence from research and local data was not used systematically or proactively in decision-making; that health service personnel usually lack the time, knowledge, skills and resources to find the appropriate information and appraise it for quality and relevance; that clinicians frequently do not know how to implement and evaluate change or manage projects effectively; and that projects are generally under-resourced [1, 5, 7, 35-41]. It was clear that provision of expertise and education, training and support of health service staff would be required to achieve Aims 1 and 2. In-house 'resource centres' have been proposed as a solution [14, 19, 42-44]. Four support services were proposed in Aim 3, exploration of three of them is reported in Paper 7.

A literature review, surveys, interviews, consultation and workshops were undertaken to address the following questions in establishing the Data, Capacity Building and Project Support Services.

- What is current practice in accessing and using evidence for making, implementing and evaluating decisions at Monash Health?
- > What decisions were made and outcomes achieved in the piloting of support services?
- > What factors influenced the decisions, processes and outcomes?

The proposed Data Service aimed to 1) interrogate routinely-collected datasets to identify potential disinvestment opportunities and communicate this information to appropriate decision-makers; 2) respond to requests from decision-makers to assess local data related to potential disinvestment opportunities identified from the research literature; and 3) provide training, advice and support in accessing and using local data as part of the Capacity Building and Project Support Services. Four models of a Data Service were explored, but none were implemented due to local factors such as limited staff capacity and problems with access and coordination of local data. Consequently, local data was not used proactively to identify potential disinvestment projects.

The Capacity Building Service was established to train and support staff to use research evidence and local data in decision-making and to implement and evaluate these decisions in successful projects. The Pharmacy Department and four medication-related committees (Therapeutics, Medication Safety, Adverse Drug Reaction and High Cost Drugs) were chosen for the pilot based on their roles in purchasing and/or governance of pharmaceuticals and their members' interest in disinvestment. Staff involved in the SHARE disinvestment projects were also invited to participate. Evaluation immediately after workshops showed participants' knowledge and confidence improved in all areas and further improvements were reported after three months, although there were only a small number of responses.

The Project Support Service was introduced to assist clinical staff undertaking SHARE disinvestment pilot projects and to investigate the nature and amount of guidance and support required. It was anticipated that methodological advice would be provided for project planning, governance, administration, implementation and evaluation and practical assistance would be provided for data capture, entry and analysis. One of the four clinical teams required support in all of these areas. The expertise of SHARE staff and the practical support in development of the evaluation plan, design of a Microsoft Access database and assistance with data entry and reporting were noted as positive factors. The other three teams were still in the decision-making and development phase and needed assistance in finding evidence and data, determining the nature and scope of the problem, clarifying the intervention and assessing feasibility and risk. These projects were subsequently withdrawn based on the outcomes of this process.

"How can we improve the absorptive capacity of service organizations for new knowledge? In particular, what is the detailed process by which ideas are captured from outside, circulated internally, adapted, reframed, implemented, and routinized in a service organization, and how might this process be systematically enhanced?"

Greenhalgh et al 2004 [45]

Paper 8: Developing, implementing and evaluating an Evidence Dissemination Service

Prior to the SHARE Program, the Centre for Clinical Effectiveness at Monash Health provided systematic reviews to inform organisational decisions and delivered a range of training programs in evidence-based practice for clinical staff. The new SHARE Capacity Building Service was establishing training and support activities for finding and appraising evidence which were specifically targeted to managers and policy makers responsible for resource allocation decisions. One element of the SHARE aims related to evidence-based decision-making was missing – delivery of research evidence directly to decision-makers to drive disinvestment decisions proactively. Hence the fourth support service was conceived as an Evidence Dissemination Service.

The following research questions were addressed in development, implementation and evaluation of two models of an in-house Evidence Dissemination Service.

- What are the potential features of an Evidence Dissemination Service in a local healthcare setting?
- How can high quality synthesised evidence be identified, captured, classified, stored, repackaged and disseminated?
- How can disseminated evidence be used to enhance current practice and how can use of evidence be reported?
- What are the processes and outcomes of disseminating evidence to self-selected and targeted participants in a voluntary framework?
- What are the processes and outcomes of disseminating evidence to designated decisionmakers in a mandatory governance framework?
- What factors influenced the decisions, processes and outcomes?

The Additional file for Paper 8 is included in Appendix 5.
RESEARCH ARTICLE

Open Access



Sustainability in Health care by Allocating Resources Effectively (SHARE) 8: developing, implementing and evaluating an evidence dissemination service in a local healthcare setting

Claire Harris^{1,2*}, Marie Garrubba², Angela Melder², Catherine Voutier³, Cara Waller², Richard King⁴ and Wayne Ramsey⁵

Abstract

Background: This is the eighth in a series of papers reporting Sustainability in Health care by Allocating Resources Effectively (SHARE) in a local healthcare setting. The SHARE Program was a systematic, integrated, evidence-based program for disinvestment within a large Australian health service. One of the aims was to explore methods to deliver existing high quality synthesised evidence directly to decision-makers to drive decision-making proactively. An Evidence Dissemination Service (EDS) was proposed. While this was conceived as a method to identify disinvestment opportunities, it became clear that it could also be a way to review all practices for consistency with current evidence. This paper reports the development, implementation and evaluation of two models of an in-house EDS.

Methods: Frameworks for development of complex interventions, implementation of evidence-based change, and evaluation and explication of processes and outcomes were adapted and/or applied. Mixed methods including a literature review, surveys, interviews, workshops, audits, document analysis and action research were used to capture barriers, enablers and local needs; identify effective strategies; develop and refine proposals; ascertain feedback and measure outcomes.

Results: Methods to identify, capture, classify, store, repackage, disseminate and facilitate use of synthesised research evidence were investigated. In Model 1, emails containing links to multiple publications were sent to all self-selected participants who were asked to determine whether they were the relevant decision-maker for any of the topics presented, whether change was required, and to take the relevant action. This voluntary framework did not achieve the aim of ensuring practice was consistent with current evidence. In Model 2, the need for change was established prior to dissemination, then a summary of the evidence was sent to the decision-maker responsible for practice in the relevant area who was required to take appropriate action and report the outcome. This mandatory governance framework was successful. The factors influencing decisions, processes and outcomes were identified. (Continued on next page)

* Correspondence: claire.harris@monash.edu

²Centre for Clinical Effectiveness, Monash Health, Melbourne, VIC, Australia Full list of author information is available at the end of the article



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¹School of Public Health and Preventive Medicine, Monash University, Melbourne, VIC, Australia

(Continued from previous page)

Conclusion: An in-house EDS holds promise as a method of identifying disinvestment opportunities and/or reviewing local practice for consistency with current evidence. The resource-intensive nature of delivery of the EDS is a potential barrier. The findings from this study will inform further exploration.

Keywords: Evidence-based practice, Evidence-informed decision-making, Evidence products and services, Evidence dissemination, Knowledge broker, Current awareness services, Current awareness alerts, Needs assessment, Needs analysis, Information needs

About share

This is the eighth in a series of papers reporting Sustainability in Health care by Allocating Resources Effectively (SHARE). The SHARE program is an investigation of concepts, opportunities, methods and implications for evidence-based investment and disinvestment in health technologies and clinical practices in a local healthcare setting. The papers in this series are targeted at clinicians, managers, policy makers, health service researchers and implementation scientists working in this context. This paper reports the development, implementation and evaluation of two models of an Evidence Dissemination Service in a local healthcare setting and discusses the factors that influenced decisions, processes and outcomes.

Background

Monash Health, a large academic health service network in Melbourne Australia, established the 'Sustainability in Health care by Allocating Resources Effectively' (SHARE) Program to investigate an organisation-wide, systematic, integrated, evidence-based approach to disinvestment. The SHARE Program was undertaken by the Centre for Clinical Effectiveness (CCE), an in-house resource to facilitate Evidence Based Practice (EBP). The focus of the program was on how a health service guides, directs and makes decisions at organisational level, in contrast to the decisions made by individual health practitioners in clinical practice.

Although there is no clear single definition, disinvestment is generally understood to be removal or restriction of health technologies and clinical practices (TCPs) that are unsafe or of little benefit [1]. In most published examples, disinvestment has been undertaken as an independent activity. However, following review of the literature and consultation with local stakeholders, Monash Health decision-makers felt that undertaking disinvestment in isolation from other decision-making processes was artificial and possibly counterproductive [2]. The scope was revised to consider disinvestment within the spectrum of all resource allocation decisions covering investment in new, continuation of existing, and disinvestment from current activities [2]. These decisions were focused in two areas: 1) allocation of funding, such as purchasing of drugs and clinical consumables and capital expenditure on building and equipment, and 2) allocation of non-monetary resources through guidelines and protocols which stipulate use of drugs or equipment, recommend diagnostic tests, prioritise staff time, specify referral mechanisms and allocate capacity in clinics, operating rooms and other facilities.

The SHARE Program was undertaken in two phases. Phase One explored concepts and practices related to disinvestment to understand the implications for a local health service [3-5] and, based on this information, identified potential settings and methods for decision-making [2]. Phase Two developed, implemented and evaluated the proposed methods to determine which were sustainable, effective and appropriate at Monash Health [6, 7]. The four aims of Phase Two are outlined in Fig. 1.

The first aim was to explore systems and processes for decision-making relating to TCPs. Objectives under this aim included investigation of methods for proactive access and utilisation of existing high quality research and health service data to initiate change [3]. Local research at Monash Health confirmed the findings of other studies that health service staff report lack of time, knowledge, skills and resources as barriers to searching for information, accessing it and appraising it for quality and relevance; and that evidence was not used systematically or proactively to drive decisions [4, 7-18]. The second aim was to pilot disinvestment projects [6] and Monash Health staff reported lack of skills and confidence in implementing and evaluating change. Local responses were also consistent with studies that identified a need for dedicated resources and in-house "resource centres" to address these barriers in the context of resource allocation [19–23]. Four support services were proposed to facilitate the SHARE aims: an Evidence Service, Data Service, Capacity Building Service and Project Support Service. Piloting of these services became Aim 3. Details of establishment of the Data, Capacity Building and Project Support Services are reported in Paper 7 in this series [7].

Research evidence underpinned two fundamental elements of the SHARE Program. The first was evidencebased decision-making (EBDM), one of the foundation principles of the program. The second was proactive use of the increasing body of literature about practices that have been demonstrated to be harmful, of little or no benefit, or where a more effective or cost-effective alternative is



available to identify opportunities and initiate evidencebased decisions for disinvestment, one of the objectives to be explored within Aim 1 (Fig. 1) [3].

CCE already provided an evidence service which facilitated EBDM 'reactively', in response to requests from decision-makers, by undertaking systematic reviews to inform organisational decisions and delivering a range of training programs [24]. Hence the new SHARE Evidence Service was conceptualised as an Evidence Dissemination Service (EDS) to 'proactively' identify, capture and deliver existing research evidence directly to decision-makers to instigate disinvestment decisions by identifying opportunities for change that they were previously unaware of.

This proactive approach of "*pushing*" research out to potential users has been advocated as a tool to increase evidence uptake [14, 25–30] and an enabler to effective resource allocation [21, 31, 32]. Research into methods to routinely and systematically capture, adapt and reframe information, then circulate it internally within a health service has been proposed [33]; as has targeted dissemination of synthesised evidence directly to decision-makers [34].

In their review of diffusion of innovations in health services, Greenhalgh and colleagues ask *"How can we improve the absorptive capacity of service organizations* for new knowledge? In particular, what is the detailed process by which ideas are captured from outside, circulated internally, adapted, reframed, implemented, and routinized in a service organization, and how might this process be systematically enhanced?" [33]. This case study presents two models of capturing, disseminating and utilising new knowledge through a systematic approach in a local health service.

While the EDS was conceived as a method of identifying disinvestment opportunities, it quickly became clear that this could be a way to confirm that practices at Monash Health were consistent with current evidence through investment, disinvestment or modification.

Monash Health is a public network of six acute hospitals, subacute and rehabilitation services, mental health and community health services, and residential aged care [35]. Australian public hospitals operate under a state-allocated activity-based fixed-budget model of financing [36]. Staff are salaried and services are provided free of charge. An overview of the SHARE Program, a guide to the SHARE publications and further details about Monash Health (previously Southern Health) and CCE are provided in the first paper in this series [24] and a summary of the findings are in the final paper [37].

Aims

The aim of the EDS was to deliver research evidence directly to clinicians, managers and policy makers for use in decision-making to ensure that allocation of resources at Monash Health was consistent with current evidence.

The aims of this paper are to report the development, implementation and evaluation of two models of an EDS in a local healthcare setting and discuss the factors that influenced decisions, processes and outcomes.

Research questions

Theoretical phase

What are the potential features of an EDS in a local healthcare setting?

Modelling phase

How can high quality synthesised evidence be identified, captured, classified, stored, repackaged and disseminated?

How can disseminated evidence be used to enhance current practice and how can use of evidence be reported?

Exploratory phase

What were the processes and outcomes of disseminating evidence to self-selected and targeted participants in a voluntary framework (Model 1)?

What were the processes and outcomes of disseminating evidence to designated decision-makers in a mandatory governance framework (Model 2)?

Explication

What factors influenced decisions, processes and outcomes?

Methods

Several of the activities reported in this paper were to develop methods that would be undertaken in subsequent activities. The methods reported in this section are those determined a priori. Methods developed during the course of the investigation to inform future activities are reported in the Results section.

Framework for design and evaluation of complex interventions

A three-phased approach was used in the development of the EDS. This approach is consistent with the UK Medical Research Council (MRC) framework for design and evaluation of complex interventions [38]. The EDS meets the MRC definition of a complex intervention: it is composed of multiple components which act both independently and inter-dependently. The components include behaviours, parameters of behaviours and methods of organising and delivering those behaviours [38]. The objectives of each phase are: Theoretical: To establish the theoretical basis that suggests the intervention will have the expected outcomes.

Modelling: To delineate and explore the intervention's components, how they inter-relate and how they influence outcomes; may include preliminary testing if appropriate.

Exploratory: To implement the intervention, potentially experiment by varying components, and identify constant and variable components to enable replication and further testing.

Model for evidence-based change

The EDS was developed using the SEAchange model for Sustainable, Effective and Appropriate change in health services developed by CCE and modified for use in this context [39]. The model involves four steps: identify the need for change, develop an intervention to meet the need, implement the intervention and evaluate the change. Each step is underpinned by the principles of evidence-based practice to ensure that the best available evidence from research and local data, the experience and expertise of health service staff and the values and perspectives of consumers are taken into account.

Step 1. Identify need for change

A literature review, surveys, interviews and a workshop were undertaken to elicit the information needs of decision-makers, identify barriers and enablers to using research evidence in decision-making in local healthcare services, and gather baseline data for evaluation. A wide range of senior decision-makers representing all health professional groups, clinical programs, campuses and relevant committees were invited to participate. Details of data collection methods and sources are provided in Additional file 1: Section 1.

Final interview and workshop notes were analysed thematically in MS Word, Excel and/or Nvivo [40] by either identification of emergent themes or categorisation according to the aims outlined in the individual project protocols (Additional file 1: Section 1). Survey totals and percentages were calculated.

Step 2. Develop intervention

Using the principles of evidence-based change [39], the SHARE team worked with stakeholders to synthesise the findings from the literature and local research and develop draft proposals.

Feedback on draft proposals was sought from senior clinical decision-makers (Nursing Executive Team, all Medical Program Directors and the General Manager of Allied Health) via structured individual and group discussions, and other health service staff via invitations to provide input distributed through the 'All staff' email list and informal discussions with staff interacting with the project team (Additional file 1: Section 2). Proposals are more likely to be successful if they have certain characteristics [33, 41, 42] and new initiatives are more likely to be sustainable if there is appropriate and adequate provision of critical factors to achieve and maintain the proposed components and activities [43]. These characteristics, assessed using a checklist for success and sustainability (Additional file 1: Section 2), and opportunities to avoid duplication and integrate new systems and processes into existing infrastructure were considered in development of the two models of the EDS.

Program logic including consideration of assumptions, inputs, activities, outputs and outcomes required to achieve objectives was used in development of the intervention, implementation and evaluation plans.

Structured workshops with senior managers, clinicians and consumers were held for discussion, refinement and decision-making related to draft proposals (Additional file 1: Section 2). Strategic direction, governance, executive sponsorship and senior management support, clinical perspectives and technical advice were provided initially by an EDS Advisory Group and later by the SHARE Steering Committee (Additional file 1: Section 2).

Decisions regarding methods for development and delivery of the new evidence products were made by the CCE team with expertise in evidence synthesis, knowledge brokerage and EBP.

The overall project and both proposed models were endorsed by the Executive Management Team and Monash Health Board.

Step 3. Implement intervention

Planned implementation activities included engaging all stakeholders, identifying what is already known about practice change in the topic area from the literature and local knowledge, undertaking an analysis of local barriers and enablers, developing an implementation plan using strategies to minimise barriers and build on enablers, piloting and revising as required, and implementing in full [39].

Barriers and enablers to use of research evidence in decisions at Monash Health were ascertained in the surveys and interviews noted above. Barriers and enablers to delivery and use of the EDS were determined from the evaluation and action research methods noted below.

Two variations of the intervention were implemented; modifications were based on findings from evaluation and ongoing action research activities.

Step 4. Evaluate change

An evaluation framework and plan, including evaluation of the EDS, was developed for the overall SHARE Program and included evaluation domains, audience, scope, evaluation questions, outcomes hierarchy, sources of data, methods of collection and analysis, reporting and timelines [44]. More detailed evaluation plans for the EDS were subsequently developed based on the 'Guide to Monitoring and Evaluating Health Information Products and Services' [45]. Planned methods included stakeholder surveys, interviews and consultation, feedback sections on Evidence Bulletins, audit of website statistics and document analysis (Additional file 1: Section 3). Details of which methods were used in each of four evaluations reported (two pilot studies, two full implementation studies) are summarised in the relevant sections below.

Action research

Action research was undertaken to refine the intervention, enable continuous improvement in implementation and evaluation, and collect data for evaluation and explication. The approach taken was based on the "researcher as facilitator for change" defined by Meyer: researchers working explicitly with and for people rather than undertaking research on them [46, 47]. In this capacity, CCE staff were both the SHARE project team and the action researchers. An agenda item for 'Learnings' was scheduled at the beginning of every team meeting. Participants were invited to consider anything that had affected the project since the last meeting using the framework 'what worked, what didn't, why and how it could be improved'. Each issue, its effect on the project, and potential changes that would build on positive outcomes or remove or minimise future problems were discussed. The learnings and actions were documented; actions were assigned, given timeframes and followed up to ensure completion. Project team observations and reflections were used for ongoing improvements to the program components, implementation and evaluation processes, and explication of the influencing factors.

Explication

Factors influencing decisions, processes and outcomes were identified and analysed to understand their effect and the resulting implications.

Factors that influenced initial decisions in development of the intervention were mapped to the components of the EDS in a synthesis matrix adapted from Wallace et al. [48].

Factors that influenced processes and outcomes of implementation and subsequent decisions in revision of the EDS were identified and reported using an existing framework and taxonomy for evaluation and explication of evidence-based innovations [49] which was adapted to investigate delivery of an in-house EDS in the context of a local health service (Figs. 2a and 3). Adaptation of the determinants of effectiveness



was based on a framework for knowledge transfer [50] and the process of change and outcome measures were modified using the guide to evaluation of health information products and services [45]. Some details within the taxonomy were also drawn from the work of others [51–55]. The additional domain of 'Local considerations' was derived from experiences in development of the EDS discussed below. Details of barriers and enablers, observable characteristics of the determinants of effectiveness, perceptions of participants and adopters, the process of change, and findings from the action research process were documented in minutes, reports, spreadsheets and templates for this purpose (Fig. 2b).

Alignment of methods

Figure 4 illustrates how the three phases of the UK MRC framework, the four steps of the SEAchange model and the action research and explication processes align with the activities undertaken in development, implementation and evaluation of the two models.

Some of the planned activities were not completed due to reduction of funding in the final year of the SHARE Program resulting in shortened timelines; details and impact are discussed below.

Results

Full details of the results of the literature search and response rates and representativeness of participants in the surveys, interviews and workshop are reported in Additional file 1: Section 1.

A systematic search of the literature was undertaken however broad searches resulted in unmanageable numbers of returned articles and narrowing the search returned none. Since the purpose of the review was to inform in-house decision-making for development of the EDS, a decision was made to take a pragmatic, iterative approach by accessing relevant publications already known to the project team and following up with simpler searches and pursuing articles from reference lists.

Data were collected from 164 survey respondents representing all campuses, clinical programs and professional disciplines in appropriate proportions; 27 interviewees including representatives of organisation-wide decision-making bodies (e.g.committee chairs), individuals with responsibility for resource allocation decisions as part of their role (e.g. department or unit heads), and members of project teams who had undertaken disinvestment activities; and 18 senior clinicians from a large multicampus department who participated in a workshop. Draft proposals were refined based on feedback from individual

			Characteris	stics of determinants	oreflectiveness		
E	TERNAL ENVIRONM	ENT	EVIDENCE PRODUCTS and SERVICES	TARGET AUDIENCE	PROCESS and INFRASTRUCTURE	LOCAL CONSIDERATIONS	IMPLEMENTATION PLAN
Financial Physical Political Community ORGA evels Network Site/Campus Program Unit/ Department Team Individual tructure Size Relationship to other organisations	Legislation Regulation Standards Policies NISATIONAL ENVIRO Leadership Management style Hierarchy Processes General logistics Administrative Transparency Access to information Use of information	Guidelines Conferences Publications Vested interests NMENT Priorities Stategic plan Business plan Population needs Staffing Knowledge and skills Support Capacity Changes Orientation Modelline	SERVICES Source of Information Level of evidence 9 Primary studies Quality • Appraisal tools • Aisk of bias Currency Content • Summary available • Actionable messages • Local implications • PICO Format • Product consistency • Language • Able to be 'skimmed' Nature of evidence	Reason for selection Authority to make changes Change agent/ champ Other Information needs Best communication too Website/blog Email RSS feed Electronic newsletter Paper documents Other Demographics Professional group Specialty Level of training Age	INFRASTRUCTORE Funding Collection and processing - Identification - Cassification - Storage Translation/Repackaging Dissemination - Delivery method - Ability to choose method - Frequency - Tringgers - Topic selection - Volume of information - Searchable database - Interaction with audience Decision-maker's response	Applicability Patient group Intervention/comparator Setting Other Importance Burden of disease Degree of impact of change Cost of change Cost of change Relevance to organisational priorities Other Need for change Level of change Usevel of change Istevel of change Usevel of chan	Strategies Tailored to barriers and enablers Based on relevant theory Format Facilitation Purpose Roles Knowledge and skills of adopters Evaluation domains Audience Scope Evaluation questions Program logic Sources of data, methods of collection and analyzic
Internal collaborations ulture Values Beliefs Assumptions Personalities	Decision-making Change Adaptability Linking Saturation Willingness Volume Frequency	 Role definition Role definition Role def EBDM Valued Supported Infrastructure provided Demonstrated application of evidence in decisions 	Evidence of harm, effectiveness, cost- effectiveness, lack of effect Lack of evidence Customisation Provision of expertise KNOWLEDGE Credibility Trustworthiness Relationships Adequate time and resource	Time since graduation Size of group Expertise Attitudes Knowledge and skills Self-efficacy BROKERING Technical expertise Content expertise Communication skills Self-efficacy	Requirements Format Reporting structure Governance Systems and processes Systematic and integrated Transparent and accountable Quality improvement Feedback methods Action Reporting structure	 Organisation Identification process Lack of policy, protocol, procedure or guideline Inconsistency with policy, protocol, procedure or guideline Clinical audit Other 	Arcess to information Access to information
	De	tails of process	of change		Out	come measures	
Type of interven structural, regula trype of targeted management, pa Setting: Reimbur oroportion of elig Wethods/quality Methods/quality Allocation, blindi mplementation dentification of I Controls used Dther: Source of	tion: Professional, fin tory behaviour change: F bient education, com ofessional status, opi sement system, locat ible providers partici : Study design, unit c ag, follow up, data co fidelity: Modificatior parriers and enablers funding, ethical appi	ancial re profession reventive service, d munication, record i nion leaders, authou ion of care (eg inpa pating of allocation, unit of illection processes is to planned interve roval	al/patient, organisational, patie iagnosis, test ordering, referral: keeping, resource use, discharg ity tient, outpatient, community, e analysis, power calculation, cor ention/s, changes to implement	Int-oriented, s, prescribing, b, prescribing, tc), country, tc), country, tc) ation plan, ation plan, Sustainal organisat	imber of copies distributed by publi es of target audience reached, influe se: User satisfaction (product, conter //beliefs; quality of product (credibl ber of users who read and underste training or research, using in own p r. Regular, routine and/or proactive se of evidence reported; organisatic ime after initiation of intervention and contr ulity and spread: Continuation after onal networks, replication in other	isher, by end-user, by other mencing factors nt, format, method of deliven (e, reputable, trustworthy, autood porduct; intending to use; poractice, using to determine o use of high quality synthesis onal practice consistent with a post-intervention follow up, p rols r project completion, integrati department/facility	eans; Number of downloads; /); knowledge gained; change horitative, reliable) : adapting for use; using in rganisational practice de vidence in decision- svidence; EBDM highly valued ossible ceiling effect on into routine practice,

and group interviews, email correspondence and informal discussions with 36 senior decision-makers and other staff representing all campuses, clinical programs and professional disciplines (Additional file 1: Section 2).

Data collected from these activities informed a range of research questions. Findings related to this paper are provided in Additional file 1: Sections 4–16, synthesised to address the research questions and reported below. Findings related to topics not addressed here are reported in other SHARE publications [2, 4, 6, 7].

Following implementation and evaluation, the initial design of the EDS was revised considerably prior to reimplementation and evaluation. Based on the definition of a model as a representation of the relationships between concepts to provide a frame of reference, where the concepts are well defined and the relationships between them are specific so that the model is a representation of the real thing [56], the two designs are reported here as Model 1 and Model 2.

The heading structure reporting the development, implementation and evaluation of the two models corresponds to the numbering of activities in Fig. 4.

Model 1

In this model, participants enrolled voluntarily to receive Evidence Alerts containing links to multiple publications.

1.1 Factors influencing decisions in development of Model 1 Initial decisions regarding scope, components, knowledge brokers, target audience and methods were based on:

- meeting the aims of the SHARE Program
- overcoming or minimising barriers and building on the enablers identified from the literature and local research
- addressing specific requests for content and format from the needs analysis
- available resources

The findings from local research (Additional file 1: Sections 4–7) were consistent with the literature. As expected, the main barriers were lack of time, skills, confidence, resources, support, awareness of and availability of research. Dissemination of evidence to decision-



makers, relevance and reliability of research, and organisational support and infrastructure for using evidence in decisions were reported as enablers. Specific needs included provision of expertise, new processes to use evidence proactively, and support that was tailored to the needs of individual units and professional groups.

The barriers, enablers and needs are mapped to the relevant components of the EDS in a synthesis matrix provided in detail in Additional file 1: Section 7a. Each component was based on a solid foundation of research evidence and local data.

1.2 Potential features of an EDS in a local healthcare setting *Scope*

The scope of the EDS was determined by the following decisions.

To avoid wasting time and resources considering information that may not be valid or may not represent a comprehensive view of all the available evidence, only high quality synthesised evidence would be used.

To ensure currency of the information, only recently published evidence would be sourced and disseminated.

To facilitate topic selection by users, and enable dissemination to appropriate target audiences, the

selected publications would be classified using multiple categories.

To facilitate utilisation of evidence, publications would be repackaged to reflect the needs of users and active responses from the target audiences would be required.

Components

Two components of an in-house program to facilitate proactive use of evidence in decision-making were identified: 'Delivery of the Evidence Dissemination Service' and 'Utilisation of the disseminated evidence' (Fig. 5). The elements in delivery of the evidence were identification, capture, classification and storage of synthesised evidence; translation and repackaging into user-friendly formats; and dissemination to decision-makers. The elements for utilisation of the evidence were engagement with the EDS, and assessment, application and reporting use of the evidence.

Knowledge brokers

The EDS team were CCE staff with expertise as systematic reviewers, knowledge brokers, implementers, evaluators and a health librarian. Some had previously been health practitioners, however it was recognised that a practicing clinician should also be involved to ensure



correct classification within clinical categories. Based on the SEAchange principle of integrating new initiatives into existing systems and processes [39], the Monash Health Medical Administration Registrar (trainee) was seconded to SHARE. The registrar would benefit from exposure to the processes of EBDM for clinical practice, management and policy-making and the EDS would benefit from their up-to-date clinical knowledge.

Target audience

The target audience was defined as individuals and groups authorised to make resource allocation decisions on behalf of the organisation that had been identified in a previous SHARE project [4]. While all Monash Health staff would be invited to subscribe to the EDS broadcasts, relevant department heads and unit managers, plus the 14 committees identified as making resource allocation decisions for TCPs, would be targeted to report on use of evidence from the EDS in their areas of authority.

Methods

Determination of the scope and components of an inhouse EDS identified that several processing steps were required prior to dissemination. The shortage of published information in most of these areas meant that establishment of an EDS would entail development of methods and tools to identify sources of high quality synthesised evidence, automate the capture process, classify and store materials in useful categories, repackage into suitable formats based on user needs, disseminate to the appropriate target groups, and report use of evidence. An overview of the options considered in development of methods and tools for the individual steps is included in Additional file 1: Section 8.

1.3 Program theory

Program theory is a way of explaining the anticipated pathway of change by identifying underlying problems, influencing factors, assumptions that underpin the choice of strategies, strategies that will deliver the intended

PROBLEMS		INFLUENCING FACTORS Objectives, barriers, enablers and needs	ASSUMPTIONS	STRATEGIES	OUTCOMES
There are no active processes to access or disseminate recently- published evidence at Monash Health Monash Health decision- makers do not use existing evidence systematically or proactively Decision- makers do not know whether documented practices at Monash Health are consistent with the best	MODEL 1	 Decision-making for resource allocation should be systematic, integrated, accountable, transparent & evidence-based. Only current, comprehensive, trustworthy evidence should be used to drive decisions. Decision-makers are unaware of recently published evidence lack the time and skills to adequately appraise evidence are not confident about selecting the most appropriate evidence Decision-makers want to receive recent evidence to keep up-to-date information that is concise, easy to read and understand quickly, delivered in consistent attractive formats implications of the findings presented and frequency of delivery and level of detail electronic dissemination with reliable links There are no established methods to identify, capture, classify, store, repackage or disseminate high quality synthesised evidence for an 'in-house' evidence service. 	 It will be possible to identify, capture, collate, store, repackage and disseminate high quality synthesised information to decision-makers. Decision-makers will agree to participate. Selecting synthesised evidence from sources that require rigorous methods will reduce the need for decision-makers to appraise evidence and increase their confidence to use it in decisions. Categorising and labelling evidence products will enable decision-makers to identify their topics of interest. Providing decision-makers with a range of delivery options and levels of detail will meet their needs. Decision-makers will read full-text by following available links. Requiring responses to evidence alerts will facilitate use. Engaging stakeholders in development will increase acceptability and utility. The products developed will not be perfect and will need review and revision based on user feedback. 	 Identify sources of synthesised evidence and criteria to assess them for quality. Identify free or low cost software to enable storage and dissemination. Develop methods and tools to capture, categorise, collate and store evidence products. Create user-friendly formats to disseminate evidence products. Develop methods for dissemination. Develop methods and tools for responding to evidence alerts and reporting and auditing use of evidence. Engage stakeholders in development activities. Develop communication and recruitment strategies to engage decision-makers. Pilot the evidence products and services. Collect barriers and enablers during piloting and create opportunities for participants to provide feedback during ongoing service delivery. 	There are effective processes to access and disseminate recently- published evidence at Monash Health Monash Health decision- makers use existing evidence systematically and proactively Decision- makers are confident that documented practices at Monash Health are consistent
available evidence Resources may not be used effectively and efficiently at Monash Health	MODEL 2	 Decision-makers found volume of information unmanageable too many publications that did not require action review process too onerous lack of time to review and report Knowledge brokers found there was no process to ensure that the relevant person with authority had considered the information too many publications to process 	 Transparency, accountability and reporting requirements will increase evidence-based decision-making. Workloads will be reduced and used more effectively by limiting selection of publications and filtering before dissemination. Providing highlighted messages and clarifying action required will increase evidence-based decision- making 	 Introduce governance processes to ensure that authorised decision- makers take appropriate action. Limit selection to high priority areas Filter publications before dissemination. Repackage the evidence to highlight key messages, demonstrate local relevance and implications, and provide actionable recommendations. 	with the best available evidence Resources are used effectively and efficiently at Monash Health

results, and the desired outcomes [57, 58]. To facilitate understanding and replication of the EDS processes and outcomes, the program theory is presented in Fig. 6.

1.4 Delivery of the Evidence Dissemination Service *Identification*

Systematic reviews, health technology assessments (HTAs), evidence-based guidelines, horizon scanning reports, and alerts and recall notices were considered relevant for resource allocation decisions, particularly disinvestment.

It was not possible within the available project resources to identify and capture all synthesised evidence or to critically appraise each individual publication to determine those of high quality. Hence a decision was made to limit the searches to electronic sources of synthesised evidence where the publication process required rigorous methods; in effect critically appraising the methods required by the publisher as a proxy for the methods undertaken by the authors.

Definitions of these evidence products, details of the appraisal criteria used and the sources accessed for the EDS are included in Additional file 1: Sections 9 and 10.

Capture

With limited resources it was important to automate the capture process as much as possible. The EDS project officer subscribed to receive information from email alerting services and Really Simple Syndication (RSS) feeds when available and scheduled dates for regular manual capture from the other sites.

Classification

Publications were classified using a taxonomy based on existing definitions from recognised health resources [59–62]. New categories, with definitions for each

classification, were developed to meet additional Monash Health needs. Definitions adapted or developed for the EDS taxonomy are outlined in Additional file 1: Section 11.

Storage

The EDS team investigated a range of storage technologies. As there was no funding for information technology, the final decision was to use free internet software to create a website, blog, email and RSS feeds and pay a small fee to maintain these facilities free of advertisements. Details of the options considered and reasons for the choice of software are provided in Additional file 1: Section 8.

Only citations, abstracts and links to full text on the publisher's website were stored. The website was searchable using the tags applied in the classification process so users could find publications based on the categories in the taxonomy. Examples of webpages are provided in Additional file 1: Section 12.

Repackaging

Findings from the literature regarding desirable characteristics of evidence products and services are summarised in Table 1 [25–28, 50, 63–67].

Findings from local survey participants about their preferences for dissemination of research to inform resource allocation decisions are provided in Additional file 1: Section 4. Most respondents wanted to receive critical appraisals and full text articles of both primary and secondary research; fewer wanted abstracts only. A range of responses were received regarding the focus of research content. These were, in descending order of preference, condition specific information (e.g. Diabetes), professional group information (e.g. Emergency Department Nursing), program relevant information (e.g. Mental Health), organisation-wide information (e.g. Infection Control) and unit relevant information (e.g. Newborn Services); however more than half of the respondents selected these within their first three preferences so all would be considered of some importance to the target audience. Email broadcasts were clearly preferred over paper-based options for dissemination of research, with short pdf attachments containing titles and hyperlinks preferred over long pdf attachments with titles, abstracts and hyperlinks.

Publications were repackaged into 'Evidence Alerts' where the aim was to drive EBDM by delivering evidence directly to decision-makers. The selected software enabled the titles to be contained within the email to save use of attachments. The titles were hyperlinked to the full citation, including abstract, located further down in the body of the email, and the citation was hyperlinked to the full text (Additional file 1: Section 13). This gave

readers flexibility to scan the list of titles easily, to find out more information from the abstract without leaving their email, or to go directly to the original document.

The titles were coded so the reader could identify the type of publication; for example, systematic reviews were identified by the prefix SR (Additional file 1: Section 10).

The initial proposal was to include an overall statement about the findings such as 'evidence of effectiveness', 'evidence of harm' or 'lack of evidence' which would be taken directly from the published article. However, it was frequently difficult to find such statements and, unless we critically appraised each individual article, we could not be confident that the findings or recommendations were valid. Hence, a statement regarding the nature of the evidence was not provided by the EDS.

Dissemination

Dissemination was by email and RSS feed to Monash Health staff who had subscribed to the EDS.

Evidence Alerts were emailed every two weeks. They contained all the publications captured by the EDS in the interval since the previous broadcast. Broadcasts were limited to a maximum of 30 publications.

Subscribers who wished to limit the information they received to selected topics of interest could establish an RSS feed based on their desired categories.

1.5 Utilisation of disseminated evidence

To achieve the SHARE aim of using proactive EBDM to ensure Monash Health practice was consistent with current evidence would require more than just dissemination of recent publications.

Engagement with the EDS

Members of the target audience were required to enrol to receive Evidence Alerts as either emails containing all publications or RSS feeds restricted to their areas of interest, to review the publications within each broadcast, and then, if they identified themselves as the person responsible for organisational decisions related to the topic of a publication, to retrieve the article in full text.

Assessment of the evidence

From the full text, subscribers could assess whether the topic was applicable to current practice at Monash Health. If it was applicable, local policies and procedures could be reviewed to ascertain whether documented organisational practice was consistent with the recently published evidence. If it was, no further action would be required. However, if there was no local guidance, or the guidance available was inconsistent with the evidence, change may be required. It would not be appropriate to proceed to changing practice without ensuring that the evidence was valid. Although the sources of synthesised evidence had

Table T Examples of desirable characteristics of evidence products and service	Table 1 Examp	ples of desirable	characteristics o	of evidence	products and	services
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Characteristics	1*	2
PRODUCT Source		
 Identify 'credible' sources to avoid the target audience spending time appraising methodological quality and merit 	\checkmark	\checkmark
 Identify sources that the target audience consider trustworthy 	\checkmark	1
Level of evidence		
 Transfer evidence from a 'body of knowledge' such as systematic reviews, health technology assessments and evidence-based guidelines so the reader has all the available evidence on the topic 	\checkmark	1
Quality and currency		
Ensure information is current and provide a publication date	\checkmark	1
 Ensure information is well written, concise, easily understood, well organised, convenient to access, clinically applicable and relevant, and linked to other relevant high-quality documents 		1
Content		
• Word the title to engage the target audience (eg as a question, with a solution-orientation)		
 Present findings using an 'inverted pyramid' (eg bulleted key messages, executive summary, full report) 		1
• Highlight 'take-home' messages from the review, particularly decision-relevant information (eg benefits, harms)		1
Present 'ideas' rather than 'data'		1
 List actionable recommendations in order of effectiveness and link to supporting evidence 		1
 Articulate the implications of the findings to policy and practice, and potential outcomes of implementation 		1
 Frame the findings and implications within the local, state/provincial, or national context 		1
 Highlight the characteristics of the participants in the included studies and the contexts in which the studies were conducted that might influence local applicability and/or raise equity considerations 		1
Limit discussion of methods, if required report in an appendix		1
Format		
Deliver a product/service that looks familiar and works in a consistent manner each time	\checkmark	1
 Use a format that is visually interesting and presented attractively 	\checkmark	1
Use a format that is easy to scan quickly	\checkmark	1
Link summaries to full text	\checkmark	1
 Use language appropriate to the target audience, jargon-free, with technical language restricted to an appendix 		1
 Ensure electronic sources run smoothly and links work as expected 	\checkmark	1
Customisation		
Customise the information to meet the needs of the target audience	\checkmark	1
PROCESSES AND INFRASTRUCTURE		
 Provide the target audience with choice and control over topic selection (eg their areas of interest, specialty, profession domain or clinical setting) 	\checkmark	
– amount of detail (eg abstract, summary, full text)	\checkmark	
– method (eg electronic, hard copy, Internet)	\checkmark	
- frequency of delivery (eg at time of publication, daily, weekly, monthly)	\checkmark	
Provide a searchable database or registry	\checkmark	
Use interactive methods	\checkmark	1
• Engage the target audience in providing online commentaries about specific reviews or review-derived products		
 Provide online briefings (eg webinars) about specific reviews or review-derived products 		
 Provide face-to-face briefings about specific reviews or review-derived products 		
• Give presentations about specific reviews or review-derived products coupled with stakeholder commentaries		
KNOWLEDGE BROKERING		
• Ensure those who transfer information are seen as credible and trustworthy by the target audience	\checkmark	1
• Engage someone with appropriate skills, preferably from within the practice setting, to repackage information, write summaries, etc		1
*1 = Model 1, 2 = Model 2		

been assessed as likely to produce high quality publications, this was not an absolute guarantee that either the systematic review, or the evidence it contained, was of high quality. Critical appraisal would be required to verify this.

Application of the evidence

If the evidence was found to be valid and the need for change confirmed, the decision-maker would be required to take the appropriate action.

Reporting use of evidence

Development of methods and tools for reporting use of evidence disseminated by the EDS was based on factors arising from the local environment and knowledge translation theory.

There were three main considerations in the local environment. Monash Health was committed to EBDM and to promoting use of evidence throughout the organisation. The SHARE Program was focused on an organisation-wide approach; i.e. the EDS would be used to ensure organisational practice, as documented in policies and protocols, was consistent with current evidence. And one of the principles underpinning the program was to integrate new initiatives into existing infrastructure.

There were several considerations from the knowledge translation literature. It was well-established that dissemination alone is not an effective knowledge translation strategy [68]. It had been proposed that the impact of HTAs at the policy level could be increased if they were linked with quality systems such as standards and performance indicators [34]. Regulation, by control or obligation through rules and laws, had been described as potentially one of the most powerful methods of influencing behaviour [69] and was thought to be particularly relevant when considering organisational, rather than individual, responsibilities [16, 70]. Managers are influenced by facilitative and regulatory mechanisms, suggesting that behaviour change in this context requires both support and interventions integrated into organisational infrastructure and policies [16, 71, 72]. Although regulation had been demonstrated to be effective in other complex organisations [70], there was no evidence in hospital settings. However mandatory measures have been well accepted in the healthcare context [16, 33], particularly in the area of patient safety [73].

The desired application of evidence from the EDS by authorised decision-makers was to determine whether change was needed and then adapt practice accordingly. To encourage completion of this process, and to facilitate the organisational responsibility of ensuring practice is consistent with the best available evidence, it was proposed that decision-makers in the target groups be required to report on the actions and outcomes following receipt of an EDS broadcast. This is consistent with definitions of regulation or structural intervention in current classification systems of implementation strategies [74, 75].

Based on the early development work categorising evidence by clinical topics, it was anticipated that managers would receive between one and three publications to review per month.

Monash Health managers were required to provide monthly reports on financial and business indicators. It was proposed that, by integrating measures related to use of evidence into these reports, current practice would be reviewed against the best available research and modified accordingly, more senior directors and executives would be informed about changes in practice in their areas of accountability, the importance of EBP would be emphasised throughout the organisation, and the responses could be collated to report on outcomes of the EDS. To reduce the burden on managers as much as possible, a reporting tool was drafted for inclusion in their regular monthly documentation and designed to minimise the effort required for completion (Additional file 1: Section 14).

1.6 Factors for success and sustainability

Prior to piloting, the characteristics, scope and components of the EDS were assessed against the criteria for success and sustainability. These were all met. Details are provided in Additional file 1: Section 7b.

1.7 Program logic

Program logic is a systematic visual representation of the relationships between the resources available to operate the program, planned activities, anticipated results and, if a program theory was not developed, the assumptions underpinning the other elements [58]. In this paper, the assumptions are included in the program theory (Fig. 6); the traditional program logic terminology of short and medium term outcomes has been replaced with parameters recommended for evaluation of health information products and services i.e. Reach, Usefulness and Use [45]; and Implementation fidelity has been added (Fig. 7).

1.8 Baseline survey

All individual subscribers were invited to complete a baseline survey regarding their use of evidence when they registered with the EDS. The evaluation plan included re-administration of this survey at the end of the SHARE Program, however this was not undertaken due to the shortened timelines. The survey and results of the 46 subscribers who participated are provided in Additional file 1: Section 15.



1.9 Pilot

The scope, components and methods described above were piloted with a range of individual decision-makers including executives, clinical program directors and senior managers. Full details are reported in Additional file 1: Section 16.

Implementation

EDS staff met with committee and department representatives to seek agreement in principle and then attended meetings to explain the service and obtain agreement from individuals. Personalised emails explaining the project and requirements of participants were sent to those who were not present at the meetings. The project team enrolled each of the designated staff members, but individuals were required to register to establish their account. An email invitation with information about the EDS, an embedded link for registration, and instructions on how to activate the link was sent to each participant.

Evaluation

The quality, currency, content, format and methods of delivery of the EDS were all viewed positively, suggesting that methods to address the barriers, enablers and needs identified from the literature and local research were successful.

1.10 Revision

The factors that led to change in the processes of delivering an in-house EDS, and the resulting decisions, are reported in Additional file 1: Section 7c.

Most were minor issues in collection and processing of publications. The technical issues were addressed, a new category for 'Disinvestment' was introduced and participant's responses were used to develop a FAQ (frequently asked questions) page on the website.

One noteworthy finding was that executives and senior managers reported that the information in the EDS broadcasts did not influence their decision-making because it was predominantly about clinical practice and their decisions were not. They observed that the different levels of management within the organisation required different types of information and proposed three levels: 1) Department heads and unit managers needed evidence for local policies and protocols related to clinical practice, 2) Program directors required evidence that informed their one to two year planning processes and was relevant to procedural aspects of the health service such as programs and service delivery as well as individual practitioners, 3) Executives and senior managers required information to inform three to five year forward planning that aligned with the organisation's strategic objectives. This resulted in the addition of a category for 'Evidence-based policy and management advice'. Potential sources were identified and, as there were no established tools to assess quality in publications of this nature, criteria were developed for this purpose (Additional file 1: Section 9).

1.11 Implementation

Implementation was proposed in two stages.

Stage 1

The model had already been piloted with individual decision-makers but was still to be tested and revised with decision-making groups such as committees. The aims were

- To implement the revised version to all staff who wished to receive EDS broadcasts
- To test the revised features with pilot committees before extending it to all decision-making groups

The Therapeutics, Medication Safety and Clinical Risk Committees were selected as a pragmatic sample of the target audience based on the potential for disinvestment in their decisions and member's links to the SHARE Program.

Stage 2

The aims were

- To enrol all members of the target audience (ie all identified individuals and groups authorised to make decisions on behalf of the organisation)
- To engage the target audience in assessing current practice against evidence disseminated by the EDS, implementing change as required and reporting on the outcomes

Implementation strategies

Three main strategies were implemented to invite all Monash Health staff to participate in the EDS.

Communication: The EDS was launched through the Chief Executive's newsletter, information was included in

other newsletters, and flyers were distributed to physical and electronic noticeboards across the organisation.

Invitation to enrol: Information about the EDS and instructions on how to enrol were sent via the 'All staff' email list.

Facilitated access: 'Hotlinks' to the EDS were included as icons on the intranet sites of the library, pharmacy, emergency department, and medical and allied health staff portals.

Each of the selected committees nominated a liaison representative. The EDS team worked with the liaison officers to explain the process, identify barriers and enablers to using the EDS, develop methods of communication and potential strategies to use the EDS material in decision-making, and customise RSS feeds to meet their needs.

1.12 Evaluation

Full details of the outcomes related to Reach, Usefulness, Use, and Implementation fidelity are reported in Additional file 1: Section 17.

The survey of individual users had a 52% response rate; all health professional groups and all campuses were represented. All three committee liaison representatives and two senior individual decision-makers participated in interviews.

The quality, currency, format and methods of delivery of the EDS were all viewed positively. Most users found the content was 'current', 'trustworthy' and generally 'useful'. Those who responded 'partially' or 'no' to some of the options explained that the information provided was not relevant to their area of clinical practice. The large volume of material disseminated was noted as a barrier to accessing the information contained in each broadcast.

Less than half of the survey respondents had used the disseminated evidence in decision-making but they were optimistic about doing so in the future. The main reasons were lack of time to read full articles and lack of relevance to their clinical setting.

Two senior decision-makers responsible for organisationwide portfolios were consulted regarding the draft reporting tool prior to implementation in Stage 2. They were in agreement that the volume of work required to access each publication to identify whether it was relevant; then appraise it for quality, local applicability and consistency with existing policies and procedures; take appropriate action and report using the proposed tool was too onerous and it was unlikely that this model would be achievable. As a result, Stage 2 was not undertaken.

Model 2

In this model, an Evidence Bulletin summarising a single publication was sent to the designated decision-maker authorised to make decisions for the organisation on the topic under consideration.

2.1 Factors influencing decisions in development of Model 2 Multiple issues were identified in the evaluation of Model 1. Their effect on the processes, outcomes and decisions related to Model 1 are provided in Additional file 1: Section 7d and summarised below.

The aim of the EDS was to ensure that organisational practice, as documented in policies and procedures, was consistent with current evidence by proactively delivering publications directly to decision-makers; and the focus of the SHARE program was to integrate new initiatives into existing infrastructure. These aims would not be met by Model 1.

While Model 1 was potentially useful for individuals to keep up with evidence in their areas of interest, given the limitation of the RSS feeds within the free software (only able to select one theme per feed), existing services from EBP and publication websites were more likely to achieve this and at no cost to the health service.

The main factors in 'Delivery' of the EDS fell into three groups. The first group related to governance, particularly the lack of transparency and accountability. EDS broadcasts were developed and disseminated rigorously and systematically, but were not accessed or used rigorously or systematically. Those responsible for decisions within the organisation were required to selfselect and take action, but there was no process to ensure that the appropriate person with authority in the area affected by the evidence had considered the information, made a decision or taken any action. Recipients could choose whether to access, use, or report use of evidence; or not. This meant that CCE time and resources were being wasted.

The second group were methodological issues. Although the content and format of the broadcasts were well-liked by the target audience, they did not contain many of the features known to increase use and application of disseminated evidence, indicating opportunities to improve the evidence product. As noted above, the initial plan to include a statement regarding the nature of the evidence such as 'evidence of effectiveness', 'evidence of harm' or 'lack of evidence' was abandoned because it was frequently difficult to find such statements and, unless each article was critically appraised, we could not be confident that the findings or recommendations were trustworthy. Since the aim of the EDS was to drive decisions with proactive use of evidence, while minimising the workload of busy decision-makers, only articles containing valid evidence should be disseminated. Hence critical appraisal by the EDS team would be required.

The third group were about resources. The EDS team had difficulty processing the large number of eligible

publications and proposed that the selection criteria be restricted to reduce the volume.

The main factors related to 'Utilisation' of the evidence were the large volume of information, large number of publications that did not require action, and lack of time to consider them. Because all newly published information from the selected sites was disseminated, findings were often irrelevant to recipient's areas of practice, already known to them, consistent with current practice, not applicable at Monash Health, not important enough to instigate change or they reported lack of evidence. This wasted decision-maker's time and increased the potential for them to miss relevant and significant findings. In addition, although the reporting tool was designed to minimise the effort required for completion of the tool itself, the activities to assess and apply the evidence prior to completion of the document (Fig. 5) were too onerous.

The SHARE funding was reduced in the final year of program. While this limited activities in some areas of the wider program, Monash Health provided the ongoing funding required for the EDS.

2.2 Potential features of an EDS in a local healthcare setting *Scope*

The scope was revised based on the decisions in Additional file 1: Section 7d. The use of only high quality, recently published, synthesised evidence was retained from Model 1. The other parameters were replaced with the following:

To ensure that the appropriate decision-makers are engaged, that they address the evidence and take action as required, and that the process is documented and reported to ensure transparency and accountability, a governance framework would be introduced.

To reduce the amount of time spent collecting evidence, only sources that provide automated capture by email or RSS feeds would be used.

To reduce the burden on busy clinical managers, publications would be filtered before dissemination to assess lack of or inconsistency with policies and procedures, quality, applicability, and potential need for change.

To facilitate utilisation of evidence, publications would be repackaged to highlight key messages, demonstrate local relevance and implications, and provide actionable recommendations.

Components

The changes in scope introduced a third component of 'Governance' (Fig. 5). Some of the elements from the components of 'Delivery' and 'Utilisation' of evidence were re-distributed to the governance component to enable transparency and ensure accountability in organisational decision-making, to assist with filtering the large volume of information regarding local applicability and potential for change, and to identify the relevant organisational decision-maker with authority in the area addressed by the evidence.

In addition to their previous tasks, the EDS team would now also undertake ascertainment of local policies and procedures and quality appraisal of the publications.

As a result of these changes, the workload of decisionmakers was significantly reduced.

Knowledge brokers

The same CCE expertise was involved in delivering the EDS.

Governing body

The Monash Health Technology/Clinical Practice Committee (TCPC) had developed an organisation-wide, transparent, accountable, evidence-based process for introduction of new TCPs [76] and had instigated the SHARE Program to take a similar approach to disinvestment. The TCPC already had the authority to require responses from organisational decision-makers and impose changes in practice related to introduction of new TCPs. Hence, it was deemed an appropriate body to undertake governance of processes to ensure that existing practice at Monash Health was consistent with the most recent evidence. The TCPC had previously included an executive sponsor; representatives with expertise in operations, finance, evidence-based practice, ethical and legal considerations; clinical program directors; health service consumers; and, when appropriate to topics under consideration, directors of pharmacy, pathology and diagnostic imaging. This was expanded for EDS governance to include all medical program directors, and senior nursing and allied health representatives.

Target audience

The target audience became defined by the topic of the individual publications to be disseminated: the designated individual or group authorised to make decisions related to organisational practice in the area addressed by the evidence. For example, findings related to medical treatment of diabetes would be directed to the Head of the Endocrinology Department; those related to nursing practice in childbirth would be directed to the Nurse Manager of Maternity Services; and those related to surgical consumables to the Chair of the Operating Suite Product Evaluation Committee.

Methods

New methods and tools for screening, appraising and reporting the quality of evidence; communicating the information to decision-makers; and capturing decisionmaker's responses were required. Most of the other methods would remain the same as in Model 1.

2.3 Program theory

The new influencing factors identified in evaluation of Model 1, assumptions that underpinned the choice of strategies, and strategies to deliver the intended results from Model 2 are outlined in Fig. 6.

2.4 Delivery of the Evidence Dissemination Service *Identification and capture*

Publications were limited to systematic reviews, HTAs and organisational health policy documents; and sources were limited to those that provided automated capture through email broadcasts or RSS feeds.

Classification and storage

Publications would no longer be classified using the taxonomy. They would only be categorised based on the nature of the evidence findings e.g. evidence of harm, benefit, a more cost-effective alternative, lack of effect, and lack of evidence. No storage would be required and the EDS website was decommissioned.

Assessment of the evidence

One of the main changes from Model 1 was that the EDS team, rather than the decision-makers, would review local policies and procedures to ascertain whether local guidance on this topic was available and, if so, whether it was consistent with the recently published evidence. If it was, no further action would be required. If there was no local guidance, or the guidance available was inconsistent with the evidence, the publication would be appraised for quality before proceeding. Appraisal criteria and the summary table used in the new Evidence Bulletins are outlined in Additional file 1: Section 18.

Filtering

Publications were only considered for dissemination when the evidence was clear, the quality was high, and there was potential for change in practice at Monash Health based on lack of, or inconsistency with, local guidance.

Repackaging

After the TCPC determined that the evidence was applicable and there was potential for change at Monash Health (Fig. 5), the information was repackaged as an 'Evidence Bulletin'. Bulletins were MS Word documents containing the details of a single publication and included, in order of appearance in the document, nature of the evidence (e.g. harm), topic addressed (e.g. laparoscopy for ovarian cyst), deadline for response (e.g. one month if evidence of harm), citation and hyperlink to full text, Author's conclusions, description of Patient/ Intervention/Comparator/Outcome (PICO) elements, summary of quality appraisal (quality and risk of bias of the systematic review, quality and level of evidence

contained in the systematic review, and the implications of these findings), consistency with local policies and procedures, and a template for response.

Tick boxes requiring only two responses minimised the effort required of the decision-makers. The Evidence Bulletin template and an example of a completed version are provided in Additional file 1: Sections 19 and 20.

2.5 Governance

Assessment of applicability and identification of relevant decision-maker

Using their knowledge of Monash Health services, the TCPC assessed local applicability of the evidence, whether change was needed, and if so, identified the authorised organisational decision-maker. To reduce workload of the committee, screening of the publications was undertaken by the Chair prior to meetings and then provided to members at the meetings.

Dissemination

Each Evidence Bulletin was sent under the signature of the TCPC Chair to either the relevant Executive or Program Director, who would forward it to the decisionmaker within their portfolio, or to the Chair of the relevant committee. The EDS Administrator sent the bulletins and received the responses; all correspondence was by email.

In addition, collations of bulletins that addressed topics related to diagnostic imaging, pathology, pharmacy or procurement were sent to the heads of these departments for their information; no response was required.

Reporting requirements

The Chief Executive determined that addressing the evidence and reporting the decisions and actions taken was a mandatory requirement of the relevant authorised decision-maker and requested monthly reports of evidence related to harm and the responses received from the target audience.

2.6 Utilisation of the disseminated evidence

Application of the evidence

The relevant decision-maker confirmed applicability and whether change was needed. They also determined whether other stakeholders should be consulted in the process, and if so, who they were. They were asked to report on their decision and, if appropriate, any action they had taken.

Reporting use of evidence

Responses were required within defined time frames. These were determined to prioritise action to areas of greatest risk to patients, staff or the organisation. When there was evidence of harm, a response was required within 1 month; evidence of clinical effectiveness or a more cost-effective alternative, 3 months; and lack of effect, 6 months. In the case of lack of evidence, the publication was provided for information only, no response was required. If there was evidence in more than one category, responses were requested for the one with the shortest time frame; for example evidence of harm and lack of effect in the same review would be classified primarily as evidence of harm.

Decision-makers were offered four response options, asked to tick the relevant box and then provide a brief explanation (Additional file 1: Section 20). The options were:

- Practice is consistent with the evidence
- Practice is not consistent with the evidence for a good reason
- Practice was not consistent with the evidence, remedial action has been undertaken and completed
- Practice is not consistent with the evidence and remedial action has been commenced/planned

Responses were returned to the EDS administrator.

Each month the TCPC was provided with a summary of all EDS activity and an overview of items with evidence of harm was provided to the Chief Executive. A six-monthly summary was provided to the Executive Management Team (Additional file 1: Section 21).

2.7 Factors for success and sustainability

Model 2 was also assessed against the criteria for success and sustainability. These were all met, however the need for adequate resources was highlighted. Details are provided in Additional file 1: Section 7b.

2.8 Program logic

A revised program logic for Model 2 is presented in (Fig. 7).

2.9 Pilot

The revised scope, components and methods described above were piloted with a pragmatic sample of publications containing evidence of harm. Full details are reported in Additional file 1: Section 22. [6]

Implementation

The implementation strategies focused on integrating the new processes into existing Monash Health infrastructure and communicating with stakeholders.

The procedure for the new EDS processes was documented and a routine item for discussion of EDS matters was included in the TCPC agenda. The Director of CCE/SHARE Director made presentations to the Executive Management Team, Medical and Nursing Executive groups, and met with clinical directors of all medical programs, allied health, pharmacy, pathology, diagnostic imaging and procurement. The Chair of the TCPC delivered a presentation to the Monash Health Board. All senior managers expressed their support for the proposed governance structure. A letter outlining the new process was sent to stakeholders by the Executive Director of Medical Services and Quality and a flyer was circulated to the 'All Staff' email list by the Chair of the TCPC (Additional file 1: Section 23).

Evaluation

Six bulletins indicating harm were disseminated. They were received and returned by the appropriate decisionmakers. Five responses indicated that practice was consistent with the evidence, the sixth reported that the practice was not undertaken at Monash Health. No action was required in these cases. There were no modifications to the planned intervention and it was implemented as planned.

2.10 Revision

The factors that led to change, and the resulting decisions, are reported in Additional file 1: Section 7e.

The main enablers were that the new EDS was promoted as an organisation-wide priority, responses were mandatory and would be audited, and all senior managers were supportive.

There were no significant barriers, but minor modifications were made to the content and format of the bulletin.

It was noted that evidence of benefit which would be of use to some decision-makers could not always be classified as clinical or cost effectiveness; for example methods to develop or implement guidelines. A new category of methodological effectiveness was added.

Drop-down boxes were introduced into the template to streamline completion by the EDS Administrator (Additional file 1: Section 19) and the table summarising quality appraisal was removed and replaced with statements regarding the appraisal findings and their implications (Additional file 1: Section 18).

2.11 Implementation

The scope, components, methods (with the minor revisions noted) and target audience described above formed the intervention.

No additional implementation activities were undertaken.

2.12 Evaluation

The EDS was discontinued prior to completion of the planned evaluation activities, however data were collected for the first seven-month period and audited to meet reporting requirements. Full details of of the outcomes related to Reach, Usefulness, Use and Implementation fidelity are reported in Additional file 1: Section 24.

During this period, 175 publications were collected and all categories of evidence were represented. Fiftyfive bulletins required a response, the remainder were disseminated for information only. Forty-three responses were received at the conclusion of data collection, three had not reached their due date and nine were overdue.

Respondents reported that local practice was consistent with the evidence (n = 32, 74%), the evidence was not applicable at Monash Health (n = 6), local practice was not consistent with the evidence for a good reason (n = 3), and changes to make practice consistent with the evidence had been commenced or was planned (n = 2).

Five respondents offered positive comments, welcoming future bulletins; others suggested it was not useful to consider evidence that they were already aware of, that was consistent with current practice, or that addressed drugs that were not locally available.

One of the two departments that noted local practice was not consistent with the evidence had already *"initiated changes to current practice to conform to the recommendations"*, and the other had tasked their guideline development group to address the inconsistency.

Bulletins could also be used to confirm that current practice does not need to be changed, but the usefulness, cost-effectiveness and impact of resource use in achieving this was questioned in respondent's feedback and project team and committee reflections.

3.1 Factors influencing processes and outcomes

An overview of influencing factors is presented using the framework for evaluation and explication of evidence products and services (Figs 2 and 3). Details are provided in Additional file 1: Section 7 and several factors are discussed in more detail as implications for policy, practice and research below.

The 'External environment' provided a wealth of high quality synthesised evidence to drive decision-making and research findings that identified desirable characteristics for evidence products and services.

The 'Organisational environment' was positive, the culture was supportive of change, leadership and commitment to the EDS was evident at the highest levels, the role of EBDM was valued, and proactive use of evidence to improve patient care was made an organisational priority.

There were problems with relevance of content to individuals in Model 1, but the other elements of 'Evidence products and services' were all highly regarded by participants in both models.

We could not establish whether the 'Target audience' was reached in Model 1 but the design of Model 2 enabled accurate targeting of the relevant authorised decision-maker for each publication. Decision-makers' lack of time to deal with the multiple requirements of the EDS process led to the failure of Model 1 but this was successfully addressed in Model 2. The volume of information to each decision-maker was reduced to only a few bulletins in the seven month period, most were provided for information only, just one or two required a response. All the bulletins they received were relevant to their clinical area. This is in contrast to Model 1 where they received up to 30 per week from all clinical areas. Decision-makers' workloads were reduced to confirming whether change was needed, taking action if required, and reporting the outcomes; which they did.

As 'Knowledge brokers', the CCE team had appropriate skills, relationships and credibility. The most significant barrier was resource requirements. Discontinuing categorisation by the taxonomy reduced the workload in Model 2, but expanding the activities to include assessment of consistency with local guidance and quality appraisal eliminated this benefit. Three months after implementation of Model 2, the scope was revised to focus on evidence in areas of high priority to the organisation. Publications to be appraised and disseminated with a requirement for decisionmakers to respond were limited to three evidence categories: evidence of harm, which was essential for patient safety, and evidence of cost-effectiveness or lack of effect, which would complement existing Monash Health initiatives addressing organisational waste. Evidence of clinical effectiveness, methodological effectiveness and lack of evidence were provided for information only. Three months later, the EDS was suspended as CCE had insufficient resources to continue this while meeting other commitments (Additional file 1: Section 7f).

'Processes and infrastructure' had both strengths and weaknesses. The technical issues were minor and fixed readily. The shortcomings of the repackaging process in Model 1 were addressed in Model 2 so that only valid evidence was disseminated in bulletins that highlighted key messages, demonstrated potential inconsistency with local practice, and clearly stated required actions (Table 1). The governance elements, absent in Model 1, enabled transparency and accountability of the processes and the appropriate decision-makers received the information and responded accordingly in Model 2.

Model 2 was designed to ensure that 'Local considerations' were addressed.

The 'Implementation and evaluation plans' were achieved successfully due to provision of adequate 'Implementation and evaluation resources', with the exception of the final evaluation which was not undertaken due to loss of funding for the SHARE Program.

Discussion

Implications for policy and practice

This study provides insight into the many factors influencing the success, or otherwise, in establishing an EDS in one local health service. Issues across most of the domains of the determinants of effectiveness (Fig. 2) were addressed by the changes made in Model 2. However there are remaining issues in two domains that require consideration for future implementation of an in-house EDS.

Process and infrastructure

Several respondents appeared to be unclear about the purpose of the EDS, in particular it was perceived that CCE had undertaken the reviews, rather than capturing synthesised evidence as it was published by others. This understandably led to questions about why some topics had been selected, particularly if they were not locally applicable. The process had been explained in correspondence during the implementation phase (Additional file 1: Section 23), but if decision-makers had not read or remembered this information, there was nothing in the Evidence Bulletin to explain the process. A flowchart (Fig. 8) or text summary of the process within each bulletin may address this.

Monash Health is an academic health network providing a range of services from primary to quaternary programs.



Several respondents pointed out that they had been involved in undertaking systematic reviews and participating in national and international guideline development in their areas of expertise and were therefore aware of the current evidence and responding to the bulletin was wasting their time. This is a valid criticism that identifies potential differences in need between highly-specialised academic facilities and more general health services, or between individual units within a single facility. However, while individuals may be aware of current evidence in areas they have reviewed, they may not be familiar with the most recent evidence in other areas of their speciality. The experience of the CCE team, who delivered regular workshops on finding the best available evidence, was that very knowledgeable clinicians thought that they were abreast of up-to-date information based on reading the main journals in their clinical areas. However many publications of synthesised evidence are distributed through different channels and, when new information was identified in the CCE workshops, it frequently contradicted clinicians' previous understanding of the current evidence. A systematic approach to dissemination of evidence is unlikely to be able to identify when a decision-maker is aware of current information and when they are not. This is a barrier which may result in loss of support from stakeholders who are unhappy to have their practice questioned or to spend time addressing something that they know is not a problem. Clarifying the process within each bulletin may also help to alleviate this.

Even with several filtering steps, topics that were not applicable in the local setting were still disseminated. Some bulletins contained information about drugs that are not available in Australia; identifying and removing these would be straightforward, but would require additional resources for the EDS team. Identifying and removing all practices that are not undertaken locally may be less straightforward since the topics found not to be applicable had been vetted by senior staff and directors of the relevant clinical programs; it may not be possible for them to be familiar with every practice in their portfolios.

Knowledge brokering

The characteristics of the studies included in the publications such as setting, population/patients, intervention, control/comparator, outcomes and selection criteria, were extracted and summarised in the bulletin. Some respondents noted that they needed additional information, such as more details of the intervention and statistical and clinical significance of the results, in order to make a decision. This would require involvement of clinicians and/or more senior evidence consultants than the EDS model trialled, and would transfer the clinical assessment from the designated decision-maker, who was likely to be the most senior practitioner in the relevant specialty, to someone less qualified and experienced. If the information is available in the publication it could be incorporated into the evidence classification, for example *"Evidence of effectiveness but of uncertain clinical significance"*.

There may be better ways of dealing with some complex issues than dissemination of individual bulletins. Three reviews of wound dressings were captured in one month, and a different decision-maker was initially allocated to each one. Shortly afterwards, a review of blunt versus sharp suture needles for preventing needle stick injuries was published. It was obvious that a single person was not responsible for decisions in these areas. Monash Health policies and procedures had insufficient documentation to know whether current practice was consistent with the evidence. Based on the SEAchange model for evidence-based change [39], a 'project approach' was proposed that involved ascertaining additional information and consulting with stakeholders before determining the next stage. This process was begun but not completed due to the suspension of the EDS. The protocol is provided in Additional file 1: Section 25.

The largest barrier to delivery of an in-house EDS was insufficient resources. It is also clear that delivery of an EDS at the local healthcare level is potentially a significant waste of resources if it is being duplicated in multiple facilities. High quality synthesised information is being produced by multiple publishers with no single point of access from which to generate proactive capture to drive decision-making. The Cochrane Library has partially addressed this by bringing together their own systematic reviews with some reviews and HTAs from other sources, but there are still many reviews and HTAs omitted and evidence-based guidelines are not included [77]. John Lavis notes that our future challenges include "examining whether and when any apparent duplication of efforts occurs in the production of review-derived products at the international level; and scaling up activities that are found to be effective in supporting the use of reviews and review-derived products in policymaking" [29].

Implications for research

Many publications had more than one conclusion: for example harm plus effect or effect plus lack of evidence. New methods are needed to address this in the dissemination and reporting processes.

The original aim of the EDS also included dissemination of evidence-based guidelines. While the capture and processing of guidelines would be mostly the same as systematic reviews and HTAs, the multiple recommendations made dissemination difficult; exploration of this was not undertaken due to suspension of the service. Investigation of methods to disseminate evidence in these situations is warranted.

The governance approach utilised in Model 2 could be classified as a *"quality focused initiative"* from the review by Hastings and colleagues [78]. There are six types of governance mechanisms proposed in this review which could be explored for future implementation of an EDS.

The framework for evaluation and explication of implementation of evidence products and services requires further testing and revision. The elements were chosen pragmatically to suit the circumstances of the Monash Health EDS and there are some potential overlaps in domains.

Contribution of this study

This study provides the details of a systematic process for recently published, high quality, synthesised evidence to be "captured from outside, circulated internally, adapted, reframed, implemented, and routinized in a service organization" [33]. To our knowledge, this is the only report of development, implementation and evaluation of an in-house EDS implemented in a governance framework within a local healthcare setting.

Existing evidence services deliver bulletins on selected topics to individual subscribers, such as McMaster Evidence Alerts, Clinical Evidence and Evidence Updates [79-81]. Types of evidence products have also been defined, for example Lavis's categories of "(1) summaries of systematic reviews highlighting decision-relevant information; (2) overviews of systematic reviews providing a "map" of the policy questions addressed by systematic reviews and the insights derived from them; and (3) policy briefs drawing on many systematic reviews to characterize a problem, policy or program options to address the problem, and implementation strategies" [29]. There are many similarities between these examples and the SHARE EDS; Model 1 is comparable to the evidence alert services and Model 2 has elements of all the evidence products. However there are several key differences between the models explored here and those trialled by others.

The main distinctions are related to the in-house systematic approach to using evidence proactively to ensure organisational practice is consistent with current evidence.

Many studies have explored the characteristics and use of publications as evidence products [25–29, 50, 55, 63–67, 82]. In addition to content and format of the products, others have noted the need to target individual decision-makers [25, 27, 29] who are authorised to implement change [9, 14, 83–87] with timely [34, 48] and locally relevant information [29, 64, 66]; actively deliver the evidence directly to decision-makers [25, 24, 82]; create an organisational culture supportive of EBDM [25, 29];

make use of existing formal infrastructure [14, 16, 34, 71] in a governance framework to provide legitimacy and engagement [88] particularly in the case of disinvestment where a governance committee is thought to "*make contentious decisions more palatable and defensible*" [19, 89–91]; and clearly identify requirements for accountability [26, 50, 83, 88] including mandated responses [30] and use of reporting tools [88].

The EDS Model 2 may be the first to integrate all of these. It builds on earlier findings by focusing on new organisation-wide systems and processes embedded in existing infrastructure, such as CCE, TCPC, authorised decision-makers, and reporting networks, in which to disseminate evidence within a governance framework.

The Evidence Bulletins had elements of each of Lavis's categories – summaries, overviews and policy briefs – but they also had critical differences with other disseminated evidence products.

- The nature of the evidence, such as evidence of harm, clinical or cost-effectiveness, lack of effect, or lack of evidence, was defined for each publication and used to determine the next steps for knowledge brokers and decision-makers.
- Each article was critically appraised for quality and an appraisal summary including implications was provided for the reader; low quality reviews were not disseminated.
- Local implications were considered.
 - Publications were only disseminated if they were inconsistent with organisational policies and protocols or there was no relevant local guidance on this topic.
 - Applicability was assessed by senior managers prior to dissemination and PICO characteristics were extracted and summarised to enable the authorised decision-maker to confirm local applicability.
- Specific time-critical actions were required of the recipients; for example in the case of evidence of harm, decision-makers had to determine whether practice change was required, develop a plan for action, and respond with the details within one month.

The governance elements ensured transparency through clear systems and processes and accountability through reporting requirements. The EDS was given high priority by the Chief Executive who instigated the mandatory responses and implementation was integrated into the organisational Business Plan.

Limitations

The EDS was implemented in an Australian public health service where all staff are bound by organisational

policies and procedures; this may limit the generalisability to other settings.

The SHARE Program was primarily a health service improvement initiative rather than a research project, however an explicit research framework was included in its development [44]. The project team responsible for delivering the EDS at Monash Health were also the researchers investigating the processes undertaken. This has the potential to introduce subjectivity into evaluations and limit insight if assumptions are accepted without challenge. Detailed exploration and documentation of 'learnings' throughout the project, extensive stakeholder involvement, transparency of methods and participation of an external evaluator in the role of 'critical friend' [44] were included in the SHARE processes to minimise these limitations.

The level of expertise within the Centre for Clinical Effectiveness is unusual in this context and will limit generalisability of the models presented to other settings. Although hospital-based resources for knowledge brokering are becoming more common [92, 93], they are not widespread, and the additional skills in implementation and evaluation are less common.

Model 2 achieved its aims, however delivery was restricted to evidence of harm and cost-effectiveness resulting in limited impact; only two bulletins initiated practice change. This process ensured that only high quality evidence was used to drive decisions, but it excluded potentially high quality information from other sources such as journals and peak body websites. It is likely that if eligibility of sources or individual publications was not restricted there would have been a greater impact. However, the greater impact may not only effect organisational practice, but also the workloads of decision-makers and knowledge brokers and require additional resources.

The reduced funding and lack of capacity imposed some limitations in implementation and evaluation of the EDS. As these are not uncommon occurrences in health service initiatives, reflecting real as well as hypothetical limitations, they need to be considered in future planning for in-house services.

The reduction of funding, followed by suspension of the service, meant that the planned evaluation was not undertaken. Although the audit was based on small numbers and some self-reported responses were not verified, it provides useful information for future planning.

Conclusion

An in-house EDS holds promise as a method of identifying disinvestment opportunities and/or ensuring practice in a local healthcare service is consistent with current evidence. The resource-intensive nature of delivery of the EDS is a potential barrier. The findings from this study will inform further exploration.

Additional file

Additional file 1: Methods and Results. (PDF 2081 kb)

Abbreviations

AGREE: Appraisal of Guidelines for Research and Evaluation; CCE: Centre for Clinical Effectiveness; EBDM: Evidence-based decision-making; EBP: Evidencebased practice; EDS: Evidence Dissemination Service; FAQ: Frequently asked questions; HTA: Health Technology Assessment; ICD-10-AM: International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification; MeSH: Medicine Medical Subject Headings; MRC: Medical Research Council; RSS: Really Simple Syndication; SHARE : Sustainability in Health care by Allocating Resources Effectively; SR: Systematic Review; TCPC: Technology/Clinical Practice Committee; TCPs: Technologies and clinical practices

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Availability of data and materials

Many of the datasets supporting the conclusions of the articles in the SHARE series are included within the articles and/or the accompanying additional files. Some datasets provide information for more than one article and are only provided once; where they are not included within an article and/or the accompanying additional file, the relevant citations to the articles in which they are provided are included. Datasets have not been made available where it is impossible to de-identify individuals due to the nature of survey or interview responses or where the data is published in confidential internal reports.

Authors' contributions

All authors contributed to design and implementation of the study. CH wrote the initial draft. MG, AM, CV, CW, RK and WR provided feedback. All authors read and approved the final manuscript.

Authors' information

CH was the Director of the Centre for Clinical Effectiveness and the SHARE Program Director. CH completed the SHARE publications as part of an unfunded PhD. MG was CCE Senior Project Officer. AM was CCE Senior Consultant in Clinical Effectiveness. CV and CW were SHARE Project Officers. RK was Director of the Medicine Program, Chair of the Technology/Clinical Practice Committee, member of the SHARE Steering Committee and co-supervisor of CH's PhD. WR was Executive Director of Medical Services and Chair of the SHARE Steering Committee.

Ethics approval and consent to participate

The Monash Health Human Research and Ethics Committee (HREC) approved the SHARE program as a Quality Assurance activity (Research Project Application No. 11403Q). Further ethical review was not required as the program met the following criteria [94]:

- "The data being collected and analysed is coincidental to standard operating procedures with standard equipment and/or protocols;"
- "The data is being collected and analysed expressly for the purpose of maintaining standards or identifying areas for improvement in the environment from which the data was obtained;"
- "The data being collected and analysed is not linked to individuals; and"

• "None of the triggers for consideration of ethical review are present." [94]

Participation was based on the 'opt-out approach' [94]. "The opt-out approach is a method used in the recruitment of participants into an activity where information is provided to the potential participant regarding the activity and their involvement and where their participation is presumed unless they take action to decline to participate." [94] Consent to participate was approved by the HREC based on the following criteria:

- Health care providers, managers, consumer representatives, and
 officers within government health departments will be informed
 about the project and the processes and invited to participate.
- Participation in interviews, workshops and/or surveys will be considered to be implied consent.

These conditions were met.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Author details

¹School of Public Health and Preventive Medicine, Monash University, Melbourne, VIC, Australia. ²Centre for Clinical Effectiveness, Monash Health, Melbourne, VIC, Australia. ³Health Sciences Library, Melbourne Health, Melbourne, VIC, Australia. ⁴Medicine Program, Monash Health, Melbourne, VIC, Australia. ⁵Medical Services and Quality, Monash Health, Melbourne, VIC, Australia.

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Chapter 4. SHARE Phase Three

"Although there is a substantial literature on healthcare organisations and institutions, relatively little is known about the specific implications of these for local level priority-setting."

Robinson et al 2012 [19]

A review of the disinvestment literature from the perspective of the local healthcare setting was initially commenced as the background to the first paper in the SHARE series. However, in order to address the well-recognised gaps in knowledge and understanding of systematic approaches to disinvestment in the local healthcare setting, the review would add more to the body of knowledge in this area if the findings of the SHARE Program were included. It then made more sense to place the review after the other papers in the SHARE series rather than at the beginning. The volume of literature was too large for a single publication and it is presented in two reviews.

"We lack a shared common language, a vocabulary, and a narrative of change for discussing the subject. Without this, an integrated policy of disinvestment will be difficult to introduce."

Cooper and Sharkey 2010 [46]

Paper 9: Conceptualising disinvestment in a local healthcare setting

Paper 9 presents the current literature on disinvestment from a conceptual perspective, considers the implications for local healthcare settings, and proposes a new definition and two potential approaches to disinvestment in this context to stimulate further research and discussion.

"There is no complete model for reassessing health technologies and there is very little information on implementation and monitoring the resulting decision of a reassessment. Theoretical information is more prevalent in the literature than practical knowledge."

Leggatt et al 2012 [47]

Paper 10: Operationalising disinvestment in a conceptual framework for resource allocation

Paper 10 discusses the current literature on disinvestment from an operational perspective, combines it with the experiences of the SHARE Program, and proposes a framework for disinvestment in the context of resource allocation in the local healthcare setting.

The Additional files for Papers 9 and 10 are included in Appendices 6 and 7 respectively.

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Sustainability in Health care by Allocating Resources Effectively (SHARE) 9: conceptualising disinvestment in the local healthcare setting

Claire Harris^{1,2*}, Sally Green¹, Wayne Ramsey³, Kelly Allen^{1,2} and Richard King⁴

Abstract

Background: This is the ninth in a series of papers reporting a program of Sustainability in Health care by Allocating Resources Effectively (SHARE) in a local healthcare setting. The disinvestment literature has broadened considerably over the past decade; however there is a significant gap regarding systematic, integrated, organisation-wide approaches. This debate paper presents a discussion of the conceptual aspects of disinvestment from the local perspective.

Discussion: Four themes are discussed: Terminology and concepts, Motivation and purpose, Relationships with other healthcare improvement paradigms, and Challenges to disinvestment.

There are multiple definitions for disinvestment, multiple concepts underpin the definitions and multiple alternative terms convey these concepts; some definitions overlap and some are mutually exclusive; and there are systematic discrepancies in use between the research and practice settings. Many authors suggest that the term 'disinvestment' should be avoided due to perceived negative connotations and propose that the concept be considered alongside investment in the context of all resource allocation decisions and approached from the perspective of optimising health care. This may provide motivation for change, reduce disincentives and avoid some of the ethical dilemmas inherent in other disinvestment approaches.

The impetus and rationale for disinvestment activities are likely to affect all aspects of the process from identification and prioritisation through to implementation and evaluation but have not been widely discussed.

A need for mechanisms, frameworks, methods and tools for disinvestment is reported. However there are several health improvement paradigms with mature frameworks and validated methods and tools that are widely-used and well-accepted in local health services that already undertake disinvestment-type activities and could be expanded and built upon.

The nature of disinvestment brings some particular challenges for policy-makers, managers, health professionals and researchers.

There is little evidence of successful implementation of 'disinvestment' projects in the local setting, however initiatives to remove or replace technologies and practices have been successfully achieved through evidence-based practice, quality and safety activities, and health service improvement programs.

Conclusions: These findings suggest that the construct of 'disinvestment' may be problematic at the local level. A new definition and two potential approaches to disinvestment are proposed to stimulate further research and discussion.

Keywords: Disinvestment, Decommissioning, De-adopt, De-implement, Resource allocation, Reinvestment, Reallocation, Rationing, Prioritisation, Decision-making

* Correspondence: claire.harris@monash.edu

²Centre for Clinical Effectiveness, Monash Health, Melbourne, Australia Full list of author information is available at the end of the article



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¹School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia

About SHARE

This is the ninth in a series of papers reporting Sustainability in Health care by Allocating Resources Effectively (SHARE). The SHARE Program is an investigation of concepts, opportunities, methods and implications for evidence-based investment and disinvestment in health technologies and clinical practices in a local healthcare setting. The papers in this series are targeted at clinicians, managers, policy makers, health service researchers and implementation scientists working in this context. This paper discusses current research and debate in disinvestment as it applies in local healthcare settings.

Background

There are many challenges to the sustainability of healthcare services. Ageing populations and the rising prevalence of chronic diseases, increasing use of new and existing health technologies, duplication and gaps in service delivery from poorly coordinated care, ineffective practices, systemic waste and external economic pressures all threaten the ability to maintain health services at optimal standards [1-8].

The primary focus of health care should be on optimising patient outcomes, but without due consideration of value for money the system will not be sustainable [9, 10]. Rigorous processes have been established to ensure that new health technologies and clinical practices (TCPs) are safe, effective and cost-effective and that their introduction will result in better health outcomes [11-15]. However many TCPs in current use were not evaluated rigorously prior to their introduction and would not meet contemporary standards [16]; some were commenced prior to establishment of these processes or the processes were not applied [11, 13, 17, 18]; some were implemented based on early evidence and the initial promising findings were reversed in subsequent studies [19-21]; the effectiveness and cost- effectiveness of many is unknown [19, 22] and others which have been demonstrated to be effective and costeffective are used inappropriately or alternatives with greater benefits are available [23, 24]. The number of patients receiving potentially unsafe or ineffective care is worryingly high. In a recent sample of US Medicare beneficiaries, 25-42% received at least one intervention considered to be 'low value' [25].

Debate and research have turned towards opportunities to reduce costs and maximise outcomes by removing, reducing or restricting these sub-optimal practices and the concept of disinvestment has emerged.

The early disinvestment literature was focused on two main areas: research guided by health economic principles to disinvest specific TCPs in a local setting and broader discussion focused on central policy-making and the role of national agencies to inform decisions [26–28]. More recently, additional topics and perspectives have been addressed in commentary and editorials [9, 29-36] and national and international approaches have been explored in discussion papers and reports [10, 37-44]. Systematic reviews have been conducted to inform disinvestment projects on specific conditions or diseases [45-47] and authors of systematic reviews addressing standard clinical questions are now routinely commenting on practices of 'low value' in their topic area [48]. Wider generic questions about the context, settings, systems, processes and principles for disinvestment have been addressed in systematic reviews [26, 47, 49–56] and other studies [13, 23, 39, 57–65]. Lists identifying 'low value' practices for potential disinvestment have been produced for clinicians and policy makers [19, 21, 59, 66-72] and have subsequently generated further debate about their validity and applicability [73-79].

Although the research and debate has broadened considerably, there remains a significant gap in the literature regarding systematic, integrated approaches to disinvestment. In particular, there is little information to guide healthcare networks or individual facilities in how they might take an organisation-wide approach to disinvestment [26, 37, 39, 45, 50, 51, 58, 60, 80, 81].

The 'Sustainability in Health care by Allocating Resources Effectively' (SHARE) Program was an organisation-wide, systematic, integrated, transparent, evidence-based approach taken by one Australian health service to address these issues at the local level. Monash Health (previously Southern Health) is a public network of six acute hospitals, subacute and rehabilitation services, mental health and community health services, and residential aged care [31]. Australian public hospitals operate under a state-allocated activity-based fixed-budget model of financing [32]. Staff are salaried and services are provided free of charge. An overview of the SHARE Program, further details about Monash Health and a guide to the SHARE publications are provided in the first paper in this series [82] and a summary of the outcomes is included in the final paper [83].

This review of the literature was initially commenced to form the background to the first paper in the SHARE series. However it became obvious that in order to address the gaps in knowledge and understanding about systematic approaches to disinvestment at the local level, the review would be improved by inclusion of the findings of the SHARE Program. The logical extension of this was to place the review after the other papers in the SHARE series.

The substantial body of literature available was too large for a single publication. As multiple themes emerged, it was clear that they could be readily divided into topics related to either conceptualisation or operationalisation of disinvestment. This paper focuses on the conceptual elements of disinvestment at the local health service level. It is a companion to the tenth paper of the SHARE series which considers the disinvestment literature from an operational perspective [84]. The contents of both reviews are summarised in Table 1.

The reviews are presented as debate papers to discuss the disinvestment literature from the local healthcare perspective but, since the arguments are based on the findings of a literature review, readers need to have confidence that the process was rigorous and as comprehensive as possible. Although undertaken systematically, this was not a systematic review. It is impossible to be absolutely comprehensive in ascertaining all the relevant literature on disinvestment for two main reasons. Firstly, there is no general agreement about use of the term 'disinvestment', it is used to convey multiple concepts, and there are many other terms used to convey the same range of concepts. Secondly, the aims, activities and outcomes of disinvestment initiatives are replicated in research and practice in other healthcare paradigms and published in various bodies of literature. Extensive searches were undertaken to ensure as much as possible that the discussion correctly reflects the literature. The methods of the literature review are included in Additional file 1.

Table 1	Contents	of the	literature	reviews
I UNIC I	CONTRACTION	OF LITE	nicialaic	

SHARE Paper 9. Conceptual perspective

- Terminology and concepts
 - Health technologies
 - Disinvestment
 - Resource allocation
 - Optimising health care
 - Reinvestment
- Motivation and purpose
 - Impetus for disinvestment
 - Rationale for disinvestment
- Relationships with other healthcare improvement paradigms

 Evidence based health care
 - Quality improvement
 - System redesign
 - Health economic approaches
- Challenges
- New approach to disinvestment

SHARE Paper 10. Operational perspective

- Existing theories, frameworks and models
- New framework
- Program
 - Principles of decision-making
 - Settings and opportunities
 - Prompts and triggers
 - Steps in the disinvestment process
- Projects
- Research
- Methods and tools
 - Identification of opportunities
 - Prioritisation and Decision-making
 - Development of a proposal
 Implementation
 - Monitoring, Evaluation and Reporting
 - Reinvestment
 - Dissemination and Diffusion
 - Maintenance
- Barriers and enablers

Four themes are discussed in this paper: Terminology and concepts, Motivation and purpose, Relationships with other healthcare improvement paradigms, and Challenges to disinvestment. Findings from the literature and experiences in the SHARE Program suggest that these themes have specific relevance to local healthcare services; in particular, they highlight the difficulties in introducing disinvestment initiatives in this context.

The reason for inclusion of each theme is explained and the discussion is structured to present current thinking from the literature; experiences from the SHARE program; and implications for policy, practice and research in the local healthcare setting for each theme.

In exploring these themes, ways to address some of the problematic issues emerged and a new definition and potential approaches to disinvestment are proposed.

Aims

The aims of this debate paper are to discuss the current literature on disinvestment from a conceptual perspective, consider the implications for local healthcare settings, and propose a new definition and two potential approaches to disinvestment in this context to stimulate further research and discussion.

1. Terminology and concepts

There are multiple definitions for disinvestment, a lack of common understanding of the reasons or objectives that underpin the concept, and disparity in use of the term between the research and practice settings. These shortcomings create difficulties in the interpretation of disinvestment and establishment of a systematic approach in the local healthcare setting.

1.1 Health technologies

Definition

Most discussion about disinvestment is centred on the use of health technologies; however the term 'health technologies' is used with a range of meanings. Definitions of 'health technologies' in the literature can be characterised in four groups (Table 2). The first is broad and includes every element of healthcare delivery [22, 61, 85, 86]. The second uses only a selection of these elements [12, 42, 87–90]. The third does not use a specific definition but suggests that health technologies are separate from other elements by including 'health technologies' within a list of selected items [27, 45, 49, 51, 53, 91-93]. The fourth is narrow and reflects only medical products and devices [23, 26, 38, 39, 50, 87, 94-96]. Many studies involving health service stakeholders in discussions about health technologies do not specify a definition but choose medical devices or diagnostic equipment as their examples [41, 45, 88, 97].

Table 2 Examples of use	of the term	'health technologies'
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Scope	Definition or use
Definition encompasses all elements across the spectrum of healthcare delivery and management	"Drugs, diagnostic tests, including indicators and reagents, devices, equipment and supplies, medical and surgical procedures, support systems, and organizational and managerial systems used across the spectrum of health care" [85]
Definition based on a selection of elements from the extensive list above	"Drugs, devices, procedures and screening" [87], "drugs, devices and procedures" [12, 90], "devices, diagnostics and digital technologies" [89], "Pharmaceuticals, devices, diagnostic tests and interventional procedures" [88], "drugs, diagnostic and procedural interventions" [42]
No definition, but wording suggests that health technologies are separate from other elements	"Health care practices, procedures, technologies and pharmaceuticals" [49, 91, 93], "health technology, drug or intervention" [51], "Technologies, services and interventions" [53]
No definition, but wording suggests that health technologies are products and devices	"Purchasing health technologies" [94–96], "sunk costs and capital infrastructure" [50], "manufacturers" [23, 38, 94, 96], "technology lifecycle" [23, 38, 50], "after a technology has been licensed" [23, 96]

Discrepancies in use

The first definition is used primarily in two settings where an all-encompassing description is very useful: by researchers, particularly those working in Health Technology Assessment (HTA), and by policy-makers determining health service coverage. However this broad definition does not reflect common use of the term by health service managers, clinicians or consumers who differentiate between health technologies, clinical practices and healthcare services and programs. Use at local level is better captured by the other three alternatives.

SHARE

The SHARE Program used the term 'technologies and clinical practices' (TCPs); defined as therapeutic interventions (including prostheses, implantable devices, vaccines, pharmaceuticals and medical, surgical or other clinical procedures) and diagnostic procedures [11, 92]. Health services and programs were referred to separately and not included in the concept of TCPs.

Implications for policy, practice and research in the local healthcare setting

It is understandable that some groups need to consider the whole range of health system activities in their work, and obvious that the HTA process and health policy decisions can be applied to "any intervention that may be used to promote health, to prevent, diagnose or treat disease or for rehabilitation or long-term care including pharmaceuticals, devices, procedures and organizational systems used in health care" [86]. But by using this catchall as a definition for 'health technologies,' researchers and policy-makers create potential for confusion and misunderstanding in their communication with health service staff and consumers who use a much narrower interpretation of this term focused on medical products and devices. This may also hamper translation of knowledge about health technologies from research to practice. A definition that captures use at the local level might be 'products, devices and equipment used to deliver health care (eg prostheses, implantable devices, vaccines, pharmaceuticals, surgical instruments, telehealth, interactive IT and diagnostic tools).' When this definition is combined with 'clinical practices', the term 'technologies and clinical practices' reflects the scope of most decisions regarding resource allocation for investment and disinvestment related to health care delivery in the local setting. This terminology will be used throughout this review.

1.2 Disinvestment

Definition

After more than a decade of research in disinvestment there is still a lack of common terminology [36, 47, 49, 53, 54, 64, 98, 99]. Although the word 'disinvestment' occurs most frequently, and has been adopted by several countries in their national programs, multiple terms are used (Table 3). Some terms are used interchangeably with disinvestment [27], new terms have been introduced to capture specific aspects of disinvestment [29, 39], and others proposed to reflect the process of disinvestment more accurately [6].

The term 'disinvestment' is also used with multiple meanings based on a range of perspectives (Table 4) [27, 64]. Some consider the objective of disinvestment to be reallocation or reinvestment of resources from one TCP to another, while others define it as removal or restriction of use without reference to reallocation. Some definitions are based on the absolute value of a TCP, whether it has intrinsic worth, for example 'this procedure is not worth funding'. Others compare the relative value of one TCP over an alternative such as 'practice A has less value than practice B' where the TCP being disinvested may have intrinsic value but an alternative is thought to have greater value. Some focus solely on TCPs with little or no health gain and others consider a broad range of factors.

Tal	ble	3	Example	s of	alternatives	for the term	'disinvestment'
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Scope	Alternative terms
Used interchangeably with disinvestment	Decommissioning, removing ineffective services, resource release, defunding, rationing [27]
Introduced to capture an aspect of disinvestment	Health technology reassessment [39], de-implementation [29]
Proposed to capture the process of disinvestment better	Displacement, reallocation, reinvestment [6]
Used to avoid the word disinvestment	Prioritisation, reappraisal, reprioritisation, optimisation, substitutional reinvestment, evidence-based reassessment [38], value for money, therapeutic equivalence, allocative reinvestment, reducing waste, bending the cost curve, contract variation, contract management, service redesign [101]

Many authors cite the definition by Elshaug and colleagues that disinvestment "relates to the processes of (partially or completely) withdrawing health resources from any existing health care practices, procedures, technologies, or pharmaceuticals that are deemed to deliver little or no health gain for their cost and thus are not efficient health resource allocation" [91]. Although frequently used, this definition differs considerably with others, particularly those that consider the relative value of TCPs and their alternatives, reallocation of resources released, or financial constraint as the driver of disinvestment decisions.

This mixture of terminology and concepts creates confusion, inconsistency and ambiguity. For example, the term 'rationing' is frequently used interchangeably with 'disinvestment', and even to define it [60, 64], however the concept of 'rationing' does not apply when disinvestment is undertaken to remove a harmful or ineffective TCP [100].

Discrepancies in use

There is a discrepancy in use of the term 'disinvestment' between the practice setting and the research community. "Invest to save", defined as "the process of making an investment in the short-term which will bring about savings in the longer-term", was identified as the commonest form of disinvestment in one study of health service staff [101], and health service commissioners defined disinvestment as "limiting new service provision" in another [64]. Neither of these would be considered to be disinvestment using any of the common research definitions. This divergence is also evident in the lack of definition for disinvestment in many health service publications. The term is used in the context of policies or processes related to "investment and disinvestment" with no further explanation of either term [102, 103].

The disparity is not limited to different contexts. In two recent publications, both set in the UK National Health Service, one uses the term 'decommissioning' to define 'disinvestment' while the other uses a different definition for each word [101, 104]. Inconsistencies have even been identified within the same decision-making body [98]. Further disparity exists in scope of application. Some authors refer to disinvestment of health technologies in the narrow sense of products and devices, some to TCPs, and others note that the concept has been extended beyond individual TCPs to include "trading-off expenditures between different service groups, better integration of health services between primary and secondary care providers, and better integration of the health system with other government agencies" [40, 47, 105].

Conflicting terminology also extends beyond the meaning of the term to the process of disinvestment. Some authors stipulate that disinvestment is an explicit process [28, 60, 98] but others consider it to be both implicit and explicit [40]. Although most definitions imply that it is an active process, it has also been classified as active and passive [47, 55, 64]. The same description is used for both explicit and active disinvestment and refers to removal or redirection of funding to achieve practice change. Although the implicit approach is described as passive, it is defined as using education and information dissemination to drive change [40], whereas the term passive disinvestment is used to describe processes that are not reliant on direct intervention by reimbursement policy makers [55] or procedures or treatments that gradually fall out of use over time [26, 47]. While implicit disinvestment potentially leads to more co-operative and flexible means of identifying areas for disinvestment; it may be ineffectual and may be more difficult to attribute savings or improvement in patient outcomes to disinvestment. The explicit approach potentially captures savings more convincingly; but the risk is loss of stakeholder support [40, 56].

Negative connotations

In the absence of common terminology, there is one notably consistent message: that the word 'disinvestment' has negative connotations and is likely to be a barrier to successful implementation of disinvestment-related change. It is associated with 'taking away', has a perceived focus on cost cutting, is associated with 'top down' interference and implies a criticism of current practice [27, 38, 46, 49, 50, 64, 98, 106]. To reduce undesirable effects, other terms have

Table 4 Examples of definitions for 'disinvestment'				
Definition	Measure	Decision criteria	Position	Action
Disinvestment is an explicit process of taking resources from one service in order to use them for other purposes that are believed to be of better value [28]	Any	Less value than available alternative	Relative	Reallocation
Disinvesting in health interventions that offer no or low health gain (eg are unproven, outdated or cost ineffective) provides an opportunity to invest in alternative proven and cost effective health interventions [132]	Effectiveness, Currency, Cost-effectiveness	Unproven, outdated or cost-ineffective	Absolute	Reallocation
Disinvestment is the process of reducing or ceasing health technologies and clinical practices that provide less favourable outcomes than known alternatives [27]	Any	Less favorable outcome than available alternative	Relative	Removal or Restriction
Disinvestment relates to the withdrawing (partially or completely) of health care practices, procedures, technologies and pharmaceuticals that are deemed to deliver no or low health gain and are thus not efficient or appropriate health resources allocations [91]	Effectiveness	No or low health gain	Absolute	Removal or Restriction
Disinvestment can take a number of forms in a healthcare settingand includes full withdrawal or decommissioning, retraction, restriction and substitution [101]	Any	Unspecified	Unspecified	Removal, Restriction or Replacement
Disinvestment refers to processes by which a health system or service removes technologies, without necessarily replacing them [42]	Any	Unspecified	Unspecified	Removal
Disinvestment relates to the withdrawal of funding from a provider organisation and the subsequent stopping of the service [104]	Any	Unspecified	Unspecified	Defunding (resulting in Removal)
Disinvestment includes the withdrawal or reduction of relatively ineffective healthcare, as well as full withdrawal or rationing of equally worthy alternatives due to resource constraints [60]	 Effectiveness Affordability 	 Relatively ineffective Unspecified 	RelativeAbsolute	Removal or Restriction
Disinvestment: the displacement of non-cost-effective technologies for resource reinvestment or reallocation [118]	Cost-effectiveness	Non-cost-effective	Absolute	Reallocation
Disinvestment involves the development and application of epidemiological, economic, ethical and policy appraisals of existing health care interventions that are cost-ineffective or inappropriately applied within health care, leading to displacement of these practices to make way for resource re-allocation towards practices and programs offering greater benefit [163]	 Cost-effectiveness Appropriate use 	Cost-ineffective Inappropriate use	Absolute	Removal and Reallocation

been intentionally introduced to replace 'disinvestment' (Table 3) [38, 101].

Theories, frameworks and models

Theories, frameworks and models for disinvestment are discussed more fully in Paper 10 of this series [84]. A summary is presented here in consideration of terminology and concepts related to disinvestment.

There is little discussion of the role of theory or theoretical approaches to the concept of disinvestment [84]; however the theory of discontinuance, part of the theory of diffusion of innovations [107], has potential for disinvestment in health care [98, 108]. While no theories of the overall process of disinvestment were identified, several theories have been applied in projects investigating decision-making in this context [45, 53, 109–112].

Fifteen frameworks and models related to disinvestment, resource allocation and priority setting were identified [84]; however they are mostly conceptual and as yet untested. They address projects to identify and disinvest individual TCPs [53, 113–116], programs for sector-wide investment and disinvestment [103, 106, 117, 118], evaluation [63, 114, 119] and stakeholder engagement [103, 120].

SHARE

The definition of disinvestment used in early development of the SHARE Program was "cessation or limitation of potentially harmful, clinically ineffective or cost-inefficient *TCPs*", which takes the absolute position. This was later expanded to include the relative position for the pilot disinvestment projects which were defined as activities that "remove a TCP that is unsafe or ineffective, restrict a TCP to more appropriate patient groups, or replace a TCP with an equally safe and effective but more cost-effective option".

Although the SHARE Program made a decision to avoid the term disinvestment, a suitable alternative proved elusive for one of the main program components which was known throughout as the "*Disinvestment pilot projects*" [114].

Several frameworks and models were developed in the SHARE Program; these are presented in detail in the relevant papers and are summarised in Paper 10 [84]. The frameworks include potential settings and methods to integrate disinvestment decisions into health service systems and processes [113], components in the resource allocation process [117] and evaluation and explication of a disinvestment project [114]. The models include integrating consumer values and preferences into decision-making for resource allocation in a local healthcare setting [120], exploring Sustainability in Health care by Allocating Resources Effectively in this context [106] and facilitating use of recently published synthesised evidence in organisational decision-making through an Evidence Dissemination

Service [115]. An algorithm facilitates decision-making for developing a disinvestment project from an evidence-based catalogue of potential opportunities for disinvestment [114]. A framework for evaluation and research was also developed for the whole SHARE Program [121]. A framework for organisation-wide disinvestment in the context of resource allocation is proposed in Paper 10 [84].

Implications for policy, practice and research in the local healthcare setting

A common understanding of terminology and concepts is required for successful decision-making, communication and implementation of change in the policy and practice settings. A consistent definition is also important for evaluation of change in the practice setting and activities in the research domain to increase rigour, ensure validity of outcomes, enable replication and comparison with others, facilitate application in equivalent situations to reduce duplication, engender familiarity and understanding to increase uptake and use of content, and build on existing work. The current multiplicity and variability of definitions hampers these objectives.

In the absence of common terminology, a definition and the concepts underpinning it should be established for shared understanding by stakeholders of disinvestment initiatives. However, the literature recommends that the term disinvestment should be avoided when attempting to implement change. A different word or way of capturing and framing these concepts to facilitate the related activities may be preferable.

Another approach could be to simplify the definition of disinvestment to 'removal, reduction or restriction of any aspect of the health system'. Removal indicates complete cessation, reduction is a decrease in current volume or delivery sites, and restriction is narrowing of indications or eligible populations. This could apply equally to devices and equipment, clinical practices and procedures, health services and programs. In the same way that investment is a process of allocating resources for the introduction, continuation or expansion of any aspect of the health system, disinvestment could simply be the decision to remove, reduce or restrict and not be complicated by the type of activity undertaken. An understanding of how the word disinvestment is being used in a particular setting would no longer be necessary and use of the word as the basis for an activity would become redundant. The focus could then be the valid reason for change, such as patient safety or reducing waste, and not the negative perceptions of the word or the notion of disinvestment for the sake of disinvestment.

Unless otherwise specified, disinvestment is considered in its broadest sense, ie according to the definition above, throughout this review.

1.3 Resource allocation

Disinvestment is frequently presented as an isolated activity independent of other decision-making processes, to be pursued for its own ends. Investment as a concept is rarely noted in the disinvestment literature. Yet in practice, investment and disinvestment exist together at opposite ends of a continuum [39, 50, 106]. When a new TCP is found to have greater benefit than an existing one, it implies that as one is introduced the other should be removed, either partially or completely. Introduction of a new TCP provides a trigger to explore opportunities for disinvestment [26]. Investment without appropriate disinvestment can be wasteful and making disinvestment decisions outside the context of existing decision-making processes may result in unsuitable or unsustainable outcomes [106]. Decisions about investment and disinvestment can be considered together as 'resource allocation' [117, 122].

Discussion about investment, disinvestment and reinvestment in the literature is usually focused on decisions about money, yet many decisions in healthcare, particularly at the local level, are about use of non-monetary resources and are often driven by considerations other than financial constraint [113]. Resource allocation is an inclusive term that encompasses financial and other resources. It also draws the focus away from the cost of healthcare provision and the perception that decisions to remove or reduce things are always about money and redirects it towards the idea that resources are limited and should be targeted to achieve the best outcomes [106].

Many national and regional policies are now based on resource allocation and address both investment and disinvestment [102, 103].

SHARE

Resource allocation is embodied in the name of the SHARE Program: Sustainability in Health care by Allocating Resources Effectively. It was made explicit that the program covered the spectrum of decision-making from investment to disinvestment and included monetary and non-monetary resources.

Implications for policy, practice and research in the local healthcare setting

Investment decisions usually have inherent incentives for successful implementation as they enable continued availability of practices in regular use or facilitate introduction of improvements to current practice. Conversely, if disinvestment activities are not considered in the context of other decision-making processes, they introduce inherent disincentives through loss of things that were familiar and believed to be beneficial without the balance of positive alternative outcomes. If the frame of reference is 'resource allocation for maximum effectiveness and efficiency', with the focus on enhancing patient outcomes and using limited resources wisely, the reasons for disinvestment and the resulting benefits become evident and provide some incentives for change.

1.4 Optimisation of health care

Sometimes the considerations for change are not as straightforward as 'to fund or not to fund' or 'x is better than y' [45, 93]. In addition to unsafe, ineffective and inefficient TCPs, many authors propose that inappropriate use of therapeutic interventions, systematic errors and organisational waste should also be addressed, and that a wider consideration of 'optimising health care' is preferable to disinvestment alone [23, 34, 38, 39, 50, 85, 123].

TCPs with demonstrated safety and effectiveness may still pose a problem if used inappropriately. Overuse, underuse or misuse may be inadvertent due to lack of knowledge or skill [23, 24, 48] or intentional due to a range of other factors [62, 124]. There may be isolated errors, but if the problem is widespread due to systemic issues such as entrenched practices, poor training or inadequate staffing it will result in significant waste of resources. In these situations the target for disinvestment is the inappropriate use of a TCP rather than the TCP itself. The term 'disinvestment' is not widely used in the American healthcare context, however the national 'Choosing Wisely' and 'High Value Care' initiatives to improve health outcomes and reduce costs are focused on decreasing waste and reducing inappropriate use of therapeutic interventions [68, 125, 126]. This approach is being replicated in national campaigns around the world [127].

Another reason to consider the optimisation perspective is that it may circumvent the ethical dilemmas associated with other approaches to disinvestment. Clinicians are required to follow the principle of beneficence, to act solely in their patient's best interests and to advocate on their behalf; however this conflicts with the principles of justice and fairness that necessitate rationing of finite resources [31, 68, 100]. Similarly there may be conflict between the principles of equity and efficiency in cases where the most efficient program identified by a disinvestment process is not the most equitable [105, 128, 129]. 'Return on investment' is a concept being introduced into the disinvestment debate, however ethical conflicts between return on investment and the principle of preventing ill health and the human right to health have been acknowledged [105]. Reducing inappropriate care and eliminating waste is compatible with beneficence, equity and efficiency, prevention of ill health and the basic human right to health and consistent with the disinvestment aims of removing harmful or 'low value' practices.

An optimisation approach has also been proposed to address the difficulties related to finding the unequivocal evidence of harm or lack of effect required for disinvestment decisions. 'Optimal targeting' has emerged as an alternative strategy where the focus is on identifying the subgroups for which a TCP is most clinically or cost-effective [1, 10, 38, 55, 56, 59]. Rather than disinvestment, this is referred to as "*refining the indications for service provision*", targeting TCPs to those who will benefit rather than removing them from those who will not [45].

SHARE

'Optimising health outcomes' was not an overt principle in the SHARE Program where the focus was stated as 'effective application of health resources'. However it was implicit in all the activities and often explicit in presentations and explanations of the approach. One of the key components of the program was investigation of decision-making processes to identify systematic problems and opportunities for improvement [117] and another was exploration of potential disinvestment projects, several of which were based on inappropriate use [114].

Implications for policy, practice and research in the local healthcare setting

Improving health outcomes is a fundamental objective of health care and a primary motivator for healthcare staff. Initiatives that emphasise the positive approach embodied in allocating resources to optimise health care may be more welcome than those focused on disinvestment with its inherent negativism.

Inappropriate use of TCPs, systematic errors and practices resulting in organisational waste should be removed because they harm patients, diminish health outcomes, impair health care delivery and increase costs unnecessarily. If opportunities for disinvestment are being sought, it could be argued that these issues are addressed first, before considering removal, reduction or restriction of procedures or processes that have relatively less benefit than available alternatives but which have intrinsic value of their own [115].

1.5 Reinvestment

The terms 'reinvestment' and 'reallocation' appear to be used with the same or similar meaning in the literature; however, like investment, they are not defined. They are variously considered to be the objective of a disinvestment exercise [28, 53, 130], the expected result [38, 39, 122], a 'hoped for' outcome [47, 61, 85, 131, 132] or not mentioned at all.

There is an assortment of views on the proposed targets or beneficiaries of reinvestment. Some specify that resources freed up through disinvestment of 'low value' TCPs should be redirected to TCPs that deliver safe and effective healthcare [37, 38, 116]. Another perspective is for resources to be retained by the

group undertaking the disinvestment activity or to be used for the benefit of patients with the same condition or to improve care in the same specialty area [50]. In contrast, some make the case that there should be no expectation that resources are returned to the same area and that it may be most appropriate to reinvest in another service or TCP [40, 53, 122]. Others note that the purpose of disinvestment can range from identifying resources specifically for reallocation or reinvestment through to finding savings to meet budgetary shortfalls where the intention is not to reinvest or reallocate but to put the released funds towards "the bottom line" [101, 133].

Resources theoretically released through disinvestment may not be achieved in practice. For example, reducing length of hospital stay may be anticipated as a saving of 'bed days' but, unless the beds are actually closed, they will be occupied immediately by a different patient group [117, 134]. This is a positive outcome as it gets some patients home earlier and reduces waiting times for others, but it is not a saving. There is also potential for disinvestment in one area to increase costs or resource utilisation in another; a practice change may avoid the need for surgery but the patients require additional outpatient services [85, 117]. And it is possible that the costs of developing, implementing and evaluating a disinvestment initiative will be more than the expected savings [135].

No formal methods for quantifying savings and benefits from disinvestment or implementing a reinvestment plan have been proposed and this deficiency has been noted as a significant barrier [51, 60, 123, 136].

SHARE

It was acknowledged early in the SHARE Program that reinvestment would not be possible as local accounting methods and the inability to itemise expenses for complex activities spanning multiple budgets and cost centres precluded measurement of savings from disinvestment projects.

Implications for policy, practice and research in the local healthcare setting

For reinvestment to occur resources must be released, be measured and be made available for reallocation. Any or all of these may not be achievable.

2. Motivation and purpose

Definitions and terminology related to disinvestment are debated in the literature, however there is little consideration of the impetus and rationale for undertaking disinvestment [57]. The reasons underpinning specific disinvestment activities are likely to affect all aspects of the process from
identification and prioritisation through to implementation and evaluation but this has not been widely discussed.

2.1 Impetus for disinvestment

The drivers for disinvestment have varied over time and within and between settings. An example of this is the change in approach to disinvestment by the UK National Health Service. In 2002 a "need to maximise efficiency and abandon ineffective interventions" was recognised; in 2005 the concept of "value for money" was added; in 2006 this was quantified in a pilot project "to identify individual low value interventions which if stopped would save over £1m each"; and in 2011 external financial pressures introduced "cost saving" as a primary driver of disinvestment [10]. These are four different objectives that will require different approaches to identification of disinvestment targets, decision-making, implementation and evaluation and have potentially different timeframes and resource requirements.

There is also a difference between rhetoric and practice. A recent international study found that disinvestment experts thought that the main drivers for disinvestment should be safety, effectiveness and cost-effectiveness, but in their experience budgetary pressures, government intervention, and capital costs and conditions were the actual reasons for change [57].

Drivers for disinvestment at the national level are likely to be based on evidence of harm, lack of effect, or availability of a more cost-effective alternative, where the evidence can be applied broadly. But local factors might identify disinvestment opportunities that are not generalisable to all health services. A study surveying local commissioners of health services across England concluded that the context for decision-making is more important than the deployment of specific tools and techniques and, in the absence of a formal process, the choice of approach would be influenced by the objectives of individual initiatives [105].

2.2 Rationale for disinvestment

It has been noted that the reasons for undertaking disinvestment can vary [101] and that project objectives are not always clear in research publications [26]. The reported aims have also been described as intertwined and unable to be delineated [56]. Disinvestment has been described as addressing three health system imperatives: ethical, quality and economic [76] but no other descriptions or classifications of the reasons for disinvestment were identified.

Many of the multiple definitions include or imply a reason for disinvestment. This wide range of concepts can be summarised in seven main themes (Table 5). An eighth option, 'for any reason', is added for completeness. Some of these concepts are broad and others quite narrow. There is considerable overlap between some themes, for example 'improving patient outcomes' and 'getting value for money' could both be objectives shared by projects focused on 'optimising health care' (Fig. 1). However others might be mutually exclusive. A project to 'improve patient outcomes' based on replacing an ineffective treatment with an effective, but more costly, alternative is not compatible with another aiming to 'release resources' or 'withdraw funding'.

There are many more reasons for undertaking disinvestment than those captured in the seven themes noted from the literature, particularly from the perspective of a local healthcare service. A list of potential reasons for individual disinvestment projects is presented in Table 6. This is illustrative rather than exhaustive and the utility of the categorisation is untested. Some items are very specifically aiming to disinvest, such as discontinuing a service in order to save money, but the majority are examples of aims to address common problems in the health system where disinvestment is a possible solution. Some of these may overlap with others and some are very similar with only subtle differences in context or emphasis. This list is submitted to prompt debate and further research exploring whether making the rationale for disinvestment explicit is a barrier, enabler or determinant of successful disinvestment and what difference the variations in context and emphasis may have.

SHARE

The SHARE Program used two main approaches. A broad approach was taken with the pilot projects, TCPs could be proposed for disinvestment for any reason [114]. However use of an Evidence Dissemination Service to identify potential disinvestment targets from recently published high quality research was more specific, focusing on evidence of harm or availability of more cost-effective alternatives [115].

Implications for policy, practice and research in the local healthcare setting

The range and diversity of reasons for disinvestment, and the complexity of relationships between them, add to the difficulties in considering disinvestment as a single entity in anything other than the broadest sense. The comprehensive simplified definition for disinvestment proposed in the preceding section could be extended to 'removal, reduction or restriction of any aspect of the health system *for any reason*,' in the same way that investment is a process of allocating resources for the introduction, continuation or expansion of any aspect of the health system for any reason. The motivation and purpose in individual situations can then be used explicitly in development of project objectives and strategies without the limitations and complications of being embedded in a definition.

Consideration of the reasons for disinvestment is crucial to project planning. If the objective of a disinvestment activity is specifically to reinvest, the savings need to be

Table 5 Examples of reasons for disinvestment from the literature

Objective	Scope
Any reason	This is the broadest sense of disinvestment and refers to cessation or limitation of something that was previously in practice. It could apply to services, programs, use of equipment, diagnostic tests or therapeutic interventions. Words used interchangeably with disinvestment in this context are decommissioning, de-implementation, removal, replacement, restriction
To optimise health care	This is also a broad concept. It incorporates investment, disinvestment and reinvestment. The focus is on effective allocation of resources to achieve maximum benefit and combines the concepts of safety, effectiveness, cost-effectiveness and eliminating waste. The approach of 'optimal targeting' is also captured here.
To optimise resource use	A similarly broad concept to optimising health care with considerable overlap of intentions. The difference is in the emphasis on economic outcomes rather than other aspects of health care. This is the objective of Program Budgeting Marginal Analysis (PBMA) and other prioritisation activities.
To improve patient outcomes	This relates to removal of harmful or ineffective practices which result in adverse outcomes for patients and/or replacement with more effective alternatives. The focus is safety and effectiveness but the terms 'low value' and 'of little or no health gain'are also used in this context. There is potential to increase costs rather than save money.
To reduce waste	This could also be thought of as improvement in health service outcomes. From the perspective of disinvestment this primarily addresses inappropriate use of diagnostic tests and therapeutic interventions and failure of care coordination.
To get value for money	This is based on consideration of cost-effectiveness and/or risk-benefit analysis. It may be defined by specifying acceptable cost/QALY ratios or based on local values.
To release resources	This can have two elements: to save money in times of financial constraint or to redirect funds to a preferred alternative. Terms used in this context are cost saving, rationing, priority setting, reinvestment and reallocation. Priority setting exercises may also have this as an objective to use disinvestment to enable investment.
To withdraw funding	The focus of this concept is on the process of disinvestment rather than the reason for doing it. Disinvestment defined in this way refers to the act of withdrawing funding from a provider organisation which results in cessation of a service.

measured and explicit decisions about redeployment of the funds are required. However if the purpose is to reduce patient harm or improve health outcomes, the evaluation parameters will be patient measures and there may no savings to reinvest and possibly increased costs to find. The barriers and enablers to implementation and evaluation of these two scenarios are likely to be quite different.

3. Relationships with other healthcare improvement paradigms

A paradigm is a framework containing the basic assumptions, ways of thinking, and methodologies that are commonly accepted by members of a scientific community [137]. Disinvestment is frequently presented as if it is a new paradigm for health improvement. It has been



Table 6 Potential reasons for disinvestment in the local healthcare setting

External

- To address political priorities
- To meet legislative, regulatory or accreditation requirements and professional standards
- To meet national recommendations
- To address legal and ethical issues
- To be sensitive to the environment

Financial

- To save money to meet budget cuts
- To find money to spend on something else
- To prioritise where money is spent
- To redistribute within or between budgets
- To support investment in new technologies
- To support continued investment
- To get value for money

Economic

- To maximise benefits from resource use
- To improve efficiency
- To maintain quality without extra expenditure
- To remove TCPs with unacceptable cost per QALY

Organisational

- To meet strategic goals and priorities
- To ensure sustainability
- To increase productivity
- To work within organisational capacity
- To work within staff capability
- To rationalise services eg only provide orthopaedics at hospital A and oncology at hospital B
- To enable system redesign
- To reduce health service utilisation
- To reduce risk to staff, finances or reputation
- To reduce waste
- To address specific problems

Patient care

- To improve patient health outcomes
- To reduce patient harm
- To target populations or indications for best results
- To improve patient flow and reduce waiting times
- To improve patient satisfaction or reduce inconvenience
- To improve patient access and equity of service provision
- To reduce unnecessary tests or treatment

Health technology, clinical practice or service

- To keep equipment up-to-date
- To remove obsolete or superseded technology
- To remove or restrict TCPs that are harmful
- To remove or restrict TCPs that have little or no value
- To replace TCPs with alternatives of greater benefit
- To remove services that are not performing as intended
- To remove services that are not meeting the needs of the target population

Evidence Based Practice

- To ensure practice is consistent with current evidence
- To actively identify evidence of harm or lack of effect and remove relevant TCPs
- To update evidence-based guidelines and protocols

Social judgement

- To ensure public funds are spent wisely
- To reduce public funding on discretionary services eg some cosmetic procedures

described as an 'emerging field'; disinvestment approaches, processes and initiatives are discussed; 'research agendas' are considered; and the need for mechanisms, frameworks, methods and tools are widely acknowledged [26, 35–39, 47, 49–51, 56, 88, 90, 91, 98, 101, 105, 123]. However there are several health improvement paradigms with mature frameworks and validated methods and tools that are widely-used and well-accepted in local health ser-

3.1 Evidence-based health care

Disinvestment is intrinsically linked to evidence-based health care (EBHC). A fundamental tenet of EBHC is that practices found to be harmful, ineffective or inefficient should be removed and an evidence-based approach would also routinely identify alternatives that were more effective or cost-effective than existing practices. Disinvestment is a natural outcome of EBHC.

vices that already undertake disinvestment-type activities.

While it would be possible to disinvest without taking an evidence-based approach, there is a strong consistent theme in the disinvestment literature advocating for explicit use of evidence in decision-making [6, 23, 26, 37–39, 42, 50–53, 58–61, 88, 95, 100, 104, 111, 131, 138–140]. The triad of evidence, expertise and consumer perspectives which underpins EBHC is also common to most publications on disinvestment.

Systematic reviews are the foundation of EBHC and are often represented in the disinvestment context as Health Technology Assessments (HTAs) or Health Technology Reassessments (HTRs), a term coined more recently to specify appraisal of existing, rather than new, TCPs with view to identifying potential targets for disinvestment [39, 85]. There are numerous examples in the disinvestment literature promoting this evidence-based approach and exploring methods to initiate and undertake HTA/HTR and implement the findings [6, 12–14, 23, 26, 39, 41, 50, 51, 61, 95, 131, 141]. Proactive use of Cochrane systematic reviews has been employed to create national recommendations for disinvestment [10]. Evidence-based guidelines have been proposed as vehicles for implementing disinvestment decisions [10, 28, 42, 46, 139].

Disinvestment is also entwined with three new fields of research and practice that have emerged from the EBHC movement: Comparative Effectiveness Research, Knowledge Translation and Implementation Science. Finding existing evidence, generating new evidence to fill gaps, appraising and synthesising it, getting it to decision-makers, using it in decisions and implementing the appropriate changes are all highlighted in the disinvestment literature.

SHARE

The SHARE Program was explicit in taking an evidencebased approach [106]. The SEAchange model for Sustainable, Effective and Appropriate evidence-based change was used for development, implementation and evaluation of the program components and projects [142]. Methods to use evidence from research and local data proactively to drive disinvestment decisions were explored [115, 143].

Implications for policy, practice and research in the local healthcare setting

Cessation or limitation of practices occurs regularly as a result of evidence-based processes. In the EBHC context this can be achieved in a positive sense by 'implementing best practice' and the negative term 'disinvestment' can be avoided.

There are two significant bodies of literature in disinvestment that can be distinguished by their approach to evidence and the sources they use: those focused on use of HTAs are driven by evidence from the research literature on the safety, effectiveness and cost-effectiveness of TCPs and those focused on priority setting where decisions are based on evidence from stakeholders, local health service utilisation data and economic factors. Used separately these sources of information are insufficient for robust decisionmaking at the local health service level; they are both required [113]. Evidence from research can highlight potential targets for disinvestment but before changes are proposed this information should be considered in light of local data. If an issue only affects a few patients or practitioners, or the burden of disease and hence potential impact are small, particularly in comparison with other issues, resources for change may be better employed elsewhere. Similarly, evidence from local data can identify problems, however review of known best practice from the published literature is required to identify effective potential solutions [113].

Most of the research in EBHC has been conducted in the domain of clinical practice. While there is still much to learn, there is a substantial evidence base to guide know-ledge translation strategies for health professionals and consumers. However the main focus of disinvestment has been on policy and management decisions where the evidence for knowledge translation is much weaker [144–146]; identifying potential for future research.

3.2 Quality improvement

For many authors writing in the area of disinvestment, quality and cost are integrally related in their arguments; even noted as "*two sides of the same coin*" highlighting the tension created by the expectation that health services will deliver better care while reducing costs [147]. Savings and improved quality of care have been cited as the two main objectives of disinvestment [38, 48, 132]. From a big picture perspective, disinvestment can be seen as part of a broader policy agenda to improve efficiency and quality of care [10, 45]; and from a local perspective, disinvestment is seen to deliver quality care as it is embodied by the definition 'the right care at the right time in the right place' [10, 70, 101]. Disinvestment policies are frequently linked to quality improvement (QI) instruments such as plans, programs or institutions. Examples of national disinvestment policies linked to quality vehicles include the Spanish National Health System Quality Plan [37], Australian Medicare Benefits Schedule Quality Framework [43], UK Quality, Productivity and Prevention Programme [10], Norwegian Council for Quality Improvement and Priority Setting in Health Care [39], and the German Institute for Quality and Efficiency in Health Care [42].

The benefits of the formal linkages between disinvestment and QI could potentially flow in either direction or be mutually beneficial. Disinvestment might be a useful tool to achieve QI objectives. It has been described as "a driver, and an enabler, of patient safety and quality health care provision" [38]. Some authors anticipate that disinvestment can reduce costs without reducing quality [101, 130], but many more expect that disinvestment will result in improved quality [28, 34, 39, 40, 45, 50, 85, 91, 116], and others describe both outcomes [10, 38]. Alternatively, linking disinvestment with quality initiatives could increase the likelihood of successful implementation [38, 85]. This is thought to facilitate more transparent discussions [45], redirect negative perceptions of rationing or cost cutting towards the positive objectives of quality and safety [46], focus on standards and performance indicators [23], and make it more acceptable to clinicians and consumers [38, 50].

Many examples of disinvestment are described in the quality improvement literature. For example interventions to decrease adverse events; limit overuse, underuse and misuse of treatments; and reduce duplication in service delivery are all thought to save money [135] and would meet any of the definitions of disinvestment, yet are most frequently referred to as 'quality improvement initiatives' and the term 'disinvestment' is never considered. There are also many examples of harmful practices being 'disinvestrategies' [148, 149].

SHARE

The SHARE Program linked to the Quality Program at Monash Health through the Policy and Procedure Framework. A new framework was developed by the SHARE team and implemented by the Quality Unit. Guidance for developing new and revising existing policies and procedures included steps to identify potential TCPs for disinvestment [114].

Implications for policy, practice and research in the local healthcare setting

Quality improvement is a much wider and more mature field of policy, practice and research than disinvestment, but given the parallels in objectives, it might prove to be a valuable source of information about methods for decision-making, implementation and evaluation.

3.3 System redesign

System redesign involves systematic changes to organisational processes to improve health outcomes, enhance patient and staff experiences of care, and increase efficiency [114]. It uses an array of approaches rather than a single technique, and has significant overlaps with EBHC and QI.

'System redesign' has been used synonymously with 'disinvestment' and proposed as a method to identify disinvestment opportunities, implement disinvestment decisions and/or quantify disinvestment outcomes [38, 60, 101]. Invoking the term 'system redesign' has also been suggested as a strategy to increase the likelihood of implementation by avoiding the word 'disinvestment' [101, 136].

SHARE

System redesign was investigated through a literature review and interviews with Monash Health staff experienced in this area. A decision was made that these processes would be considered as implementation strategies for the pilot disinvestment projects [114].

Implications for policy, practice and research in the local healthcare setting

Like EBHC and QI, system redesign is familiar to health service staff and offers a well-established and accepted context to introduce practice change [113]. The methods used can identify disinvestment opportunities, implement the decisions and evaluate the outcomes.

3.4 Health economic approaches

Most of the early research in disinvestment was based on health economic principles, primarily priority-setting approaches. Historically, priority-setting was an exercise to decide between investment options, however the current economic challenges in health care have led decision-makers to consider disinvestment strategies in this process [60].

There are many priority-setting approaches [150], the most common being Program Budgeting and Marginal Analysis (PBMA) [133] which now features highly in the literature as a rigorous, transparent method to identify disinvestment opportunities. PBMA applies the economic principles of opportunity costs and margins to determine priorities for health program budgets in the context of limited resources [151]. The language of the PBMA framework has changed over the past decade to make disinvestment more explicit. In 2001 the framework sought to release resources through increasing effectiveness and efficiency [152]; in 2004 it noted "scaling back or stopping some services" as one way to release resources [153] and by 2010 "evaluation of investments

and disinvestments" had become an overt component [154]. PBMA has been proposed as the basis of a pragmatic framework for *"rational disinvestment"* that can incorporate service redesign approaches [155] and some successes in this context have been reported [156, 157].

SHARE

Monash Health did not have a health economist and chose to take an evidence-driven, rather than economicdriven, approach to disinvestment based on the in-house expertise in utilisation of evidence from the research literature and local data [106]. However a consultant health economist was engaged to work with the SHARE team to advise on design and evaluation of program components and projects. The potential for PBMA to be used for disinvestment at Monash Health was explored, but it was decided that without in-house expertise this was not a feasible option [114].

Implications for policy, practice and research in the local healthcare setting

Unlike EBHC, QI and system redesign, health economics methods are not familiar to most staff in health services. PBMA and other priority-setting approaches have been employed by university health economists working with health sector decision-makers in research projects. Although they have considerable potential benefits, implementation of these methods in routine decision-making will require academic partnerships and appropriate funds.

4. Challenges

In addition to the lack of common terminology, negative connotations of the term 'disinvestment', shortage of theories and tested frameworks and models, and paucity of proven methods and tools, the nature of disinvestment brings some particular challenges for policy-makers, managers, health professionals and researchers working in this area.

4.1 Sense of loss

The aversion to loss described in prospect theory is particularly relevant to disinvestment [158]. Clinicians and patients perceive greater disadvantage from removal of a TCP, program or service in current use than denial of access to a new one of similar value [50, 99]. Patients also feel entitled to services previously available to them and removal results in loss of that entitlement [50, 55, 134]. The perceived loss from disinvestment is clear and immediate, while any gains from disinvestment may not be readily specified, may not occur for some time, and may not even be achieved at all [42]. For clinicians, removal of a TCP, program or service is not only a loss of something they believed was beneficial for their patients, but also a loss of autonomy [99]. The emotions arising from loss can create formidable opposition that must be anticipated and dealt with [38, 42, 50, 56].

4.2 Challenge to clinical expertise

Health practitioners choose tests and treatments based on what they believe to be the patient's best interests [64]. A decision to remove, reduce or restrict a technology or clinical practice in current use introduces criticism or potential censure of their expertise. It is challenging for clinicians to accept that current evidence may demonstrate that the care they have provided in the past was less than ideal [98, 99]. Clinicians may also see specific practices as integral to their professional practice and identity, making change particularly difficult [50, 55, 91, 159].

4.3 Need for more convincing evidence

To overcome stakeholder resistance, the evidence for removal of a TCP, program or service must be more persuasive than for introduction of a new one [38, 42, 50]. Not only is convincing evidence of absence of benefit required, but also evidence of absence of harm from its withdrawal. While more information and less uncertainty are required [10, 50], the reality is that there is a lack of conclusive evidence for most current practices [26, 48, 51, 56, 100]. Finding evidence for existing practice is more difficult than for new practices which routinely have randomised controlled trials to support them [50, 87]. Since current practice is assumed to be of benefit, conducting trials that question this assumption face resistance, potential ethical objections, impediments to funding and difficulties in recruitment.

4.4 Possibility of benefit

Potential targets for disinvestment are often identified from evidence of harm or lack of benefit. These research findings are based on outcomes of the total study population or specified subpopulations. However there is always a possibility that the TCP may be of benefit to other subgroups or some individuals [10, 20, 50, 56, 76]. Individual patients who experience improvement from a current treatment and clinicians who perceive benefit in certain patient groups can argue for exceptions. There are also situations of 'last resort', when all other treatments have failed or there is imminent risk of death. Flexibility in implementation of disinvestment decisions in these circumstances could be considered [10, 50, 100].

4.5 Heterogeneity of outcomes

A diagnostic or therapeutic intervention can have multiple outcomes. It may result in benefit, have no effect, or even cause harm when used in different patient groups. Effectiveness identified in a particular population with certain indications may not be evident in another group with different characteristics [10, 38, 48, 56, 76]. Disinvestment is generally thought of from the perspective of a dichotomous decision: to maintain or to remove. Selective removal from some patient groups or restriction to certain indications is more complex to communicate as a disinvestment decision and becomes a much more difficult task to implement [55]. This complexity increases when the reason for disinvestment is inappropriate use of TCPs in a patient group. The decisions become more controversial when the service or practice is effective, but does not reach a specified costeffectiveness threshold, or there is another of equal effect which is more cost-effective [48].

4.6 Lack of data

There is a universal lack of suitable economic and usage data and no formal methods for quantifying savings and benefits from disinvestment [10, 51, 56, 100, 135]. Current routinely-collected datasets are considered to be generally inadequate, however improving their quality and reliability may still not address the problem. They lack the precision required for disinvestment and the expense of customisation to achieve this is likely to be prohibitive [10]. Data is needed to underpin decisions, support implementation strategies and monitor and evaluate outcomes. Measurement of savings enables reinvestment and provides incentives for future disinvestment. Without appropriate data and the ability to measure resource release, the concept of disinvestment is undermined.

4.7 Lack of standardised practices/Lack of transparency

The absence of standardised methods for disinvestment decision-making is well-recognised [51, 57, 101, 123] and lack of transparency is also discussed in relation to disinvestment processes [38, 50, 57, 64, 88, 105, 114, 133]. The ad hoc approaches commonly used, based on "gut feeling" and the search "for a quick fix" [57], are reported to be "non-sustainable, reliant on chance or not conducive to independently identifying local opportunities for disinvestment" [98].

4.8 Conflicting roles of local decision-makers

In regional and local healthcare settings, those making decisions to disinvest are likely to have multiple roles [117]. As clinicians they are advocates for their patients; as managers they are advocates for their departments; as decision-makers considering disinvestment they are advocates for the healthcare system, wider population, principles of effectiveness and efficiency, or whatever concepts underpin the local process. There is potential for these roles to be conflicted and it is understandable that the personal, practical and immediate needs of patients and colleagues may be given greater priority than the less tangible and more distant outcomes of disinvestment.

4.9 Nomination by 'outsiders'

There are two issues at play here. Firstly, when invited to nominate candidates for disinvestment, clinicians frequently identify the practices of other professional groups rather than their own [74, 98, 114]. This may induce resistance in those whose practice is being challenged by others outside the relevant area of expertise and preclude local ownership of the problem making successful implementation less likely. Secondly, *"how the technology got on the agenda, where it came from and who was pushing for it"* have been reported as important factors for senior health decision-makers [88]. The influence of nominations from 'outsiders' may introduce unnecessary conflict or bias in the decision-making processes.

4.10 Lack of clarity and rationale

Clarity of aims and objectives at the start of a project and clear rationale for change were in the top 10 considerations for successful disinvestment, one of three best practice recommendations arising from a study of international experts [57] and one of three key themes from an international workshop [85]. Lack of clarity and rationale has been reported as a problem in identifying suitable disinvestment projects. Insufficient information on the population, intervention, comparators, outcomes, harms and benefits, strength and quality of evidence, and wider implications of the proposed change are noted as the main issues [48, 114].

SHARE

All of these were experienced in the SHARE program. Summaries of findings related to these challenges presented in the SHARE papers include: issues to consider in development of an organisational program for disinvestment [113]; implications for disinvestment in the local setting and resulting decisions for program development [106]; barriers and enablers to implementing and evaluating health service decisions for resource allocation [117]; and factors that influenced decisions, processes and outcomes in undertaking disinvestment projects [114] and establishing services to support EBHC [143].

Implications for policy, practice and research in the local healthcare setting

Decision-making in healthcare is described at three levels: macro (national, state/provincial and regional settings), meso (institutions) and micro (individuals) [141, 160]. At macro and meso levels, governments and institutions can withdraw funding or issue guidelines, but enacting these recommendations requires change at meso and micro level [70, 139, 161]. In addition, some decisions cannot be made centrally. National recommendations cannot take into account local factors such as population demographics, organisational priorities, budgets, capacity or capability; hence many decisions about the use of TCPs, programs and services have to be made locally [11]. The challenges inherent in disinvestment processes, particularly those related to implementation, are likely to have greatest impact in the local healthcare setting.

New approach to disinvestment

Although research and debate in disinvestment is increasing, and several countries have formal programs, there is little evidence of active and successful implementation of specific 'disinvestment initiatives' in the local healthcare setting [42, 47, 51, 56, 64, 101]. Seeking out targets when the expressed aim is 'to disinvest' has not been effective [10, 26, 48, 101, 105, 114]. This review highlights many reasons why this might be so.

However successful removal, reduction and restriction of technologies, clinical practices, programs and services are commonplace at the health service level; but these changes have not been called disinvestment. In these cases, the impetus for change is not 'to disinvest' but to meet more constructive aims such as to improve patient safety, implement evidence-based practices, address changing population needs or redirect resources to more pressing priorities [117].

This suggests that the construct of 'disinvestment' may be problematic in the local healthcare setting. After more than a decade of limited success, it may be time to consider new ways of approaching disinvestment. To stimulate research and debate, we propose two options that address some of the issues identified in this review; there may be others.

Clarification and consolidation

This option proposes that the concept of 'disinvestment' as a specific aim and activity is clarified and consolidated from three perspectives.

Terminology: A common understanding of disinvestment between researchers and decision-makers with a single agreed definition and clear and consistent terminology to convey the underlying concepts would improve communication in disinvestment initiatives.

Research: Initiatives currently labelled as 'disinvestment research' are a mixed bag of activities. Several of these are well-established research fields in their own right, independent of disinvestment, for example HTA, PBMA, quality improvement and implementation science. In these situations the primary aim of the activity is not to disinvest; disinvestment is an outcome, byproduct or part of the process. If there is to be a discipline of disinvestment research, it needs to be defined, theoretical underpinnings explored, and scope and methodologies agreed upon. Application: Frameworks, models, methods and tools are needed. It has been proposed that mechanisms to develop, implement and evaluate disinvestment activities can be built on existing conceptual frameworks from other research paradigms such as HTA/HTR, PBMA, knowledge translation and implementation science [29, 123, 155]. As a step in this direction, an evidence-based framework for disinvestment in the context of resource allocation is proposed in Paper 10 in this series [84].

Simplification and assimilation

This option proposes that disinvestment is considered as the opposite of investment; it is not a specific aim or activity, but is the outcome of, rather than the reason for, a resource allocation decision.

The definition is simplified. If investment is a process of allocating resources for the introduction, continuation or expansion of any aspect of the health system for any reason, disinvestment would be a process of withdrawing resources for the removal, reduction or restriction of any aspect of the health system for any reason. This makes the term more neutral by removing some of the emotive and negative connotations. Use of the term is likely to decrease as there is no need to use it to describe why or how cessation or limitation is being undertaken.

The approach is more constructive. Considering disinvestment within the spectrum of all resource allocation decisions [39, 50, 102, 103, 106, 117, 122] and from the perspective of optimising patient care and health outcomes [23, 34, 38, 39, 50, 123] is more positive and is closer to reality than undertaking disinvestment decisions and activities in isolation from other health service processes.

The activities are assimilated. The why and how of disinvestment embedded in the current definitions would be integrated within the language and methods and tools of familiar health service improvement paradigms such as EBHC, QI and system redesign.

There is still a need for research, development and application of methods to identify and address unsafe, ineffective, inefficient and inappropriate practices, but this does not need to be described as disinvestment, it can be achieved within the existing methodologies.

Limitations

Although a rigorous systematic approach was taken to search the health databases and online publications (Additional file 1), it is impossible to be comprehensive in ascertaining all the relevant literature on disinvestment for the two reasons noted above.

Disinvestment in its broadest sense, cessation or limitation of something that was previously in practice, has always happened in health services but has not been labelled in this way. These decisions are mainly made and implemented in health care settings and, more recently, by government agencies. Neither of these groups typically publishes their work due to time pressures, competing priorities, lack of incentive to do so and, in the case of disinvestment, potential disincentives due to political sensitivities [26, 56].

The disinvestment literature is predominantly from developed countries and the generalisability to resourcepoor settings may be limited.

These limitations mean that some relevant publications may not have been identified and some information has not been published. However, despite the limitations, several strong and consistent messages about disinvestment are evident. Unfortunately some of these consistent messages are about the lack of consistent messages.

The literature has been reviewed from the perspective of a local health service, however the authors' experience is based in the Australian health system; hence differences with other health systems may not have been recognised and additional concepts or relationships may have been missed.

Conclusions

Increasing use of new and existing health technologies and clinical practices has contributed to escalating costs and led to concerns about sustainability of the healthcare system. Some TCPs do not achieve the desired objectives and removing or restricting their use should improve health outcomes and reduce costs. While funders and health services have always made decisions about what is and is not provided, the construct of 'disinvestment' has emerged to describe the removal, reduction or restriction of current practices. The literature describes three main areas of opportunity for disinvestment: 1) TCPs in current use that were not evaluated rigorously prior to their introduction and have subsequently been identified as unsafe, ineffective or not cost-effective, 2) existing TCPs that are safe, effective and cost-effective but which have alternatives offering greater benefit and 3) TCPs that are overused or misused.

Early research and debate in disinvestment focused on national policy initiatives and local projects based on health economics approaches. Although the scope has widened considerably since, there is still little information to guide a systematic organisation-wide approach to disinvestment in the local healthcare context. The SHARE Program was established to address this.

There is no agreed terminology in this area. There are multiple definitions for disinvestment based on a range of different concepts, some overlap and others are mutually exclusive. There are also numerous alternative terms to convey the same concepts, some developed intentionally to avoid the negative connotations associated with the term disinvestment. Disinvestment is focused on the use of 'health technologies' but there is also a range of definitions for this term. To compound the difficulties in reaching a common understanding, the terms 'disinvestment' and 'health technologies' are used in one way by researchers and in another by decision-makers. Definitions of disinvestment are further complicated by constraints imposed by including a specified purpose (eg withdrawing practices of 'low value'), defined criteria (eg effectiveness or cost-effectiveness) or anticipated outcome (eg reallocation of resources). This leaves no room for cessation of TCPs for other purposes, based on other criteria for different outcomes.

Investment is not defined in the health literature, but general use of the term reflects a process of allocating resources for the introduction, continuation or expansion of any aspect of the health system for any reason. Similarly, disinvestment could simply be 'removal, reduction or restriction of any aspect of the health system for any reason'. Government and health service policy and guidance documents frequently use the phrase 'investment and disinvestment' without defining either term, indicating the continuum from funding to defunding or introduction to removal which represents the reality of decision-making. The various complex research definitions of disinvestment only capture fragments of this process. If this broad definition was used there would be no need to disinvest for the sake of disinvesting, and practice change would not be associated with the negatively-perceived purpose of 'disinvestment'. Removal, reduction or restriction of existing practices would be driven by positive objectives such as reducing harm, improving outcomes, enhancing patient care, addressing national priorities, meeting local needs, introducing preferred alternatives, decreasing systematic errors and removing organisational waste. This approach is more likely to add incentives and reduce barriers to change.

Disinvestment is often undertaken in isolation from other decision-making systems and processes. Viewing disinvestment in the context of all resource allocation decisions with the purpose of optimising health care may also provide motivation for change, reduce disincentives and avoid some of the ethical dilemmas inherent in other disinvestment approaches.

Reinvestment is cited as a reason for and an outcome of disinvestment but there are no guarantees that resources will be released; costs may even increase. Health service accounting procedures and lack of data on usage of TCPs make it difficult to measure resources released from individual practice changes, and no reported methods for quantifying the resources released or reallocating them were identified.

There is considerable overlap between the aims, activities and outcomes of disinvestment initiatives and those of EBHC, QI, system redesign and PBMA. All of these are well-established in health service practice and research and have validated methods and tools. Given the negative connotations of disinvestment, and the lack of success in delivering projects which aimed 'to disinvest', perhaps removal, reduction and restriction of current practices would be more successful undertaken within existing healthcare paradigms.

We were unable to find any theories and found largely untested frameworks and models specifically for disinvestment. This is understandable given the variability and inconsistencies in terminology. Without common understanding of what 'disinvestment' is, the research agenda will continue to be a mixed bag of activities that belong to other domains. Researchers and decision-makers must reach agreement on definitions and concepts.

There is clearly a need to develop frameworks, models, methods and tools to systematically and proactively identify harmful, ineffective and inefficient TCPs, services and programs; to implement their removal, reduction or restriction; to evaluate the impact and outcomes of these changes; to measure savings if possible; and reallocate resources if appropriate. This can all be achieved without using the label 'disinvestment' which has been shown to have negative connotations and act as a barrier to change.

Additional file

Additional file 1: Methods. (PDF 210 kb)

Abbreviations

EBHC: Evidence based health care; HTA: Health technology assessment; HTR: Health technology reassessment; PBMA: Program budgeting and marginal analysis; QI: Quality improvement; SHARE: Sustainability in health care by allocating resources effectively; TCPs: Technologies and clinical practices

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Availability of data and materials

Many of the datasets supporting the conclusions of the articles in the SHARE series are included within the articles and/or the accompanying additional files. Some datasets provide information for more than one article and are only provided once; where they are not included within an article and/or the accompanying additional file, the relevant citations to the articles in which they are provided are included. Datasets have not been made available where it is impossible to de-identify individuals due to the nature of survey or interview responses or where the data is published in confidential internal reports.

Authors' contributions

All authors contributed to the design of the paper. CH, WR, KA and RK contributed to project design and delivery, decision-making and direction

throughout the SHARE Program. CH undertook the literature review and drafted the initial manuscript. SG provided critical revisions. WR, KA and RK provided later feedback. All authors read and approved the final manuscript.

Authors' information

CH was the Director of the Centre for Clinical Effectiveness and the SHARE Program Director. CH undertook this review and completed the SHARE publications as part of an unfunded PhD. SG is Professorial Fellow in the Monash University School of Public Health and Preventive Medicine and co-supervisor of CH's PhD. WR was Executive Director of Medical Services and Chair of SHARE Steering Committee. KA was the SHARE Project Manager. RK was Director of Medicine Program, member of the SHARE Steering Committee and co-supervisor of CH's PhD.

Ethics approval and consent to participate

The Monash Health Human Research and Ethics Committee (HREC) approved the SHARE program as a Quality Assurance activity. Further ethical review was not required as the program met the following criteria [162]: • "The data being collected and analysed is coincidental to standard operating

procedures with standard equipment and/or protocols; • The data is being collected and analysed expressly for the purpose of maintaining standards or identifying areas for improvement in the environment from which the data was obtained:

The data being collected and analysed is not linked to individuals; and
None of the triggers for consideration of ethical review are present." [162]
Participation was based on the 'opt-out approach' [162]. "The opt-out approach is a method used in the recruitment of participants into an activity where information is provided to the potential participation is presumed unless they take action to decline to participate." [162] Consent to participate was approved by the HREC based on the following criteria:

• Health care providers, managers, consumer representatives, and officers within government health departments will be informed about the project and the processes and invited to participate.

 Participation in interviews, workshops and/or surveys will be considered to be implied consent.

These conditions were met.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Author details

¹School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia. ²Centre for Clinical Effectiveness, Monash Health, Melbourne, Australia. ³Medical Services and Quality, Monash Health, Melbourne, Australia. ⁴Medicine Program, Monash Health, Melbourne, Australia.

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Sustainability in Health care by Allocating **Resources Effectively (SHARE) 10:** operationalising disinvestment in a conceptual framework for resource allocation

Claire Harris^{1,2*}, Sally Green¹ and Adam G. Elshaug^{3,4}

Abstract

Background: This is the tenth in a series of papers reporting a program of Sustainability in Health care by Allocating Resources Effectively (SHARE) in a local healthcare setting. After more than a decade of research, there is little published evidence of active and successful disinvestment. The paucity of frameworks, methods and tools is reported to be a factor in the lack of success. However there are clear and consistent messages in the literature that can be used to inform development of a framework for operationalising disinvestment. This paper, along with the conceptual review of disinvestment in Paper 9 of this series, aims to integrate the findings of the SHARE Program with the existing disinvestment literature to address the lack of information regarding systematic organisation-wide approaches to disinvestment at the local health service level.

Discussion: A framework for disinvestment in a local healthcare setting is proposed. Definitions for essential terms and key concepts underpinning the framework have been made explicit to address the lack of consistent terminology. Given the negative connotations of the word 'disinvestment' and the problems inherent in considering disinvestment in isolation, the basis for the proposed framework is 'resource allocation' to address the spectrum of decision-making from investment to disinvestment. The focus is positive: optimising healthcare, improving health outcomes, using resources effectively.

The framework is based on three components: a program for decision-making, projects to implement decisions and evaluate outcomes, and research to understand and improve the program and project activities. The program consists of principles for decision-making and settings that provide opportunities to introduce systematic prompts and triggers to initiate disinvestment. The projects follow the steps in the disinvestment process. Potential methods and tools are presented, however the framework does not stipulate project design or conduct; allowing application of any theories, methods or tools at each step. Barriers are discussed and examples illustrating constituent elements are provided.

Conclusions: The framework can be employed at network, institutional, departmental, ward or committee level. It is proposed as an organisation-wide application, embedded within existing systems and processes, which can be responsive to needs and priorities at the level of implementation. It can be used in policy, management or clinical contexts.

Keywords: Disinvestment, Decommissioning, De-adoption, Resource allocation, Reinvestment, Reallocation, Rationing, Prioritisation, Decision-making, Framework

²Centre for Clinical Effectiveness, Monash Health, Melbourne, Victoria, Australia Full list of author information is available at the end of the article



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^{*} Correspondence: claire.harris@monash.edu

¹School of Public Health and Preventive Medicine, Monash University, Melbourne, Victoria, Australia

About share

This is the tenth in a series of papers reporting Sustainability in Health care by Allocating Resources Effectively (SHARE). The SHARE Program is an investigation of concepts, opportunities, methods and implications for evidence-based investment and disinvestment in health technologies and clinical practices in a local healthcare setting. The papers in this series are targeted at clinicians, managers, policy makers, health service researchers and implementation scientists working in this context. This paper proposes a framework for operationalising disinvestment in the context of resource allocation in the local healthcare setting.

Background

Although there is no clear single definition, disinvestment is generally understood to be removal, reduction or restriction of technologies and clinical practices (TCPs) that are unsafe or of little benefit, in order to improve patient outcomes and use available resources more efficiently [1]. Three main areas of opportunity for disinvestment have been identified: 1) TCPs in current use that were not evaluated rigorously prior to their introduction and have subsequently been identified as harmful, ineffective or not cost-effective for all patients or certain subgroups, 2) existing TCPs that are safe, effective and cost-effective but which have alternatives offering greater benefit, and 3) TCPs that are overused or misused [1].

Following successful implementation of a systematic, integrated, transparent, evidence-based program to assess new TCPs prior to their introduction within the health service [2], Monash Health, a large health service network in Melbourne Australia, sought to develop a similar program for disinvestment. The 'Sustainability in Health care by Allocating Resources Effectively' (SHARE) Program was established to investigate this. An overview of the program and a guide to the SHARE publications are provided in the first paper in this series [3] and a summary of the findings are in the final paper [4].

It is common for healthcare networks and individual facilities to make decisions within organisation-wide frameworks; for example introduction of new TCPs and models of care, delivery of programs and services, development and authorisation of policies and procedures, capital expenditure and clinical purchasing. Although disinvestment can be considered in all these contexts, it is frequently reported in individual standalone projects, isolated from other decision-making settings. Monash Health chose to explore disinvestment in the context of organisation-wide systems and processes for all resource allocation decisions.

There was little published information available to guide development of a systematic organisation-wide local approach to disinvestment at Monash Health. In the absence of guidance from the literature, a twophased process was proposed to identify and then evaluate potential opportunities for disinvestment (Fig. 1). The aim of Phase One was to understand concepts and practices related to disinvestment and the implications for a local health service and, based on this information, to identify potential settings and methods for decisionmaking. The aim of Phase Two was to develop, implement and evaluate the proposed settings and methods to determine which were sustainable, effective and appropriate at Monash Health.

The outcomes of Phase One provide information redecision-making settings, decision-makers, garding scope and type of decisions, strengths and weaknesses in current processes, barriers and enablers, and criteria used for allocating resources within a local health service which, to our knowledge, has not previously been documented to this level of detail in this context [5-8]. While the program had limited success in achieving the aims of Phase Two, the investigation provides in-depth insight into the experience of disinvestment in one local health service and reports the process of disinvestment from identification, through prioritisation and decisionmaking, to implementation and evaluation, and finally explication of the processes and outcomes [9-11]. These detailed findings enabled development of several frameworks and models for a range of purposes related to disinvestment and resource allocation in the local healthcare setting.

At the completion of these activities, a third phase was undertaken to review the current literature from the perspective of a local health service, and combine it with the published findings from the SHARE Program to address some of the gaps in information about disinvestment in this setting. This review focuses on the practical and operational aspects of disinvestment at the local level. It is a companion to the ninth paper of the SHARE series which provides a conceptual description; disinvestment is introduced and discussed in relation to terminology and concepts, motivation and purpose, relationships with other health improvement paradigms, challenges, and implications for policy, practice and research [1]. The methods of the literature review are included in Paper 9 and the contents of both reviews are summarised in Table 1.

Although research and debate has broadened considerably over the past decade, there remains a lack of information to guide healthcare networks or individual facilities in how they might take a systematic, integrated, organisation-wide approach to disinvestment in the context of all resource allocation decisions [1]. Despite the paucity of evidence in this context, there are clear and consistent messages regarding principles for decision-making, settings and

SHARE					
Sustainability in Health care by Allocating Resources Effectively					
PHAS	E ONE	PHASE	TWO		
STEP 1 Identify need for change	STEP 2 Develop proposal for change	STEP 3 Implement change proposal	STEP 4 Evaluate outcomes of change		
 What concepts, definitions and perspectives underpin disinvestment? What models or methods of disinvestment have been implemented in hospitals or health services? Where are the opportunities for systematic decisions about disinvestment in a local health service? Where, how and by whom are decisions about resource allocation made, implemented and evaluated at Monash Health? What factors influence these processes? What knowledge or experience of disinvestment exists within Monash Health? How can consumer values and preferences be integrated into organisation-wide decision-making? 	 What are the implications for disinvestment at Monash Health? What is the most appropriate and effective approach to enable organisation-wide, systematic, integrated, evidence-driven decision-making for disinvestment at Monash Health? Can a model for evidence-driven resource allocation in the local healthcare setting be derived from the Monash Health program to enable replication and testing? 	 Aim 1. Systems and Processes To develop, implement and evalu organisation-wide systematic, tra evidence-based decision-making Aim 2. Disinvestment Projects To develop, implement and evalu identify and prioritise potentia undertake evidence-based disi Aim 3. Support Services To develop, implement and evalu deliver evidence from research build capacity in evidence-based implementation and evaluatior support staff in project conduct Aim 4. Program Evaluation, Research To undertake evidance research to undertake action research to undertake action research 	ate systems and processes for nsparent, accountable and ate methods to I disinvestment opportunities nvestment projects ate methods to a and data to decision-makers ed decision-making and n of evidence-based decisions t and administration ch and Dissemination asure outcomes o understand processes to share knowledge and nd develop links for collaboration sh publications and presentations		
Take an evidence-based approac service staff, and Values and pers Address systems issues: Ensure s Integrate with existing systems	n: each step underpinned by Eviden pectives of consumers ustainability through structure, skill	ce from research and local data, Expe s, resources, leadership and commitm	erience and expertise of health nent; Avoid duplication; and		
Use action research methods: Do	cument, investigate and learn from	barriers and enablers encountered in	n the change process		

opportunities to identify disinvestment targets, steps in the disinvestment process, barriers and enablers to successful implementation, and some frameworks and models for elements of the disinvestment process. This practical information can be used to develop an organisation-wide framework for operationalising disinvestment in the local healthcare setting.

Aims

The aims of this paper are to discuss the current literature on disinvestment from an operational perspective, combine it with the experiences of the SHARE Program, and propose a framework for disinvestment in the context of resource allocation in the local healthcare setting.

Existing theories, frameworks and models Theories

Theories are based on concepts or ideas that characterise a particular phenomenon and propositions or relationships that link the concepts [12]. No specific theories of disinvestment have been proposed, however resource allocation theory, prioritisation theories, and decision-making theories have been applied in disinvestment projects; examples are listed in Table 2 [13–18].

Perhaps the most relevant to disinvestment is the theory of discontinuance, defined by Rogers in his discussion of the theory of diffusion as "a decision to reject an innovation after having previously adopted it" [19]. In their review of diffusion of innovations in health care, Greenhalgh et al. note the importance of research into discontinuance and the lack of studies in this area

Table 1 Contents of the literature reviews

SHARE Paper 9. Conceptual perspective

Terminology	and	concepts	

- Health technologies
- Disinvestment
- Resource allocation
- Optimising health care
- Reinvestment
- Motivation and purpose
 - Impetus for disinvestment
 - Rationale for disinvestment
- Relationships with other healthcare improvement paradigms
 Evidence based health care
 - Quality improvement
 - System redesign
 - Health economic approaches
- Challenges
- New approach to disinvestment

SHARE Paper 10. Operational perspective

- Existing theories, frameworks and models
- New framework
- Program
 - Principles of decision-making
 - Settings and opportunities
 - Prompts and triggers
 - Steps in the disinvestment process
- Projects
- Research
- Methods and tools
 - Identification of opportunities
 - Prioritisation and Decision-making
 - Development of a proposal
 - Implementation
 - Monitoring, Evaluation and Reporting
 - Reinvestment
 - Dissemination and Diffusion
 - Maintenance
- Barriers and enablers

[20]. Hollingworth et al. propose a schema of health technology adoption and withdrawal which includes both discontinuance and disinvestment [21] and Niven et al. use the definition of discontinuance for the term 'de-adoption' in their review of low-value clinical practices [22].

Frameworks

Frameworks use concepts and relationships to provide a frame of reference, organise and focus thinking and

assist interpretation. Frameworks are descriptive, tend to be high-level and can apply to a wide variety of situations [12, 23]. No frameworks for systematic, integrated, organisation-wide approaches to disinvestment were identified, however there are several frameworks for specific aspects of the disinvestment process. These are summarised by setting, aims, method of development and components in Table 3. Those applicable to the local healthcare setting are discussed in more detail under the relevant steps in the disinvestment process below.

Polisena and colleagues [24] identified three frameworks in their review of disinvestment projects: Health Technology Assessment (HTA) [25], Accountability for Reasonableness (A4R) [26] and Program Budgeting and Marginal Analysis (PBMA) [27]. To distinguish between evaluation of new TCPs and those in current practice, the term Health Technology Reassessment (HTR) has been introduced for methods aiming to identify potential targets for disinvestment [28, 29]. HTA and A4R are frameworks by definition and are valuable tools for decision-making; however, although their use may lead to disinvestment, they are not frameworks specifically for disinvestment. Like A4R and HTA, PBMA and other priority setting frameworks [30-32] can play a key role in certain approaches to disinvestment, but do not address all potential aspects of the disinvestment process or all opportunities to drive change. However they would all integrate readily into a wider framework for disinvestment, as aspired to with the trialing of the Australian Medicare Benefits Schedule Review initiative [33]. Recently Elshaug et al. provided a comprehensive inventory of disinvestment policy and practice levers that could flow from HTA/HTR and other priority setting processes [34].

Sources of synthesised evidence such as HTAs, systematic reviews and evidence-based guidelines, can underpin disinvestment decisions in two ways. Firstly, the process of evidence synthesis can be undertaken reactively to address policy, management or clinical questions as they arise and inform the resultant decisions.

 Table 2 Examples of theories proposed or applied in disinvestment-related projects

Theory	Purpose	Context
Decision-making theory	To guide resource allocation decisions	Health service delivery organisations [16]
Deliberative democratic theory Deliberation theory	To capture stakeholder perspectives	Assisted Reproductive Technologies [15, 18] Pathology testing for vitamin B12 and folate [15]
	To underpin patient involvement	Priority setting healthcare improvement [13]
Social constructionist theory	To inform data analysis	Pathology testing for vitamin B12 and folate [15]
Resource allocation theory	To refine arguments in funding debate	Assisted Reproductive Technologies [14]
Prioritisation and quality improvement theories	To develop a proposal for rationalisation, prioritisation and rationing	Assisted Reproductive Technologies [17]

Table 3 Examples of frameworks and models related to disinvestment

Framework/Model	Setting	Aims	Method of development	Components
PROJECTS TO IDENTIFY AND DISIN	VEST INDIVIDUAL TCP	S		
Framework of potential settings and methods for disinvestment [5]	Organisation-wide program in local health service network	To identify potential settings and methods for disinvestment decision-making within local health service systems and processes	Literature review; survey of external experts, interviews and workshops with local stakeholders	Three organisational contexts that provide potential opportunities to introduce disrivestment decisions into health service systems and processes are presented in order of complexity, time to achieve outcomes and resources required: 1. Explicit consideration of potential disrivestment in routine decision-making for purchasing and procurement and development of guidelines and protocols 2. Proactive decision-making about disrivestment driven by available evidence from published research and local data, 3. Specific exercises in priority setting and system redesign.
Algorithm for selecting a disinvestment project from a catalogue of potential opportunities [9]	Organisation-wide program in local health service network	To facilitate decision- making for identification of potential and selection of actual disinvestment projects	Literature reviews; surveys, interviews and workshops with local stakeholders; document analysis; consultation with experts; taxonomy development	Five steps in selection process: 1. Assess highest risk, 2. Assess importance and potential, 3. Assess quality and strength of evidence, 4. Assess extent of problem, 5. Assess implications of change. Three key decision-making steps between Steps 2 and 3, 3 and 4, and after 5. After selection: Notify decision; Implement; Evaluate; Report Each step includes the activities, who will undertake them, and the decision options
Model for an Evidence Dissemination Service [11]	Organisation-wide program in local health service network	To facilitate use of recently published synthesised evidence in organisational decision-making	Literature reviews; surveys, interviews and workshops with local stakeholders; document analysis; consultation with experts; taxonomy development	Methods and tools to identify sources of high quality synthesised evidence; automate methods of capture; classify, collate and store materials in useful categories; prioritise based on user and health service needs; repackage into suitable formats based on user needs; identify relevant individuals or groups to receive information; disseminate to the appropriate target groups, and report use of evidence
Guideline for Not Funding Health Technologies (GuNFT) [35]	Two versions are provided, one for application at national and regional level and the other at local level.	To facilitate establishment of a transparent, systematic and explicit process for assessing the potential for disinvestment in certain health technologies or in some of their indications	Literature review; face-to-face meeting, teleconference and emails using Nominal Group Technique with 10 experts representing health care delivery, administration, technology assessment and consumers to draft the guideline; validation by two external experts in HTA; wide circulation for comment and approval	Seven phases: 1. Identification through applications, 2. Validation of applications; 3. Prioritisation (if necessary); 4. Assessment; 5. Decision making; 6. Development of an action plan; 7. Diffusion of the decision, the reasons why it has been taken and the action plan. Applications are submitted by health care professionals; validation, prioritisation and assessment of the applications are undertaken by a HTA agency or the health service Technology Assessment Committee; and the decision, development of the action plan and diffusion is undertaken by the health service or regional health authority management team or other multidisciplinary body. Tools are available.
Disinvestment framework to guide resource allocation decisions in health service delivery [16]	Health service delivery organisations	To aid disinvestment activity in the local setting.	Thematic analysis of systematic review and a scoping review of the public sector and business literatures. Draft framework critiqued by Decision Maker Advisory Committee (Chief Financial Officers from Canadian health services) and External Reference Group (international academics) before being finalised.	Seven steps: 1. Determine objectives and scope; 2. Identify strategic priorities; 3. Identify options and risk, 4. Rank options; 5. Develop implementation plan; 6. Conduct disinvestment; 7. Assess outcomes and processes. Oversight Committee (senior managers and clinical leaders) is responsible for the majority of the process components including making final decisions; independent Assessment Committee (managers, clinicians, other taff and public representatives) defines the criteria, weights and scale used to assess disinvestment options. Support Committee (researchers and financial personnel) assists in the assessment of disinvestment options in the form of evidence, financial analysis and evaluative measures.

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Framework of components in the resource allocation process [6]	Organisation-wide program in local health service network	To represent components in the process of resource allocation and the relationships between them	Interviews and workshops with stakeholders, thematic analysis of responses, document analysis, use of existing frameworks to synthesise findings	Eight components: Governance, Administration, Stakeholder engagement, Resources Decision Making, Implementation, Evaluation, and, when appropriate, Reinvestment. Details of elements of structure and practice within each component is provided. Structure is described as 'who' and 'what' and includes people, systems, policies, requirements, relationships and coordination. Practice addresses 'how' through processes, procedures, rules, methods, criteria and customs.
Model for Sustainability in Health care by Allocating Resources Effectively (SHARE) [8]	Organisation-wide program in local health service network	To develop, implement and evaluate organisation- wide systematic, transparent, accountable and evidence- based decision-making systems and processes	Three literature reviews; online survey, interviews and structured workshops with stakeholders; consultation with experts in disinvestment, health economics and health program evaluation; drafted in consultation with staff, consumers and external experts; assessed against framework for success and sustainability	Four components, each with multiple elements. 1. Systems and processes; 2. Disinvestment projects; 3. Support services; 4. Program evaluation and research. The model outlines each component and the relationships between them, their aims and activities as well as the underlying principles and the preconditions required for success and sustainability. There is also detailed discussion of the antecedents, barriers and enablers.
New Zealand National Health Committee Workplan [36]	National government decision-making	To provide the Minister of Health with recommendations for use and funding of health technologies	Not documented	The program addresses which technologies should be publicly funded, to what level and where technology should be provided and how new technology should be introduced and old technology removed. Six phases: 1. Identification, 2. Prioritisation, 3. Analyse and Assess, 4. Recommend, 5. Implement, 6. Evaluate.
Health technology reassessment and decommissioning framework/ model [37]	National or provincial government decision-making	To create a model for assessing the health technology life cycle to identify and delist obsolete technologies	Focused narrative literature review and input from experts.	Two components: 1. Health technology life cycle and reassessment, 2. Reassessment and Decommissioning Model, with Oversight Committee, Triggers, and Possible Outcomes. Second component includes triggers and processes, structure (oversight committee), decisions and outcomes
PROGRAM EVALUATION				
Framework for evaluation of priority setting [39]	National, regional and individual healthcare facilities	To develop a framework for the evaluation of priority setting practice at macro and meso levels	Literature review and thematic analysis	Two evaluation domains: 1. Consequentialist outcomes: Efficiency, Equity, Stakeholder satisfaction, Stakeholder understanding, Shifted (reallocation of resources), Implementation of decisions, 2. Proceduralist conditions: Stakeholder engagement, Empowerment, Transparency, Revisions, Use of evidence, Enforcement, Community values
SHARE Program Evaluation Framework and Plan [8]	Organisation-wide program in local health service network	To assess the effectiveness of the SHARE program, implementation fidelity and factors for successful change	Drafts prepared by project team in consultation with Consultant in Health Program Evaluation to meet the information needs of key stakeholders and the internal capacity of staff conducting the project, revised and finalised in consultation with key stakeholders	Seven evaluation domains: 1. Improved patient care, 2. Improved resource allocation for health technologies and clinical practices, 3. Improved decision-making, 4. Improved staff capacity in use of evidence and data in decision-making and implementation of practice change, 5. Barriers and enablers, 6. Implementation fidelity, 7. Sustainability and spread. Includes an outcomes hierarchy based on the SHARE program components and a research program based on a theoretical framework for implementation of an evidence-based innovation.

Table 3 Examples of framewc	orks and models reli	ated to disinvestment (Co	ntinued)	
Framework for evaluation and explication of the processes and outcomes of a disinvestment project [9]	Organisation-wide program in local health service network	To adapt a framework and taxonomy for evaluation of evidence- based innovations to enable evaluation and explication of disinvestment projects	Literature review, surveys and interviews with stakeholders	Three components: 1. Determinants of effectiveness (characteristics of external environment, organisation, proposal for change, rationale and motivation, potential adopters, potential patients, identification process, prioritisation and decision-making process, implementation plan, implementation resources), 2. Process of change (delivery of implementation strategy and stages of change); 3. Outcomes (process and impact for patient, practitioner, systems, economic,

of implementation strategy and stages of change); 3. Outcomes (process and impact for patient, practitioner, systems, economic, reinvestment, sustainability and spread). Taxonomy containing details within each component is provided.	o assess the impact of Not documented Provides list of measurement tools linked to specific project/ forts to reduce low- alue care.
projects	To assess the impac efforts to reduce lov value care.
	Relevant settings within health care systems

projects		

n Literature review, individual and group	interviews with Consumer Working Gro	re and health service staff, workshop with	Community Advisory Committee, draftii
To involve consumers ir	organisation-wide	decision-making, captur	their perspectives and

Organisation-wide program in local

SHARE model for incorporating consumer views into decisions

STAKEHOLDER ENGAGEMENT

Integrative framework for

measuring overuse [38]

health service

for resource allocation [7]

network

Four components: 1. Principles, 2. Scope, 3. Preconditions, 4.

consultation and participation) and use of Consumer evidence

Activities include Consumer engagement (communication,

Activities

sources). Details of activities are reported in the context of the

(consumer perspectives found in publications and data

components of the resource allocation process noted above

Community Advisory Committee, drafting and revision with consumer participation. shop with

incorporate them into

decisions for resource

allocation.

engage with the health To seek advice and

sector

decision-making

government

National

New Zealand National Health

Committee Workplan [36]

Not documented

clinicians via colleges and specialty societies; providers such as District Health Boards, NGOs and private facilities via Health Sector Forum; international Health Technology Assessment agencies; Universities and Research Institutes, international and domestic manufacturers. Tiered approach to engage with and seek advice from

Secondly, dissemination of the findings of published HTAs, systematic reviews or guidelines can be a proactive method of initiating decision-making to ensure policy and practice is consistent with the best available evidence.

The 'Disinvestment framework to guide resource allocation decisions in health service delivery' [16] and the 'Guideline for Not Funding Health Technologies' (GuNFT) [35] are examples of frameworks to identify and disinvest individual TCPs. They are very similar to the process outlined in the Workflow Diagram of the New Zealand National Health Committee for introduction of new and removal of old technologies [36]. All three are systematic, transparent and based on a series of steps to identify suitable TCPs, engage relevant stakeholders, make the appropriate decisions, implement and evaluate change.

The New Zealand National Health Committee also includes a framework for wider stakeholder engagement in their Business Plan [36].

Joshi and colleagues use both framework and model when referring to the outcome of their narrative review 'Reassessment of Health Technologies: Obsolescence and Waste' [37]. Based on the definitions used herein, it is classified as a framework. It includes the role of reassessment in the life cycle of a health technology and triggers, structures and outcomes for health technology reassessment and decommissioning.

Bhatia et al. present an 'Integrative framework for measuring overuse' as an evaluation tool to be implemented within initiatives that aim to reduce 'low value care' [38] and Barasa and colleagues propose a framework for evaluation of priority setting processes which considers both procedure aspects and outcomes in a range of contexts [39].

Conceptual frameworks developed in the SHARE Program for a range of purposes within the disinvestment process include potential settings and methods to integrate disinvestment into health service systems and processes [5], components in the resource allocation process [6], an evaluation framework and plan for the overall SHARE program [40] and an algorithm to facilitate decision-making for selecting projects from an evidence-based catalogue of potential opportunities for disinvestment [9]. An existing framework for evaluation and explication of implementation of an evidence-based innovation was adapted for use in disinvestment projects [9] and health information products and services [11].

Models

Models are more precise and more prescriptive than frameworks. They are narrower in scope, the concepts are well defined and the relationships between them are specific. Models are representations of the real thing [12, 23].

The SHARE Program produced three models: integrating consumer values and preferences into decisionmaking for resource allocation in a local healthcare setting [7], exploring Sustainability in Health care by Allocating Resources Effectively in this context [8] and facilitating use of recently published synthesised evidence in organisational decision-making through an Evidence Dissemination Service [11]. These are summarised in Table 3. No other models for disinvestment were identified in the literature.

New Framework

Information pertaining to the practical and operational aspects of disinvestment in the local healthcare setting is presented and discussed in the context of a new framework (Fig. 2). The framework proposes a systematic approach that is integrated within organisational infrastructure. It brings together the definitions, concepts, principles, decision-making settings, potential prompts and triggers to consider disinvestment, and steps in the disinvestment process identified from the literature. It also seeks to remove barriers when it is possible to do so through establishment of new or adjustment of existing operational mechanisms. The details of each of the framework components are clearly articulated in the literature; many are derived from extensive work with stakeholder groups including decision-makers, policymakers, health service staff, patients and members of the public.

The proposed framework builds on the work of others. While incorporating all the messages from the literature, it draws heavily on the three noted frameworks which identify steps in the disinvestment process [16, 35, 36]; the SHARE frameworks and models [5–9]; and other frameworks for introduction of new TCPs [2] and evidence-based change [41].

Audience

The framework is aimed at health service decisionmakers considering disinvestment and resource allocation, and health service researchers and implementation scientists working in this context.

The setting for this initiative was Monash Health, a large health service network in Melbourne Australia operating within a state-allocated fixed-budget model of financing. We anticipate results of this work and elements of the framework to have broader applicability and transferability, including to fee-for-service environments.



Application

Decision-making in healthcare is described at three levels: macro (national, state/provincial and regional), meso (institutional) and micro (individuals) [42, 43].

The proposed framework was developed for use in policy, management and/or clinical decision-making at the meso level. It was designed to be embedded within existing systems and processes where it can be responsive to local needs and priorities at the level of implementation; for example health service networks, individual facilities, departments, wards or committees.

Definitions

The lack of standardised terminology is a barrier to development of systematic approaches to operationalise disinvestment [1]. To address this, definitions and key concepts underpinning the framework are made explicit. The proposed framework provides a common language for researchers and decision-makers within and between programs, institutions and health systems making it easier to build and share a body of knowledge.

There are multiple definitions for disinvestment in the literature based on a range of different concepts [1, 44]. Numerous alternative terms conveying the same concepts are also in common use. Disinvestment is focused on the use of 'health technologies' but there is also a range of definitions for this term. To compound the difficulties arising from multiple definitions, the terms 'disinvestment' and 'health technologies' are frequently used in one way by researchers and in another by health service decision-makers [1]. Definitions relevant to the local healthcare setting are provided in Table 4.

We use the term disinvestment in the broadest sense, 'removal, reduction or restriction of any aspect of the health system for any reason'. This can be applied to products, devices and equipment; clinical practices and procedures; health services and programs; information technology and corporate systems. Unlike most of the research definitions for disinvestment, this version is not

Table 4 Definitions

Health technologies	Health products, devices and equipment used to deliver health care (eg prostheses, implantable devices, vaccines, pharmaceuticals, surgical instruments, telehealth, interactive IT and diagnostic tools). This is a narrow definition which reflects the common use by decision-makers and consumers in the local health care setting. Clinical practices, support systems, or organisational and managerial systems are NOT considered to be health technologies in this context.	
Health technologies and clinical practices (TCPs)	Therapeutic, preventative and diagnostic procedures (eg use of products, devices and equipment PLUS medical, surgical, nursing, allied health and population health interventions). This is a pragmatic term to reflect the scope of most resource allocation decisions in the local healthcare setting.	
Health programs and services	Agencies, facilities, institutions and the components within them that deliver health care, rehabilitation or population health practices such as health promotion and education.	
Disinvestment	Removal, reduction or restriction of any aspect of the health system for any reason. Removal indicates complete cessation, reduction is a decrease in current volume or delivery sites, and restriction is narrowing of current indications or eligible populations. This is a broad definition, in essence the conceptual opposite of investment. This could apply equally to products, devices and equipment; clinical practices and procedures; health services and programs; information technology and corporate systems.	
Principles	Fundamental qualities or elements that represent what is desirable or essential in a system.	
Criteria	Standards against which alternatives can be judged in decision-making.	
Routine decisions	Decisions made on a recurring basis or scheduled via a timetable eg annual budget setting processes, six- monthly practice audits, monthly Therapeutics Committee meetings, reviews of protocols at specified intervals after their introduction, etc.	
Reactive decisions	Decisions made in response to situations as they arise eg new legislation, product alerts and recalls, applications for new drugs to be included in the formulary, critical incidents, emerging problems, etc.	
Proactive decisions	Decisions driven by information that was actively sought for the purpose of healthcare improvement eg accessing newly published synthesised research evidence such as Cochrane reviews or Health Technology Assessments to compare against current practice, interrogating routinely-collected datasets to ascertain practices with high costs or high rates of adverse events, etc.	
Prompt	An informal reminder or encouragement for thought or action.	
Trigger	A formal mechanism that initiates or activates a reaction, process or chain of events.	
Diffusion	Passive processes by which an innovation is communicated over time among members of a social system; usually unplanned, informal, untargeted, uncontrolled, decentralised, and largely horizontal or mediated by peers.	
Dissemination	Active processes to spread knowledge or research eg publications, presentations and other deliberate strategies; planned, formal, often targeted, controlled or centralised, and likely to occur more through vertica hierarchies.	
Maintenance	Active processes to sustain recently implemented change after project support is removed; to integrate the change into organisational systems, processes and practices; and to attain long-term viability of the change.	
Methods and tools	Approaches, instruments or other resources that identify 'what' tasks are needed at each step and/or 'how' to undertake them. This is a pragmatic inclusive definition developed for use in this review to assist health service staff in disinvestment. This broad definition allows frameworks and models to be included if they meet these criteria.	

constrained by a specified purpose (eg withdrawing practices of low value), defined criteria (eg effectiveness or cost-effectiveness) or anticipated outcome (eg reallocation of resources) which do not address cessation or limitation of TCPs for other purposes, based on other criteria, for different outcomes, which are likely to arise in local health services [1].

In contrast, we define health technologies in the narrowest sense; as products, devices and equipment used to deliver health care (eg prostheses, implantable devices, vaccines, pharmaceuticals, surgical instruments, telehealth, interactive IT and diagnostic tools) which reflects common use by health service decision-makers and consumers [1]. Clinical practices, health programs and services, information technologies, support systems, and organisational and managerial systems are not included in this definition. Although contained in many research definitions, they are not included in general references to health technologies in the local healthcare setting [1].

The terms 'principles' and 'criteria' are often used interchangeably; definitions for use in this review are included in Table 4.

Concepts

The proposed framework is underpinned by several key concepts (Table 5). While disinvestment is the aim, it is not considered in isolation but in the context of resource allocation, addressing the spectrum of decision-

Table 5 Concepts

Concept	Implication for framework			
Use of the term disinvestment as a driver or justification for change is associated with negative connotations such as focusing on cost cutting, engendering suspicion and distrust, and getting stakeholders offside.	Do not use 'disinvestment' as the basis for the framework or the aim of change initiatives			
Conducting disinvestment activities independently of existing systems and processes does not represent the reality of health service decision-making. It may be counterproductive: lacking incentives for change and introducing disincentives. Disinvestment should not be considered as an isolated activity, but integrated within existing systems and processes in the context of all resource allocation decisions, covering the spectrum from investment to disinvestment.	ns and processes does not unterproductive: lacking should not be considered ocesses in the context of all nt to disinvestment.			
Removal or restriction of practices that are harmful or of little or no value; replacement of inferior practices with more effective or cost-effective alternatives; and reduction of organisational waste, systematic error and inappropriate use of TCPs all arise from good policy, management and clinical decisions. If these are based on evidence from research, local data and/or stakeholder views there are sound positive drivers for action. There is no need for the concept of disinvestment to be introduced as a reason for change.	Focus on the positive reasons driving			
It has been proposed that disinvestment activities are more likely to be successful if decisions are transparent, integrated into everyday decision-making and central to local planning rather than ad hoc decisions, individuals 'championing' causes or standalone projects	removal, reduction or restriction of current practices			
Disinvestment driven from a positive perspective focusing on optimisation of health care through allocation or reallocation of finite resources for maximum effectiveness and efficiency is more likely to be successful.	Use existing systems, processes, expertise, methods and tools whenever possible			
Existing healthcare improvement paradigms such as Knowledge Translation, Evidence Based Practice, Quality Improvement, System Redesign and Health Economics offer theories, frameworks, methods and tools for decision-making, implementation and evaluation that can be applied to disinvestment.				

making covering investment in new, continuation of existing, and disinvestment from current activities. The focus of the framework is positive: optimising healthcare, improving health outcomes, using resources effectively and efficiently. The components of the framework are integrated within current systems and processes and within existing health improvement paradigms such as evidence-based practice (EBP), quality improvement (QI) and system redesign.

Level of detail

Many of the elements within the proposed framework should be self-evident and be applied routinely as good practice, making it unnecessary to stipulate their requirement. However strong and consistent messages in the literature confirm that they are not standard practice and authors felt the need to state that they should be made explicit. Incorporating them all into a detailed framework achieves this.

Another reason for including all the elements in detail is to address potential ethical dilemmas [1]. In some circumstances it may be difficult to accommodate the principles of beneficence and utilitarian justice; clinicians advocate for the best interests of individual patients but resource allocation aims for the greatest benefit for the most people [45–47]. Similarly, arguments for equity may conflict with those for efficiency when the most efficient outcome is not the most equitable [48–50]. A systematic, transparent approach acknowledging these issues may facilitate difficult discussions and create potential for some efficiency to be traded away for equity maintenance or gain.

Some elements may be more important than others in individual situations. However, because they are all defined in the framework, the decision to exclude or reduce the role of some elements in extenuating circumstances becomes explicit. This strengthens the process and empowers those who have previously participated in suboptimal decision-making due to lack of resources, hidden agendas or organisational politics [6, 51–57].

Components

The proposed framework is composed of three interconnected and interdependent components: 1) a program for organisation-wide decision-making, 2) projects to implement decisions and evaluate outcomes, and 3) research to understand and improve the program and project activities. Each component has a number of elements which are outlined in detail below.

Characteristics

The framework is primarily descriptive to enable application in a local healthcare service and allow adaptation, replication and testing. It was developed using both deductive and inductive methods. Although not based on a specific theory, it has potential to facilitate future theory development and/or testing. Specific characteristics of the framework and potential for its use are summarised in Table 6 using domains and

Domain	SHARE features
Purpose • descriptive, explanatory or predictive	The framework is primarily descriptive to enable application and allow replication and testing. There are also some explanatory elements addressed in the relationships between components, for example ethical principles underpin all activities, decision-making settings sit within the scaffold of all eight principles, projects follow on from decisions, research is conducted in all aspects.
Development • deductive or inductive • supporting evidence	Methods used in development were both deductive and inductive. Evidence from research literature and other publications was the primary source. Many of these findings were based on extensive work with stakeholder groups. This was supplemented with experience from the SHARE program.
Theoretical underpinning explicit or implicit 	No specific theory was used to underpin the framework.
 Conceptual clarity well-described, coherent language for identification of elements strengths and weaknesses of theories potential to stimulate new theoretical developments 	Three components are outlined in the framework: Program, Projects and Research. The Program is based on eight principles and nine settings for decision-making. The Projects are outlined in eight main steps. The relationships between them are captured in a diagram. Details of each component and the elements within them are provided in the text and in tables. No specific theories were used so no comparisons are made. There is potential for new theoretical developments if: • specific theories are tested in development and implementation of the components • components are removed or the relationships changed • principles or pre-conditions are varied • the framework is applied for purposes other than resource allocation • the framework is applied in a range of contexts
Level • individual, team, unit, organisation, policy	The framework was developed for implementation at meso level within the health system eg local network, institution, department, ward or committee.
Situation • hypothetical, real	The framework represents actual settings and contexts in health service decision-making and implementation of change. However it could also be used for teaching or capacity building through hypothetical classroom discussions or simulation exercises.
Users • nursing, medical, allied health, policy makers, multidisciplinary	The framework can be used by any decision-makers within the health system. While use of the framework could be initiated by any group, engagement and involvement of all relevant stakeholders is an underlying principle of application. The framework could be used in policy, management or clinical contexts.
 Function barrier analysis intervention development selection of outcome measures process evaluation 	The main function is to establish and maintain systems and processes to make, implement and evaluate decisions regarding resource allocation and research the components involved. The principle of evidence-based implementation requires assessment of barriers and enablers but the framework itself does not specifically facilitate this process other than to prompt users. Details of barriers identified from the literature are contained in the text and tables. The steps within the Project component will facilitate development of an intervention for systematic evidence-based decision-making and implementation of change. Evaluation of process and outcomes is a key element; however selection of variables and outcome measures is not facilitate by the framework per se, other than to prompt users to take an evidence-based approach. Examples of measures proposed by others are included in the text.
Testable • hypothesis generation • supported by empirical data • suitable for different methodologies	The framework describes principles to underpin robust decision-making, settings and opportunities, implementation of change and evaluation of process and outcomes. A range of hypotheses could be developed for each of these elements and the relationships between them which could be tested in a number of ways using various methodologies. The framework could also be tested beyond the local healthcare level, at national or state/provincial level; or outside the health context in education, community development, social services, etc

Table 6 Characteristics of a framework for organisation-wide approach to disinvestment in the local setting

criteria developed to assess the robustness and utility of proposed models and frameworks [12]. This assessment enables potential users to identify whether the framework will meet their aims and be applicable to their situation.

Program

Principles for decision-making

Forty-two principles were identified from the existing literature and the SHARE publications and grouped into eight categories that emerged from these findings: Boundaries, Ethics, Governance, Structures, Processes, Stakeholder involvement, Resources and Preconditions. These are presented in the framework as two groups (Fig. 2).

The first group have a hierarchical relationship depicted as a series of nested boxes. The whole program is defined by explicit boundaries, ethical principles underpin good governance, governance directs and controls structure, and structure enables and accommodates process. The decision-making settings, prompts and triggers all sit within the scaffold of these five categories.

The second group, represented as three vertical bars, are required across all of the other elements. For

example, stakeholders need to be involved in defining the boundaries and establishing the ethical parameters and methods of governance; they should be included in the structures and processes and participate in the projects and research. Adequate and appropriate resources and the noted preconditions will be required to establish, maintain and improve all aspects of the framework.

The intersection of the two groups of principles also demonstrates that ethics, governance, structures and processes also apply to stakeholder engagement, resources and preconditions. For example, stakeholder engagement should be systematic and integrated, funding should be sourced ethically and influence should be transparent.

These principles and their relationships also apply to the project and research components.

Further details of the categories, full descriptions of individual principles, and related citations are outlined in Additional file 1.

Settings

Nine settings for decision-making are described in three categories: Decision-making infrastructure, Specific initiatives and Individual decision-makers.

While the framework is proposed for organisationwide application, any of the nine settings could be considered individually. A framework for a single setting would be underpinned by the same principles, decisions would lead to projects with the same steps and research could be conducted on all elements.

Decision-making infrastructure

Each sector of the health system has an organisational infrastructure of decision-making settings where committees, designated panels or individuals with delegated authority make decisions on behalf of the jurisdiction or individual facility. A classification system and descriptors for decision-making settings, decision-makers, scope and type of decisions in the local health service setting was developed in the SHARE Program [6].

Decisions can be categorised as routine, reactive and proactive [6, 58]. Routine decisions are made on a regular basis; reactive decisions are made in response to situations as they arise; and proactive decisions are driven by information that was actively sought for the purpose of healthcare improvement. Examples are included in Table 4.

A range of potential decision-making activities are outlined in Table 7 [1, 5, 6, 8, 59–61]. Most of these occur in more than one of the three categories of decision-making and can be used for more than one aspect of the disinvestment process. Development or revision of guidance documents is a good example. Guideline and protocol development can occur routinely, particularly when existing documents are updated at regular intervals; in reactive situations such as a critical incident which highlights lack of guidance in a specific area; or when proactive use of research identifies that current documents do not reflect the best available evidence. Disinvestment opportunities can be identified if the systematic review process undertaken when initiating or revising a guidance document determines that a TCP, service or program should be removed or replaced [5, 17, 60–63]. Guidance documents can also be used to implement disinvestment decisions and audit of guideline adherence can measure the results [59, 60, 64–66]. Manuals for guideline or protocol production could include prompts to note and follow up opportunities for disinvestment as part of the document development process [5].

Formal priority setting exercises may also be built into the decision-making infrastructure. These determine which TCPs, programs or services to introduce, maintain or remove based on a pre-determined set of criteria. An example might be annual capital expenditure decisions. In this situation, priority setting could be classified as 'routine', however it is noted separately in the framework as it also commonly arises in the context of individual initiatives described below.

Specific initiatives

In addition to the decision-making settings outlined, specific initiatives to improve practice are undertaken by health services, many of which involve disinvestment. These may be instigated by government, management or health practitioners, and although there is considerable diversity, most are related to EBP, QI, system redesign or economic approaches to priority setting such as PBMA [1, 6, 34]. Some projects may set out to disinvest, others may have quite different initial aims but the need for disinvestment becomes apparent during the project.

An EBP approach might be to remove or reduce use of inferior practices identified from systematic reviews, HTAs, evidence-based guidelines or 'low value' lists, or reduce their use to levels deemed clinically appropriate [9]. Clinical audit, QI and system redesign methods may be used to tackle inappropriate use of TCPs or organisational waste. Priority setting exercises like PBMA consider the costs and benefits of relevant alternatives in an aspect of healthcare delivery to determine the maximum outcome from the available resources.

There are several examples of disinvestment-related initiatives with relevance at the local health service level. Therapeutic equivalence or drug substitution programs involving replacement of expensive drugs with equally effective but lower cost alternatives from the same drug family has demonstrated considerable cost saving in macro and meso programs [67, 68]. Generic prescribing, substituting brand name drugs

Activity	Example	Routine	Reactive	Proactive	Priority Setting
Meeting external requirements	 Addressing legislative, regulatory and accreditation requirements, national and professional standards, etc 	1	\checkmark		
	 Responding to product alerts and recalls 		\checkmark		
Setting budgets	Determining sources of income and items of expenditure	\checkmark			\checkmark
Spending money	 Introducing new items to funding lists. Examples include, but are not limited to, national health schemes, insurance benefits schedules, institutional lists of permitted TCPs, formularies. 	1	1	1	1
	 Commissioning health services and programs 	\checkmark	\checkmark	\checkmark	\checkmark
	 Procuring capital works, plant and equipment 	\checkmark	\checkmark	\checkmark	\checkmark
	Purchasing clinical consumables	\checkmark	\checkmark	\checkmark	\checkmark
	 Assessing grant and funding applications 	\checkmark	\checkmark		
Allocating non-monetary resources	Allocating people, time, access to facilities, etc	\checkmark	\checkmark	\checkmark	\checkmark
	 Developing guidance documents, promotional information or educational materials that indirectly allocate resources. Examples include, but are not limited to, peak body recommendations, clinical guidelines, protocols, standard operating procedures, decision support systems, posters, presentations. 	1	J	1	1
Making strategic and operational decisions	Developing goals and strategies for Strategic Plans	\checkmark			\checkmark
	Developing outcomes measures and targets for Business Plans	\checkmark			\checkmark
Using evidence to initiate and/or inform decisions	 Updating existing evidence, undertaking Health Technology Reassessment, etc. 	1	~	\checkmark	
	 Accessing and utilising research evidence, population health data, local health service data, consumer and staff feedback 	1	\checkmark	\checkmark	\checkmark
Evaluating outcomes of previous decisions and projects	 Monitoring, evaluating and reporting of all newly introduced TCPs to see if they perform as expected, post marketing surveillance 	\checkmark			
	 Monitoring, evaluating and reporting of purposive or random samples of decisions 	\checkmark	\checkmark	1	
	 Monitoring, evaluating and reporting of purposive or random samples of projects 	\checkmark	√	1	

Table 7 Examples of activities and settings for disinvestment within decision-making infrastructure

with generic alternatives, has been addressed at international, national, institutional and individual levels with mixed outcomes [69–72]. Benchmarking the results from individual interventions or programs across different health providers aims to ascertain best practice which others can aspire to and which can be applied at all levels; but by simultaneously identifying inferior practices it can also be used as "*a tool to start a disinvestment dialogue*" [21, 73, 74].

Individual decision-makers

At the micro level, the term 'disinvestment' is not generally applied to changes initiated by individuals; however the principle is the same. Individuals cease or restrict practices when they become aware of new evidence or to address local needs and priorities.

Much of the literature on decision-making focuses on how money is spent, however there are considerable opportunities for disinvestment in allocation of non-monetary resources. Although clinical encounters do not usually involve funding decisions, they offer opportunities to consider disinvestment in use of other resources such as ordering tests, referring to other practitioners, using drugs and other therapies, or undertaking procedures. An example is the Choosing Wisely program being replicated in national campaigns across the world which highlights potentially 'low value' treatments and tests so that clinicians and consumers can consider the relative benefits in their specific situations [75].

Prompts and triggers

Prompts and triggers are proposed to initiate and facilitate identification of disinvestment opportunities. Prompts are informal reminders or encouragement for thought or action and triggers are formal mechanisms that initiate or activate a reaction, process or chain of events (Table 4). The settings above provide opportunities to introduce systematic prompts and triggers to use evidence from research, data and stakeholder feedback to drive decision-making.

Prompts, triggers and potentially even mandatory requirements to consider disinvestment could be built into existing decision-making infrastructure [5, 37]. Using expenditure decisions as an example, prompts and triggers could be incorporated into meeting agendas of finance committees, budgeting processes, application forms, algorithms, protocols or checklists. Mandatory requirements to consider disinvestment could be implemented as specific directions within purchase orders, explicit decision-making criteria for committees, or steps in application processes that require authorisation. Additional examples of prompts and triggers at the organisational level are outlined in Table 8.

In specific initiatives to implement health service improvements, prompts and triggers to consider disinvestment could be introduced into project management templates or training programs for project management, change management, quality improvement processes, etc.

Prompts, triggers and mandatory requirements could also be used to guide the decisions of individual practitioners in clinical encounters; these could be included in local guidelines and protocols to steer practice away from unsafe, ineffective or inefficient use of TCPs.

Steps in the disinvestment process

The disinvestment process begins when opportunities for disinvestment are identified from the activities in the settings above. Eight steps in the disinvestment process were ascertained from existing frameworks [6, 16, 35, 36]: Identification of opportunities; Prioritisation (if required) and Decision-making; Development of a proposal; Implementation; Monitoring, Evaluation and Reporting; Reinvestment (if required); Dissemination and Diffusion; and Maintenance. Two additional elements are included: some projects may require development of local criteria for prioritisation and decisionmaking and projects that aim to reinvest will need to measure the resources released as part of the evaluation process.

The first two steps are part of the decision-making program, the following six are undertaken in projects arising from the decisions.

Projects

Once a decision has been made, a project to implement it can be initiated. While individual projects will have specific characteristics and requirements such as aims, objectives, timelines, budgets, deliverables, roles and responsibilities, the principles outlined in the framework apply to all project activities. **Table 8** Examples of systematic prompts and triggers to initiate disinvestment decisions

- Approve introduction or continuation of TCPs for limited time only and require review of desired outcomes, costs, etc. before re-approval is granted at end of time period
- Approve new guidelines and protocols for limited time only and require review of evidence, costs, etc. and appropriate revision before re-approval is granted at end of time period
- Include steps that consider disinvestment of existing practices in manuals for guideline and protocol development
- Include steps that consider disinvestment of existing practices in checklists for a range of organisational decisions
- Add consideration of disinvestment to templates for meeting agendas where appropriate
- Mandate consideration of disinvestment in procurement processes: include in requisition documents and require sign off by relevant body overseeing disinvestment at appropriate level
- Systematically ascertain evidence from research, data or stakeholder feedback, send directly to decision-makers and seek and/or require response
- Incorporate flags and/or question use of low value TCPs in clinical decision support systems
- Build questions about potential disinvestment into business case templates and application forms for grants, changes to formulary, introduction of new TCPs, etc.
- Introduce requirements for consideration of disinvestment into documents governing scope of decisions such as position descriptions and committee Terms of Reference
- Add prompts to consider disinvestment to data reports, scorecards, dashboards, etc.
- Add prompts to consider disinvestment in project management templates and training programs for project management, change management, quality improvement processes, etc.
- Build disinvestment into strategic planning processes
- Build disinvestment KPIs into business plans or performance plans
- Consider 'one for one' swaps where a new TCP can only be introduced if an old one is removed

Examples of methods and tools for disinvestment are discussed below; however the proposed framework does not stipulate project design or conduct, allowing application of any theories, methods or tools at each step.

Research

Research is required to understand and improve the program and project activities. It is overlaid across all elements in the diagram to represent the potential for research in each aspect of the framework.

Methods and tools

There are many definitions for the terms theory, framework, model, method, tool, strategy and related concepts. Some definitions note specific features that make the terms mutually exclusive, others allow the terms to be used interchangeably, and some overlap. In this review, the label 'methods and tools' is used pragmatically to assist health service staff in disinvestment and includes approaches, instruments or other resources that identify 'what' tasks are needed at each step and/or 'how' to undertake them. This broad definition allows frameworks and models to be included if they meet these criteria.

Appropriate, valid and reliable methods and tools are required for effective decision-making, implementation and evaluation. The resources identified are described briefly but no evaluation was undertaken due to lack of relevant data; some have been piloted and refined, but most have no published reports of their effectiveness or impact. The availability of validated materials is noted where appropriate. Hence users will need to consider the validity and applicability of these resources in their individual contexts.

There are many sources of generic advice for ascertaining and utilising evidence, undertaking and applying health economic analyses, making decisions, implementing change and evaluating outcomes including, but not limited to, The Cochrane Library, Canadian National Coordinating Centre for Methods and Tools, UK National Institute for Health and Care Excellence (NICE), US Institute for Healthcare Improvement, US Centers for Disease Control and Prevention, and US Agency for Healthcare Research and Quality.

There are also many methods and tools from other areas of health research and practice that are relevant to disinvestment which could be employed within this framework; knowledge translation, EBP, QI, system redesign and other improvement methodologies all have welldeveloped validated processes that are familiar to health service staff [1]. While there are few published examples of successful initiatives labelled as 'disinvestment' within local health services, there are many examples in the EBP and quality and safety literature of disinvestment-type activities where TCPs that are unsafe or ineffective have been discontinued. A review of 'de-adoption' summarises 39 such interventions that provide information on several steps in the disinvestment process [22].

Two publications provide advice in a range of areas relevant to disinvestment. A book on rationing, priority setting and resource allocation in health care discusses multiple generic and specific methods and tools suitable for disinvestment including stakeholder participation, leadership, economic evaluation and several of the steps in the disinvestment process [76]. A toolkit for decommissioning and disinvestment, defined as withdrawal of funding from the provider organisation, provides highlevel guidance on governance and administrative matters for removal of health services, not individual TCPs, and some tools for assessing service performance against UK data [77]. Several products from the SHARE Program also address a range of principles and steps in the disinvestment process.

- Summaries of issues to consider in development of an organisational program for disinvestment [5] and implications for disinvestment in the local setting [8] were compiled.
- An investigation of the resource allocation process in a local health service generated a framework of eight components, the relationships between them, and features of structure and practice for each component [6]. Structure is described as 'who' and 'what' and includes people, systems, policies, requirements, relationships and coordination. Practice addresses 'how' through processes, procedures, rules, methods, criteria and customs.
- A classification of decision-making settings, decision-makers, and scope and type of decisions was developed and strengths, weaknesses, barriers and enablers to resource allocation in a local health service were ascertained [6].
- A model for exploring Sustainability in Health care by Allocating Resources Effectively (SHARE) in the local healthcare setting brings together systems and processes for decision-making; identifying and undertaking disinvestment projects; support services to facilitate making, implementing and evaluating decisions; evaluation and research to measure and understand the processes and outcomes of these disinvestment-related activities; and principles and preconditions for success and sustainability [8].

Methods and tools for the principles are presented in Additional file 1.

1. Identification of opportunities

Potential disinvestment opportunities can be derived from all of the decision-making settings discussed above, either incidentally or systematically from prompts or triggers embedded in local systems and processes. However, at the health service level, it is more common for disinvestment opportunities to be identified through ad hoc proposals based on individual's observations or local knowledge than through a systematic evidence-based approach [9, 21, 79, 80].

The sources of information noted in the literature that could be used in these settings to identify disinvestment opportunities include research, health service data, expert opinion and stakeholder consultation. While any

one of these sources could identify a potential target for disinvestment, ideally information from all four would be combined in confirming the appropriateness of the choice [5]. Evidence from research would be considered in light of local data. For example, if a systematic review or HTA identified a more cost-effective intervention to one in current use, decision-makers could use local data to assess whether the burden of disease, volume of use, likely impact and potential cost of change warrant the required disinvestment activities. Similarly, evidence from local data would be enhanced by using the literature to identify best practice. For example, if an audit of prescribing rates of a high cost drug finds variation between departments, a review of the appropriate research would confirm whether the higher rate is overuse and should be reduced or the lower rate is underuse and should be increased. Expert opinion and stakeholder consultation add clarification and important perspectives to these decisions and may also reveal examples of inappropriate use of TCPs not identified by other methods. The SHARE Program used the SEAchange model [41], a formal evidence-based approach to change, to ensure that evidence from research and local data, experience and expertise of health service staff, and values and perspectives of consumers were considered at each step (Fig. 1) [3].

1.1 Research

Reactive decisions can be informed by synthesised evidence and relevant primary studies; the type of research design and level of evidence required depends on the context of the decision and the nature of the question being addressed. Rigorous evaluation of new TCPs prior to inclusion in nationally funded health schemes has been standard practice for the past two decades and high quality HTAs, systematic reviews, evidence based guidelines and clinical effectiveness research reports have been developed to determine other national health policies. There is also a long history of locally-developed HTAs for use in decisions about introduction of new TCPs at health service level [2, 81]. Health technology reassessment of existing TCPs with view to identifying potential targets for disinvestment has been undertaken at both national and local level [28, 29, 82, 83].

Systematic use of research in routine decisions is evident in reassessment of new TCPs at specified time periods after their introduction at national [72, 84] and local level [2]. At the other end of the TCP lifespan, "obsolescence forecasting" has also been proposed as a systematic approach to initiate HTR when it is anticipated that "a new, more functional product or technology supersedes the old or when the cost of maintenance or repair of old technology outpaces the benefits of a new piece of technology" [37]. Examples of proactive use of research for disinvestment at national level include a review of all listed drugs conducted in France resulting in removal of 525 drugs considered to have *"insufficient medical value"* [72] and commissioning of a complete review of the Australian Medicare Benefits Schedule (fee-for-service) to ensure that all funded items are safe, effective and cost-effective [33]. There are other examples of systematic and ad hoc use of research to drive disinvestment at national level [60, 72, 85].

Similar approaches have been used at local level where organisations have reassessed all of the TCPs related to a specific clinical issue or area, or reassessed one particular TCP at a time [83]. The SHARE Program implemented an Evidence Dissemination Service to proactively retrieve, appraise, summarise and categorise synthesised evidence from high-quality sources soon after publication and deliver it directly to the relevant designated groups and individuals responsible for organisational decision-making related to resource allocation [11]. The SHARE Program also proposed a framework for consumer involvement that included proactive use of sources of published consumer evidence [7].

Lessons from these national and local examples may be useful to those undertaking local disinvestment initiatives.

High quality sources of research evidence are available and readily accessible through online resources, however there are some challenges to their use in the local health service setting.

Health service staff report lack of time, knowledge, skills and resources as barriers to searching for, accessing and appraising research; and that evidence is not used systematically or proactively to inform decisions [6, 10, 86–96]. Reports of HTAs undertaken by local health services [81, 97] and decision-making for use of TCPs [2, 98–100] note limitations in local processes, resources and expertise resulting in decision-making with varying degrees of rigour, structure and transparency. In addition to expertise, training and support, systematic prompts and triggers to use research evidence in all three types of decision-making are needed at the local level and could also be used to identify relevant TCPs for disinvestment or initiate discussions on potential disinvestment topics.

There are also limitations in coverage and applicability of currently available synthesised evidence to address all the needs of local decision-makers. The topics reviewed by national agencies are most frequently medical interventions, pharmaceuticals and diagnostic tests that have a high profile and are expensive as individual items. While these are obviously important in local health services, lower profile areas such as nursing and allied health practices, service delivery options, models of care and clinical consumable items, all of which have potential for considerable improvement in patient outcomes and reduction in costs and resource utilisation, are less commonly addressed in these formats, leading to locally-conducted HTA/HTR with the shortcomings noted above.

These limitations have additional implications for local health services given the lack of standardised methods for HTR [37, 82, 83]. Further research in this area has been proposed to develop consistent methods which will increase rigour, enable replication, enable comparison with others, facilitate application in equivalent situations to reduce duplication, engender familiarity and understanding to increase uptake and use of content, and build on existing work [28, 29, 83].

1.2 Health service data

Routine, reactive or proactive investigation of available data can identify potential opportunities for disinvestment. There are many generic tools like dashboards, statistical process control or balanced scorecards available to analyse health service data, however none were identified in this review of the disinvestment literature. These tools, plus simple data interrogation methods, can identify factors associated with TCPs that might be worthy of further exploration as candidates for disinvestment; for example high volume, high cost, long length of stay and high rates of mortality, adverse events, readmission or reoperation, and geographic variation [5].

Searching routinely-collected datasets for known 'low value' practices is a direct and potentially productive method of identifying disinvestment opportunities [38, 101, 102]. With initiatives such as Choosing Wisely proliferating, it is now less a case of list-making as list-taking and prioritising. An algorithm developed in the SHARE Program for selection and prioritisation of disinvestment projects from a catalogue of potential targets derived from the research literature using locally-developed criteria could be adapted for use with a collection of potential targets identified from investigation of local data [9].

There is a large body of literature on examination of practice variation [103]. Reporting on variations in healthcare practice has been done at national and regional levels and atlases of healthcare variation have been produced [104–108]. Similar processes could be undertaken at local level. Comparisons can be made between regions, facilities, departments and individual practitioners, or over time; but should only be done when the population demographics, socio-economic factors and particularly patient acuity are similar [5, 21, 73, 105, 109, 110].

Recent studies have investigated practice variation specifically to identify ineffective practices; they note the potential to do so within local health services or for health services to benchmark against their counterparts [21, 105, 110]. Examination of health service utilisation and patient outcomes data, as well as differences in rates of prescribing, ordering diagnostic tests or use of specific interventions, could indicate inappropriate or suboptimal practices suitable for disinvestment. Procedures with high variability are often not on the 'low value' lists, indicating additional possibilities to identify disinvestment opportunities from this approach [21].

Use of local data clearly has potential but problems with data validity, reliability, comprehensiveness and degree of sensitivity to disinvestment requirements remain significant barriers [21, 24, 46, 48, 58, 60].

There are many methods for analysis, synthesis and interpretation of data however, like research evidence, there is a lack of systematic prompts or triggers to use them [5, 21]. While not specifically directed at disinvestment or resource allocation, a conceptual framework and logic model developed by Nutley and colleagues for improving data use in health system decision-making could facilitate a more proactive, systematic approach [111, 112].

The aims of the SHARE Data Service were 1) to interrogate routinely-collected data to identify potential disinvestment opportunities and communicate this information to appropriate decision-makers and 2) to respond to requests from decision-makers to assess local data related to potential disinvestment opportunities that had been identified from the research literature [10]. Although the Data Service was not implemented due to unanticipated local factors, the decisions underpinning the design and the models proposed may be helpful to local health services wishing to establish similar resources to support use of data in the disinvestment process.

1.3 Stakeholder nominations

Stakeholder engagement is noted as a fundamental principle of the decision-making process and involvement of stakeholders and local ownership of decisions and projects are noted as facilitators of change in general [113–115] and in relation to disinvestment [21, 58, 72, 82].

The Ontario Reassessment Framework gives priority to potential candidates for disinvestment if nominated by a clinical expert [85] and four frameworks for disinvestment employ applications from stakeholders in the identification process [9, 16, 35, 36].

Participants in the SHARE Program noted that, while formal prompts and triggers could be built into existing decision-making infrastructure, there are also informal yet systematic approaches that could be integrated into other systems and processes to facilitate identification of opportunities for disinvestment by health service staff [9]. Examples are included in Table 9.

Stakeholder nomination can be a powerful contribution to the process, providing the nominated items are objectively scrutinised against additional identification and prioritisation criteria [109], however there are some considerations in the actual implementation.

Although evaluation of the applications in these frameworks is rigorous, based on explicit local criteria and health technology assessment, the process of how the topic was raised initially is not systematic or transparent. Applications can be received from any stakeholder for any reason. In this context they are likely to be driven by non-systematic factors such as clinician's interests, information obtained from conferences or journal articles, or awareness of practice elsewhere [2, 6]. *"Understanding how the technology got on the agenda, where it came from and who was pushing for it"* and the potential for *"gaming by industry"* are concerns reported by senior health decision-makers [116], but are often unclear in a stakeholder application process.

When invited to nominate candidates for disinvestment, clinicians have been found to be more likely to identify the practices of other professional groups than their own, practices that do not affect their revenue-generating services and practices of low impact [9, 21, 117].

Clarity of aims and objectives at the start of a project and clear rationale for change were in the top 10 considerations for successful disinvestment and one of three best practice recommendations arising from a Delphi study of international experts [52]. However lack of clarity and rationale have been noted as problems in identifying disinvestment opportunities [63], particularly from stakeholder applications [9, 10].

These issues may create systematic biases in the choice of investment targets and miss some key opportunities. Unnecessary duplication of effort may also result, with

Table 9 Additional systematic methods to facilitate identification

 of disinvestment opportunities in a local health service

- Discuss principles of disinvestment and examples of successful projects at department/unit meetings, educational events, etc.
- Assign a group member to look for disinvestment opportunities in committee/working party decisions
- Add a disinvestment question to the 'Leadership Walkround' protocol
- Identify clinical champions interested in disinvestment in each program/department/unit who would look out for opportunities
- Support staff who have undertaken a disinvestment project to look for more opportunities
- · Have disinvestment as a high priority in medication safety reviews
- Encourage or require projects that are introducing something new to have a component of disinvestment
- Review projects that are being conducted for other reasons and identify and focus on any disinvestment elements

individual facilities or regions undertaking extensive evaluations of the same topics.

1.4 'Low value' lists

'Low value' lists are compilations of practices that have been demonstrated to have little or no benefit or potential to cause harm. They have been developed by governments and health agencies [118–120], commissioners of health services [121], professional bodies [65, 122, 123] and researchers [124–126]. Some of these lists are derived from research evidence, some are based on expert opinion and others from a combination of the two.

Duckett and colleagues separate them into 'top down' and 'bottom up' approaches, noting that each has benefits and drawbacks [73]. The 'top down' approaches, such as the UK National Institute for Health and Clinical Excellence 'Do Not Do' Recommendations [54], are described as providing the most consistent, objective, transparent and relevant evaluations. The 'bottom up' approaches, such as the Choosing Wisely program [74], highlight potentially 'low value' treatments and tests that should be carefully considered at the point of care.

Removing, reducing or restricting practices of little or no value clearly has merit, and 'low value' lists are likely to be very useful to health service decision-makers if they are based on sound evidence backed by expert consensus. However the definition of 'low value' is not always explicit and the validity and appropriateness of some of the lists and the ethics of their application have been questioned [117, 125, 127–130]. Potential users of 'low value' lists may wish to confirm the basis for claims made, in particular the definition being used and the use of systematic review evidence in the inclusion process [9].

The SHARE algorithm described earlier could also be applied to 'low value' lists to assess local applicability and facilitate prioritisation [9].

1.5 Economic approaches to priority setting

These priority setting approaches combine evidence from local data, expert opinion and stakeholder consultation [27, 32].

PBMA applies the economic principles of opportunity cost and marginal analysis to determine priorities for health program budgets in the context of limited resources [131]. This method approaches disinvestment from the relative perspective, with decision-makers weighing up options for investment and disinvestment and reaching their preferred balance using locallyrelevant criteria established by the stakeholders. The process is well-tested and guidance is available [27]. Although decision-makers acknowledge the usefulness of PBMA, it remains quite difficult to achieve in practice [24, 48, 131]. Another criticism is that it fragments the health sector into 'program budget silos' resulting in allocation and re-allocation of resources within, rather than between, programs which fails to identify more cost-effective options outside the program area [31, 48, 131, 132].

In contrast to PBMA, the Health-sector Wide model is designed to shift the focus of priority setting away from program budgets towards well-defined target populations with particular health problems [31]. The condition-specific silos created here may be an improvement on program budget silos, but the model is more difficult to apply in local health services where funding decisions are not based on condition-specific populations.

The major limitations for all priority setting approaches include idiosyncrasies in cost-accounting, lack of sufficient high quality data to inform decision-making, and lack of time and appropriate skills of decision-makers to undertake the process and implement the decisions [24, 27, 46, 48, 55, 131]. Lack of inhouse expertise in health economics is a particular barrier at the local level [9].

2. Prioritisation and decision-making

Priority setting exercises clearly include a prioritisation process, however initiatives that identify their disinvestment targets by other means may need a specific prioritisation process to choose between the options available. Methods and tools for systematic, transparent and equitable decision-making may be used if prioritisation is not required or to complement the prioritisation process.

Prioritisation tools primarily focus on characteristics intrinsic to the TCP; however additional criteria may influence the decision to proceed with a disinvestment project in the local healthcare setting [9]. These might be pragmatic features that enhance initiatives chosen specifically as pilot or demonstration projects, such as opportunities for 'quick wins', or factors that affect the outcome of a project, such as likelihood of success and sustainability or potential usefulness of the evaluation.

There is a huge range of potentially relevant criteria for resource allocation decisions. Most authors emphasise that a list of criteria should be developed with input from all stakeholders to meet the objectives of individual situations. The commonly cited basic requirements include clinical parameters such as safety and effectiveness, economic measures such as cost-effectiveness and affordability, and social factors such as local values and priorities. Additional criteria will depend on the setting and context. Methods and tools to assist in assessment of safety and effectiveness [133–136] and use of economic measures [137–139] are available. Similar resources for consumer and community engagement are addressed in Additional file 1. Deciding between several alternatives is a complex process requiring consideration of multiple factors. Health service decision-makers are often not good at this, relying on heuristic or intuitive approaches which ignore potentially important information [140]. Methods such as burden of disease analyses, cost-effectiveness analyses and equity analyses focus on some but not all of the available information [140]. Multi-criteria decision analysis (MCDA) allows consideration of all factors simultaneously, and although used widely in other scientific disciplines, it has only been used in health care relatively recently [76, 140].

The Star model, a "socio-technical allocation of resources" based on MCDA and health economic theory, has been piloted successfully in two settings, revised and developed into a toolkit [141–143]. MCDA is also the foundation of the Evidence and Value: Impact on DEcision Making (EVIDEM) framework, which is being investigated further through research conducted by the international EVIDEM Collaboration [144].

While the components of the A4R framework are included within several principles in the new framework, policy makers, managers and clinicians may also wish to use the A4R terminology specifically in their decisionmaking processes.

A4R is also the basis for the Systematic Tool for Evaluating Pharmaceutical Products for Public Funding Decisions (6-STEPPPs) [145] and A4R and MCDA have been combined in other decision-making applications [146, 147].

Lists of criteria for consideration in prioritisation and decision-making have been published for disinvestment [78, 82, 85, 109, 148], including many who have applied or adapted the criteria framework proposed by Elshaug et al. [72]; resource allocation [6, 149–151]; and general decision-making [42]. A tool to analyse gaps in priority setting has also been developed [152].

Many health service decision-makers use a prioritisation matrix, but most of these are developed locally and based on simple spreadsheets or business case templates [9, 48, 55, 153]. This variety of tools makes it difficult to compare costs and outcomes more broadly and there is some scepticism amongst decision-makers about the lack of rigour, transparency and skills involved in their local programs [21, 48].

There are also software applications to facilitate PBMA and generic prioritisation processes [27, 154, 155].

3. Development of a proposal

Once a decision has been made that there is a need for change, a proposal to meet that need and implement the decision is developed. When the proposal is drafted, the time and other resources required to implement and evaluate it can be assessed to determine if the benefits outweigh the costs of the exercise and to inform planning. The range of potential disinvestment activities is broad and disparate. A proposal to remove a drug from a hospital formulary is likely to be very different to a proposal to close down an inpatient facility. No specific methods and tools were identified for developing disinvestment proposals, but generic materials for developing the program theory or rationale and defining the program logic would be useful [156–164], as would business case proformas and communication templates.

Proposals are more likely to be successful if they have certain favourable characteristics and new initiatives are more likely to be sustainable if there is appropriate availability and adequate provision of critical factors to achieve and maintain the proposed components and activities [20, 165–167]. A checklist of the factors influencing likelihood of success and sustainability is available [8].

4. Implementation

Some successes with national approaches to disinvestment have been reported and may have elements that are generalisable to local circumstances [72, 85, 102]. However in some circumstances national approaches are not applicable at state/provincial, regional or institutional levels; for example removing or refining indications for reimbursement for 'low value' TCPs in national fee-for-service schemes for doctors in private practice may not apply to doctors working in state funded hospitals.

As noted above, there are also many examples in the EBP and quality and safety literature of successful projects at local level to remove unsafe or ineffective TCPs which are not labelled as disinvestment.

Many articles about disinvestment do not address implementation at all and some note that there are difficulties related to implementation but offer no solutions. Of those that do consider implementation, many of the comments are principles, captured in the section above, or barriers and enablers, captured below.

One recommendation for successful implementation is that "we could create conditions that make it easy for people to avoid using low-value health care services" [128]. Environmental changes such as closing services, physically removing products from storerooms and work areas, and eliminating items from formularies and purchasing catalogues should achieve this aim and result in complete cessation. In addition, if providers or recipients of a TCP, program or service receive financial reimbursement, removal of funding is likely to reduce use considerably, although not necessarily completely [64, 72, 117, 168, 169]. But not all disinvestment decisions can be managed with structural changes.

The need for an implementation strategy for each disinvestment activity is widely acknowledged. One

disinvestment guideline details eight generic steps in their Action Plan [35], the SHARE Program used the SEAchange model for evidence-based change [41] to implement disinvestment pilot projects and support services [9, 10], and a model for 'de-adoption' utilises the 'Knowledge to Action' framework [22, 170].

A range of approaches to facilitate implementation of disinvestment decisions has been proposed. These include communication and educational materials [58, 72, 78, 117, 121, 171]; financial incentives and pay-forperformance [59, 64, 72, 117, 168]; reinvestment of resources saved [29, 78, 80, 172]; clinical champions [48, 80]; clinical pharmacists to monitor and advise prescribers [68]; quality standards [59, 117]; professional standards, maintenance-of-certification activities and practice audit [117]; prompts through guidelines, protocols, clinical pathways and decision support systems [5, 58-60, 72, 82, 168, 171]; requirements to report variations from mandatory guidelines [59, 72]; monitoring and reporting of outcomes [72, 78, 168]; public reporting of provider performance [59, 117, 168]; training and re-organisation of staffing and equipment [10, 78]; and "picking low hanging fruit" before tackling more difficult projects [80]. These proposals have arisen from qualitative work with stakeholders or been derived from an understanding of implementation science; the papers offering these suggestions for implementation do not report application or evaluation of these strategies in the disinvestment context.

Several authors note that implementation is more likely to be successful if decisions are made at the local level, integrated into everyday decision-making and central to local planning [55, 59, 60, 80]. A wellresourced and well-designed formal priority setting entity is reported to improve implementation of decisions [27, 37, 55, 173]. It provides a recognised vehicle to consider information such as new evidence or local performance concerns, one which has transparent processes and appropriate authority for decisionmaking and action, where local expertise can be built up and local knowledge utilised. It is thought to "make contentious decisions more palatable and defensible" [55].

The SHARE Program used the Technology/Clinical Practice Committee (TCPC) as a formal decisionmaking structure [2]. After piloting several approaches, the Evidence Dissemination Service mentioned above as a method of identification, was finally implemented within a governance model to ensure maximum adherence [11]. Recently-published, high-quality synthesised evidence was identified and publications reporting evidence of harm, lack of effect or findings of a more costeffective alternative to current practice were prioritised for dissemination. An Evidence Bulletin summarising an individual publication was provided to the TCPC, which then forwarded it to the department head or committee chair responsible for practice in the specific topic area. A response was required to confirm whether current practice was consistent with the evidence, and if not, what measures were being taken to address this or an explanation of why change was not required. When there was evidence of harm, responses to the TCPC were required within 1 month and the responses, or lack thereof, were reported to the Chief Executive the following month. Responses to other Evidence Bulletins were required in three or 6 months. A total of 175 publications were disseminated, 55 of the Evidence Bulletins required responses. Of the 43 responses received during the evaluation period, 32 reported that local practice was consistent with the evidence, six reported that the evidence was not applicable at Monash Health, three noted that local practice was not consistent with the evidence but provided a justifiable reason, and two reported that remedial action was planned to bring local practice into line with the evidence [11].

Although there are some particular challenges to asking people to stop doing things they believe in [1], the general principles of implementation should apply to disinvestment as they do for any practice change. These are summarised in the SEAchange model and the Knowledge to Action framework: engaging all stakeholders, identifying what is already known about practice change in the topic area from the literature and local knowledge, undertaking an analysis of local barriers and enablers, developing an implementation plan including strategies to minimise barriers and build on enablers, piloting and revising as required, and finally implementing in full [41, 170].

5. Monitoring, evaluation and reporting

The Schmidt 'Framework for disinvestment' notes that both process and outcome evaluations should be undertaken but provides no details [16]. In their framework for evaluation of priority setting processes, Barasa and colleagues propose measures for both procedure aspects and outcomes [39] and a systematic review summarises a range of performance measures to assess use of 'low value' TCPs [174]. The 'Integrative framework for measuring overuse' lists measurement tools linked to specific project/program goals and discusses advantages and disadvantages of each approach [38].

The SHARE Evaluation Framework and Plan was created for an organisation-wide program of disinvestment in a local health service network [40]. It was developed in consultation with stakeholders and included evaluation domains, audience, scope, evaluation questions, sources of data, methods of collection and analysis, reporting and timelines. A theoretical framework and taxonomy adapted for evaluation and explication of disinvestment projects was also used to understand the process of disinvestment in the SHARE Program [9].

The deficiencies in available economic and usage data and lack of methods for quantifying savings are considered to be significant limitations to evaluation [46, 60, 82, 175, 176].

There are many generic guidance documents for monitoring and evaluation of health programs and projects in a range of settings. Like implementation, the principles, methods and tools for evaluation should be as appropriate for disinvestment as they are for any healthcare improvement project.

Findings from monitoring and evaluation activities should be reported on a regular and/or scheduled basis to the appropriate stakeholders in accordance with project terms of reference, governance protocols and other local requirements.

6. Reinvestment

This step will only apply in certain projects when it is anticipated that firstly resources will be released and secondly that they will be available for use elsewhere. Although there is considerable discussion about the potential for reinvestment or reallocation, there is little information about how to do it [1]. Resource release and reallocation are built into prioritisation processes for budget-setting but are not integral to other methods of disinvestment. One proposal for a "sensible, wellmanaged reinvestment program" describes "a costaccounting process to capture, and a financial strategy and analysis to return, a pre-agreed portion of real savings" [172]. However the comments by other authors regarding inconsistencies in accounting practices, insufficient valid and reliable data, lack of methods and tools and absence of reported examples suggest that this may not be currently achievable [1, 21, 48, 60, 83, 175–177].

7. Dissemination and diffusion

These terms have been used with specific, but inconsistent, meanings in the disinvestment literature. For example, diffusion has been used to refer to uptake of 'new' technologies where disinvestment is used for removal of 'old' technologies [178]. In contrast, diffusion and discontinuation have been used to represent 'spontaneous' uptake and removal of technologies where dissemination and disinvestment are their counterparts for 'managed' uptake and removal [21]. The former links disinvestment with diffusion, the latter with dissemination.

Since the focus of this framework is on implementation of change, and does not differentiate between implementation of investment or disinvestment decisions,
the definitions of dissemination and diffusion are taken from the knowledge translation literature (Table 4) [20, 170, 179]. Dissemination involves planned, active processes to share and spread information; diffusion is unplanned and passive.

Outcomes of disinvestment projects should be disseminated to others working in this area to fill gaps in knowledge, avoid duplication, build on successes and learn from mistakes and misfortune. However no guidance for systematic dissemination or facilitation of diffusion of successful disinvestment initiatives at the local health service level was identified. Guidance from the knowledge translation, EBP, QI and implementation science literature for dissemination and diffusion of new TCPs may be a useful starting point, however the specific challenges of disinvestment may influence the generalisability of these methods [1, 180].

8. Maintenance

Maintenance is the final step in the change process. It involves strategies to sustain recently implemented change after project support is removed; to integrate the change into organisational systems, processes and practices; and to attain long-term viability of the change (Table 4). Several terms are used in the broader health literature to capture this concept; examples include adoption, assimilation, sustainability and institutionalisation. Sustainability has been used in the context of disinvestment [3, 8, 22, 169, 181]. Maintenance is used in this framework to avoid confusion with use of the term 'sustainability' in a different context in the title of the SHARE Program. Maintenance is also used in the evaluation literature to assess "the extent to which a program becomes institutionalized or part of the routine organizational practices and policies" and can be applied to both the population targeted for behaviour change and the organisation that enacted or adopted the policy [182].

Montini and Graham propose that the disciplines of *"Science and technology studies, the History and philoso-phy of science, the Sociology of health and illness, and Medical Anthropology"* be explored to understand the factors relating to sustaining change related to 'de-implementation' [169]. Niven and colleagues recommend that 'de-adoption' interventions include a sustainability plan to prevent healthcare providers knowingly or unknowingly reverting to old practices [22].

The SHARE Program applied, adapted and developed methods and tools to facilitate sustainability of disinvestment-related initiatives at both the program and project level.

• SHARE projects were assessed against a framework for sustainability based on five categories: structure, skills, resources, commitment and leadership [8].

- The SEAchange model for sustainable, effective, appropriate evidence-based change in health services applied in SHARE projects includes formal assessment of sustainability at each step in the change process [41].
- The determinants of effectiveness outlined in a framework and taxonomy adapted for evaluation and explication of SHARE disinvestment projects could be considered in developing strategies for sustainability of new disinvestment interventions [9].
- The preconditions and underlying principles derived from the literature and local research in development of the SHARE model for exploring sustainability in health care by allocating resources effectively in the local health service setting were identified as factors related to success and sustainability of the whole SHARE Program [8].

Barriers and enablers

The terms barrier and enabler are commonly used to describe factors influencing the success of change initiatives in health care, but interestingly they are less frequent in the disinvestment literature. Most authors refer to the 'challenges' related to disinvestment, few refer to specific 'barriers'. 'Enablers' or existing factors that could facilitate desired change are rarely mentioned, however many authors describe favourable conditions that represent the absence of specific negative factors or strategies that seek to remove them. The challenges and negative factors identified are interpreted as barriers and summarised in Table 10.

Some barriers impact on all aspects of disinvestment across each level of influence [15, 16, 21, 24, 29, 48, 58, 78-80, 83, 116, 120, 129, 175, 178, 183-187]. Barriers to establishment and delivery of a program for decisionmaking are noted [8, 9, 24, 31, 55, 58, 64, 79, 82, 120, 131, 132, 153, 175, 183] and other barriers are categorised using the steps of the disinvestment process: stakeholder engagement [2, 58, 78-80, 82, 120, 153], identification of disinvestment targets [8, 9, 16, 21, 24, 46, 48, 58, 60, 63, 72, 79, 82, 120, 129, 175, 183, 188-190], prioritisation and decision-making [2, 21, 24, 31, 46, 48, 55, 58, 60, 63, 64, 72, 79, 82, 120, 129, 132, 175, 183, 188, 190, 191], implementation [2, 8, 21, 46, 58, 64, 79, 82, 120, 132, 153, 169], monitoring and evaluation [8, 46, 48, 60, 82, 175], reinvestment [55, 64, 153, 175, 176] and research [58, 183, 189]. There is some overlap where the same barriers affect more than one aspect of the process.

This summary only captures barriers to disinvestment activities. Barriers and enablers to investment in new TCPs and strategies to address them are summarised elsewhere [2]. Programs for disinvestment may require system reform, so the barriers inherent in large-scale

Table 10 Examples of potential barriers to disinvestment

Common to all aspects of disinvestment

- Lack of common terminology, theories, tested frameworks and models, proven methods and tools
- The word 'disinvestment' generates negativity and mistrust
- Divergent understanding of the concept of disinvestment between researchers and health service decision-makers
- Lack of guidance and/or successful examples to follow
- · Lack of resources particularly time, funds and skills
- Lack of any of the elements of the framework
- Resistance to change

Establishment and delivery of program

- Lack of communication between agencies
- Autonomy of agencies resulting in multiple different systems
- Wastage of resources by duplication of effort, particularly in HTA
- Lack of resources to support policy mechanisms
- Lack of appropriate data collection systems
- Cost of appropriate data collection systems
- Lack of political, clinical, or administrative will to achieve change
- Difficulty establishing systems and processes to assess choices and reallocate resources across and between programs. Easier when done within programs but this has limited effectiveness.
- Difficulty establishing systems and processes between competing sectors or paradigms eq cure versus prevention, acute versus community care, drug therapy versus counselling
- Lack of coordination and integration of systems and processes Short-termism in government policy
- · Conflicting priorities at individual levels, and/or between levels System inertia
- · Longstanding structures, institutional practices and organisational relationships
- Poor understanding of organisational practices and relationships
- Lack of established triggers to initiate disinvestment discussions
- Scarcity of strategic plans that include disinvestment
- Lack of incentives, presence of disincentives
- · Fee for service models reward quantity not quality

Stakeholder engagement

- Lack of stakeholder commitment
- Stakeholder inertia
- Difficulty identifying and engaging multiple diverse stakeholders
- Resistance to, or lack of understanding of consumer participation

Identification of disinvestment opportunities

- Health Technology Reassessment (HTR) not conducted routinely
- Public and private funding focused on HTA rather than HTR
- Insufficient 'unequivocal' evidence to disinvest
- Lack of mechanisms to identify disinvestment targets
- Difficulties in producing, accessing & interpreting economic data
- Willingness to use lower quality evidence to maintain status quo

Prioritisation and decision-making

- Lack of knowledge of available tools
- Unfamiliarity with economic evaluations
- Disagreement with assumptions in economic evaluations
- Difficulties estimating marginal costs
- Reluctance to disinvest if there are sunk costs in existing technology and supporting capital infrastructure
- Reluctance to expend effort in disinvestment if benefits not clear
- · Gains from disinvestment are less readily measured and may not happen but losses from disinvestment are immediate
- Strength of vested interests and lobby groups
- · Lack of negotiating skills making it difficult to resist opposition
- Conflicting priorities between decision-makers
- Conflicting priorities between local, regional and national levels
- Reluctance to disinvest due to heterogeneity of outcomes and/or if there is potential for benefit in some subgroups or individuals
- · Controversy associated with removal of an effective TCP in favour of a more cost-effective alternative and/or where there is lack of evidence of effect but general perception that it works
- Sensitivity of disinvestment target eg children, cancer, end of life
- Lack of decision-making processes

Table 10 Examples of potential barriers to disinvestment (Continued)

- Lack of integration with other decision-making processes
- Requirement for prospective data collection or further research to provide enough information for decision

Page 24 of 31

- Difficulty making choices and reallocating resources across and between programs. Easier when done within programs but this has limited effectiveness.
- Difficulty making choices between competing sectors or paradigms eg cure versus prevention, acute versus community care, drug therapy versus counselling
- Decision-makers not held in sufficiently high regard for decisions to be respected and enforced
- Perceived influence of power imbalances and hidden agendas
- Political challenges

Implementation

- Inadequate project timelines
- Lack of funding for implementation
- Lack of skills in project management
- · Lack of skills in change management
- Loss of patient choice
- Loss of perceived entitlement to treatment
- Loss of clinical autonomy
- Clinician reluctance to remove practices they perceive as integral to their professional practice and identity
- · Loss of perceived benefit of intervention being removed
- Perceived criticism of practice and/or practitioners
- Perception that management priority is only to save money
- Lack of incentives, presence of disincentives
- Lack of data to substantiate need
- Gains from disinvestment less readily measured and may not happen, but losses from disinvestment are immediate
- Complexity of practice change if disinvestment limited to certain groups or for certain indications
- · Lack of coordination between projects resulting in gaps and duplication
- Stakeholder fatigue and disillusionment with constant change

Monitoring and evaluation

- · Routinely-collected data not valid or reliable, often out-of-date
- · Routinely-collected data not precise or specific enough
- Cost of obtaining appropriate data
- Lack of post-market surveillance
- Lack of methods to quantify savings
- Distrust of reasons for monitoring and evaluation

Reinvestment

contextual factors.

- Lack of methods for reallocating resources released
- Lack of examples of successful reinvestment
- Some cost savings may not be realised eg length of stay reduced but beds immediately filled with other patients of greater acuity

Research

- Assumptions that current practice is effective
- Ethical objections to randomising patients to control groups
- Resistance to enrolling patients in trials due to belief in intervention
- Difficulty getting funding to research existing practices

change will also be applicable. The body of literature on barriers and enablers to using evidence in decisionmaking and implementing practice change will also be relevant to disinvestment activities.

In addition to the list summarised here and the wider

literature, an analysis of local barriers and enablers

should be undertaken for every project to identify crucial

Discussion

Limitations

Although a rigorous systematic approach was taken, it is impossible to be comprehensive in ascertaining all the relevant literature on disinvestment; the reasons are outlined in the conceptual review [1]. As a result, some relevant publications may not have been identified and some information may not have been published. Despite these limitations, the messages about operationalising disinvestment are generally clear and consistent and provide strong underpinnings for the framework.

The literature has been reviewed from the perspective of a local health service, however the authors' experience is based in the Australian health system; hence differences with other health systems may not have been recognised and additional decision-making settings or methods and tools may have been missed.

The specific details of the 'where, who and how' of decision-making is likely to differ between organisations but the underlying premises should be the same: individuals and groups make decisions under certain conditions. The classifications of decisions and decisionmakers might be useful starting points to elucidate local particulars.

The proposed framework is conceptual and untested. Naming of categories, determination of their constituent elements and the relationships between components has not been piloted or refined with stakeholder input. It is large, complex and all-encompassing and may prove too daunting or complicated to be achieved in this format. Testing and research may establish if it is feasible in the current overarching format or if it should be renamed, redefined or reformulated for implementation in smaller sections.

The framework is proposed at the 'big picture' level and requires supplementation with detail for all the components. There are some existing frameworks, models, methods and tools that can be applied in several areas but not for all elements within the framework.

There are many barriers that cannot be addressed by generic system changes and must be tackled when implementing the framework in individual situations. Many of these may be successfully overcome with local strategies; however some aspects of the framework involve potentially insurmountable barriers in the current environment. The main example is lack of valid, reliable, timely, appropriate and sufficiently specific data to identify disinvestment targets and monitor and evaluate disinvestment initiatives.

Implications for policy and practice

As the focus of this review is operationalisation of disinvestment, the implications for policy and practice have been integrated throughout the paper.

Implications for research

The implications for research in operationalising disinvestment are enormous. Placing the research component of the proposed framework across all the constituent elements illustrates that there is a need for research in each of them. Some topics stand out as priorities.

Many authors report a lack of frameworks, models, methods or tools for disinvestment. However there are some frameworks and models for disinvestment, although not tested; and plenty of methods and tools, many of which are tested, frequently from other research disciplines but which are relevant for disinvestment projects. Perhaps a more important factor is the lack of proactive mechanisms, prompts and triggers [9, 11, 16, 21, 24, 27, 192]. There are rigorous methods for HTA and analysis of health service data but no systematic methods to initiate these processes or draw the results to the attention of health service decision-makers. It is also not clear who is, or should be, responsible for instigating and making decisions and taking action. Research in these areas is a priority.

Investigation of data requirements, data collection methods and skills of decision-makers to use data for disinvestment is another priority [21, 24, 27, 46, 48, 55, 58, 60, 131]. Support for data collection after a TCP has been introduced is low and research into methods and resources required for post-market surveillance and *"cover-age with evidence development"* is required [24, 132].

Some authors have highlighted other aspects of disinvestment for research such as exploring disinvestment at local health service and individual practitioner level [16, 55, 56, 80, 188, 193], taking a longitudinal approach from inception through implementation to outcomes that cross organisational boundaries [80, 188], identifying determinants for disinvestment [15, 80, 129], implementing change management [56, 58], and drafting and refining frameworks, methods and tools [15, 24, 29, 58, 129, 175, 184, 185]. Mechanisms to develop, implement and evaluate disinvestment activities can be built on existing theoretical frameworks from other research paradigms such as HTA, knowledge translation and implementation science [28, 83]. Measures of impact, potential unintended consequences and factors contributing to success or failure also need to be captured [24, 83, 193]. The SHARE Program provides some early work to build on by reporting disinvestment projects from inception to implementation [9]; identifying determinants for disinvestment, potential unintended consequences and factors contributing to success or failure [9]; and developing frameworks, models and algorithms [5-9, 11] and evaluation frameworks and plans [10, 11, 40]. These outputs of the SHARE Program are summarised in Paper 1 [3].

Research could also include testing the proposed framework in different contexts.

Conclusions

There is no agreed definition or common understanding of disinvestment, yet the concept is widely discussed and disinvestment initiatives and research are called for. Although there are only a few, largely untested, frameworks and models and little practical guidance in the literature, there are clear and consistent messages regarding principles for decision-making, settings and opportunities to identify disinvestment targets, steps in the disinvestment process, methods and tools, and barriers and enablers. This information has been drawn together into a framework for operationalising disinvestment in a systematic, integrated, organisation-wide approach in the local healthcare setting.

Definitions for essential terms are proposed and key concepts underpinning the framework have been made explicit. The term disinvestment is used in the broadest sense, 'removal, reduction or restriction of any aspect of the health system for any reason, and can be applied to products, devices and equipment; clinical practices and procedures; health services and programs; information technology and corporate systems. Given the negative connotations of the word and the problems inherent in considering disinvestment in isolation, the basis for the framework is 'resource allocation' addressing the spectrum of decision-making from investment to disinvestment.

The framework is based on three components: the program consists of principles for decision-making and settings that provide opportunities to introduce systematic prompts and triggers to initiate consideration of disinvestment; projects follow the steps of the disinvestment process; and research is needed across all aspects of the framework.

The proposed framework can be employed at network, institutional, departmental, ward or committee level. It is proposed as an organisation-wide application, embedded within existing systems and processes, which can be responsive to needs and priorities at the level of implementation. It can be used in policy, management or clinical contexts, for resource allocation and potentially other decision-making processes.

There are many theories, frameworks, models, methods and tools from other areas of health research and practice that are relevant to disinvestment which could be employed within this framework.

Multiple barriers to establishing a decision-making framework and implementing disinvestment initiatives were identified. Some of these relate to the lack of elements that form individual principles and are addressed in the framework, however many involve local factors that can only be tackled when implementing the framework in particular contexts.

The framework captures all the identified information from the literature about operationalisation of disinvestment in the context of resource allocation. This could be a strength, if all the elements are required for a robust effective program of decision-making and action, or a weakness, if it is too complex to be achieved in practice.

Additional file

Additional file 1: Principles for resource allocation. (PDF 697 kb)

Abbreviations

A4R: Accountability for Reasonableness; EBP: Evidence Based Practice; EVIDEM: Evidence and Value: Impact on DEcision Making; HsW: Health Sector Wide; HTA: Health Technology Assessment; HTR : Health Technology Reassessment; MCDA: Multi-criteria decision analysis; NICE: National Institute of Health and Clinical Excellence; PBMA: Program Budgeting and Marginal Analysis; QI: Quality Improvement; SHARE: Sustainability in Health care by Allocating Resources Effectively; STEPPP: Systematic Tool for Evaluating Pharmaceutical Products for Public Funding Decisions; TCPC: Technology/ Clinical Practice Committee; TCPs: Technologies and Clinical Practices

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Availability of data and materials

Many of the datasets supporting the conclusions of the articles in the SHARE series are included within the articles and/or the accompanying additional files. Some datasets provide information for more than one article and are only provided once; where they are not included within an article and/or the accompanying additional file, the relevant citations to the articles in which they are provided are included. Datasets have not been made available where it is impossible to de-identify individuals due to the nature of survey or interview responses or where the data is published in confidential internal reports.

Authors' contributions

CH and SG developed the conceptual approach. CH undertook the literature review and drafted the framework and initial manuscript. SG provided critical revisions to both. AGE provided critical revisions and proposed refinements and changes to scope. All authors read and approved the final manuscript.

Authors' information

CH was the Director of the Centre for Clinical Effectiveness and the SHARE Program Director. CH undertook this review and completed the SHARE publications as part of an unfunded PhD. SG is Professorial Fellow in the Monash University School of Public Health and Preventive Medicine and cosupervisor of CH's PhD. AGE is Professor of Health Policy, HCF Research Foundation Professorial Research Fellow, and Co-Director of the Menzies Centre for Health Policy at The University of Sydney and Senior Fellow with the Lown Institute in the USA.

Ethics approval and consent to participate

The Monash Health Human Research and Ethics Committee (HREC) approved the SHARE program as a Quality Assurance activity. Further ethical review was not required as the program met the following criteria [194]:

• "The data being collected and analysed is coincidental to standard operating procedures with standard equipment and/or protocols;

• The data is being collected and analysed expressly for the purpose of maintaining standards or identifying areas for improvement in the environment from which the data was obtained;

The data being collected and analysed is not linked to individuals; and
None of the triggers for consideration of ethical review are present." [194]
Participation was based on the 'opt-out approach' [194]. "The opt-out approach is a method used in the recruitment of participants into an activity where information is provided to the potential participant regarding the activity and their involvement and where their participation is presumed unless they take action to decline to participate." [194] Consent to participate was approved by the HREC based on the following criteria:

• Health care providers, managers, consumer representatives, and officers within government health departments will be informed about the project and the processes and invited to participate.

• Participation in interviews, workshops and/or surveys will be considered to be implied consent.

These conditions were met.

Consent for publication

Not applicable

Competing interests

AGE receives salary support as the HCF Research Foundation Professorial Research Fellow, and holds research grants from The Commonwealth Fund and Australia's National Health and Medical Research Council (ID 1109626 and 1,104,136). AGE receives consulting/sitting fees from Cancer Australia, the Capital Markets Cooperative Research Centre-Health Quality Program, NPS MedicineWise (facilitator of Choosing Wisely Australia), The Royal Australasian College of Physicians (facilitator of the EVOLVE program) and the Australian Commission on Safety and Quality in Health Care, and as a member of the Australian Government Department of Health's Medicare Benefits Schedule Review Taskforce.

CH and SG declare that they have no competing interests.

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Author details

¹School of Public Health and Preventive Medicine, Monash University, Melbourne, Victoria, Australia. ²Centre for Clinical Effectiveness, Monash Health, Melbourne, Victoria, Australia. ³Menzies Centre for Health Policy, Sydney School of Public Health, University of Sydney, Sydney, Australia. ⁴Lown Institute, Brookline, Massachusetts, USA.

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Chapter 5. Discussion and conclusions

"The process of detecting and eliminating services that provide less than satisfactory health benefits is complex and challenging."

Healthcare Improvement Scotland 2013 [48]

The SHARE Program had mixed success.

This exploration of current and potential systems and processes not only contributed to development of the Monash Health disinvestment program, but also confirmed existing knowledge and generated new information. The barriers, enablers and needs known from research in other contexts were found to be applicable to disinvestment and the novel findings include details about generic decision-making practices and the specific experience of disinvestment from identification to implementation, evaluation and explication in a local health service setting.

Although some of the objectives were not achieved, the investigations produced a rich source of material to guide and inform future policy, practice and research in health service decision-making.

"However, whereas an extensive literature exists on implementation of innovations, our understanding of the process of abandonment of existing low value care is limited: little knowledge is available about the specific agents involved in abandonment, the barriers and facilitators for abandonment and effective interventions that accelerate abandonment of low value care."

van Bodegom-Vos 2016 [49]

Paper 11: Reporting outcomes of an evidence-driven approach to disinvestment

Paper 11 consolidates the findings, discusses the contribution of the SHARE Program to the knowledge and understanding of disinvestment in the local healthcare setting, and considers the implications for policy, practice and research.

The Additional file for Paper 11 is included in Appendix 8.

DEBATE

Open Access



Sustainability in Health care by Allocating Resources Effectively (SHARE) 11: reporting outcomes of an evidence-driven approach to disinvestment in a local healthcare setting

Claire Harris^{1,2*}[®], Kelly Allen^{1,2}, Wayne Ramsey³, Richard King⁴ and Sally Green¹

Abstract

Background: This is the final paper in a thematic series reporting a program of Sustainability in Health care by Allocating Resources Effectively (SHARE) in a local healthcare setting. The SHARE Program was established to explore a systematic, integrated, evidence-based organisation-wide approach to disinvestment in a large Australian health service network. This paper summarises the findings, discusses the contribution of the SHARE Program to the body of knowledge and understanding of disinvestment in the local healthcare setting, and considers implications for policy, practice and research.

Discussion: The SHARE program was conducted in three phases. Phase One was undertaken to understand concepts and practices related to disinvestment and the implications for a local health service and, based on this information, to identify potential settings and methods for decision-making about disinvestment. The aim of Phase Two was to implement and evaluate the proposed methods to determine which were sustainable, effective and appropriate in a local health service. A review of the current literature incorporating the SHARE findings was conducted in Phase Three to contribute to the understanding of systematic approaches to disinvestment in the local healthcare context.

SHARE differed from many other published examples of disinvestment in several ways: by seeking to identify and implement disinvestment opportunities within organisational infrastructure rather than as standalone projects; considering disinvestment in the context of all resource allocation decisions rather than in isolation; including allocation of non-monetary resources as well as financial decisions; and focusing on effective use of limited resources to optimise healthcare outcomes.

(Continued on next page)

* Correspondence: claire.harris@monash.edu

 $^2 \rm Centre$ for Clinical Effectiveness, Monash Health, Melbourne, VIC, Australia Full list of author information is available at the end of the article



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¹School of Public Health and Preventive Medicine, Monash University, Melbourne, VIC, Australia

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Conclusion: The SHARE findings provide a rich source of new information about local health service decisionmaking, in a level of detail not previously reported, to inform others in similar situations. Multiple innovations related to disinvestment were found to be acceptable and feasible in the local setting. Factors influencing decisionmaking, implementation processes and final outcomes were identified; and methods for further exploration, or avoidance, in attempting disinvestment in this context are proposed based on these findings. The settings, frameworks, models, methods and tools arising from the SHARE findings have potential to enhance health care and patient outcomes.

Keywords: Disinvestment, Decommission, de-adopt, de-list, de-implement, Health technology, TCP, Resource allocation, Decision-making, Implementation

About SHARE

This is the eleventh in a series of papers reporting Sustainability in Health care by Allocating Resources Effectively (SHARE). The SHARE Program is an investigation of concepts, opportunities, methods and implications for evidence-based investment and disinvestment in health technologies and clinical practices in a local healthcare setting. The papers in this series are targeted at clinicians, managers, policy makers, health service researchers and implementation scientists working in this context. This paper presents the findings and key messages from investigation of an organisation-wide, systemevidence-based atic, integrated, approach to disinvestment taken by one Australian healthcare network.

Background

The concept of disinvestment has emerged in response to rising healthcare costs, continuing advances in expensive health technologies and increasing recognition of ineffective practices and systemic waste in health services [1–7]. There are three main areas of opportunity for removal, reduction or restriction of health technologies and clinical practices (TCPs): 1) TCPs in current use that were not evaluated rigorously prior to their introduction and have subsequently been identified as unsafe, ineffective or not cost-effective; 2) TCPs that are safe, effective and cost-effective but which have alternatives offering greater benefit; and 3) TCPs that are overused or misused [8].

Following successful implementation of a rigorous evidence-based program for introduction of new TCPs [9], members of the Technology/Clinical Practice Committee at Monash Health, a large health service network in Melbourne, Australia, sought to implement a similar program for disinvestment. The 'Sustainability in Health care by Allocating Resources Effectively' (SHARE) Program was established in 2009 to investigate a systematic, integrated, evidence-based approach to disinvestment in the context of organisation-wide systems and processes. Research and debate in disinvestment have broadened considerably over the past decade, yet a number of significant gaps remain. There is little evidence to guide local healthcare facilities in how they might take a systematic organisation-wide approach [10-19]. There is also a lack of information about the factors that influence resource allocation, the processes involved in implementation of disinvestment decisions, and the perspectives and experiences of healthcare staff undertaking disinvestment [10, 19-22].

In the absence of guidance from the literature, a twophased process was implemented to identify and then evaluate potential opportunities for disinvestment at Monash Health (Fig. 1). These investigations are presented using a case study approach to describe, explore and explain the decisions, processes and outcomes to address some of the gaps in knowledge and facilitate development of theory and interventions [23–29]. A review and synthesis of the disinvestment literature incorporating the SHARE findings was undertaken as a third phase [8, 30].

Monash Health is a network of six acute hospitals, subacute and rehabilitation services, mental health and community health services, and residential aged care [31]. The SHARE Program was funded as a three-year demonstration project by the Victorian Government Department of Human Services (DHS) and was undertaken by the Centre for Clinical Effectiveness (CCE), an inhouse resource at Monash Health aiming to facilitate evidence-based practice. The overall approach to SHARE program activities was underpinned by the UK Medical Research Council framework for design and evaluation of complex interventions [32] and the SEAchange model for Sustainable, Effective and Appropriate evidence-based change in health services [33]. To address the limited understanding of resource allocation processes in health services, and the lack of detail in reporting of implementation of change in the literature [34-36], the SHARE papers are presented using appropriate case study methods [37–40] and reporting guidelines [41–43].

SHARE	PAPER	RESEARCH QUESTIONS/AIMS	METHODS	
	2	 What concepts, definitions and perspectives underpin disinvestment? What models or methods of disinvestment have been implemented in local health services? Where are the opportunities for systematic decisions about disinvestment in a local health service? 	Literature reviews Concepts, methods and activities related to disinvestment Consumer engagement in organisation-wide decisions Interviews and surveys with stakeholders: clinicians, managers, policy-makers, consumers, committee	
PHASE ONE Specifying the context, understanding the problem and defining the components of an optimal intervention	3	 Where, how and by whom are decisions about resource allocation made, implemented and evaluated at Monash Health? What factors influence these processes? What knowledge or experience of disinvestment exists within Monash Health? 	representatives, project staff Workshops • Decision-makers in diagnostic services • Community Advisory Committee • Health service leadership groups Consultation • National and international experts in	
	4	 How can consumer values and preferences be integrated into organisation-wide decision-making for resource allocation? 	disinvestment Health program evaluator and health economis State health department Health Technology Program Document analysis	
	5	 What are the implications for disinvestment at Monash Health? What is the most appropriate and effective approach to enable organisation-wide, systematic, integrated, evidence- driven decision-making for disinvestment at Monash Health? Can a model for evidence-driven resource allocation in the local healthcare setting be derived from the Monash Health program to enable replication and testing? 	Synthesis and analysis Deliberation and decision-making in structured workshops Development of frameworks and proposals	
PHASE TWO Assessing acceptability and feasibility of the components	6	 What methods are available to identify potential disinvestment opportunities in a local health service? What methods are available for prioritisation and decision-making to initiate disinvestment projects in a local health service? What methods are available to develop, implement and evaluate disinvestment projects in a local health service? What were the processes and outcomes of application of these methods at Monash Health? What factors influenced the processes and outcomes? 	Literature reviews Opportunities for disinvestment in priority setting Opportunities for disinvestment in system redesign Methods for prioritisation and decision-making Staff needs to enable evidence-based decision-making Interviews and surveys with stakeholders: clinicians, 	
and identifying methodological issues for implementation and evaluation	7 & 8	 What was current practice in accessing and using evidence for making, implementing and evaluating decisions at Monash Health? What decisions were made and outcomes achieved in the piloting of the Evidence, Data, Capacity Building and Project Support services? What factors influenced these decisions and subsequent processes and outcomes? 	managers, policy-makers and consumers Analysis of barriers and enablers Development of implementation and evaluation plan Workshops with senior decision-makers Consultation with local experts and the Public Affairs and Communications Department	
PHASE THREE Consolidating, reflecting and	9 & 10	 To discuss the current literature on disinvestment from a conceptual perspective, consider the implications for local healthcare settings and propose a new definition and two potential approaches to disinvestment to stimulate further research and discussion To discuss the current literature on disinvestment from an operational perspective and propose a framework for disinvestment in the context of resource allocation 	Literature review of disinvestment from the local healthcare perspective Development of framework for system-wide program of disinvestment within the context of resource allocation	
considering the implications	1 & 11	 To consolidate the findings of the SHARE program and literature reviews and identify the key messages arising from these activities To discuss the contribution of the SHARE program to the knowledge and understanding of disinvestment in the local healthcare setting To consider the implications for policy, practice and research 	Summary of outputs and outcomes Analysis and discussion key messages	

An overview of the SHARE Program, guide to the SHARE publications and further details about Monash Health are provided in the first paper in this series [44].

Aims

The aims of this paper are to 1) consolidate the SHARE findings, 2) discuss the contribution of the SHARE Program to the knowledge and understanding of disinvestment in the local healthcare setting, and 3) consider the implications for policy, practice and research.

Findings of the SHARE Program

A complete summary of SHARE Papers 2–10, including tables of findings and all figures, are presented and discussed in the context of the current literature in Additional file 1. A brief overview is presented below.

Phase One

Based on the UK Medical Research Council framework for complex interventions [32], Phase One involved specifying the context, understanding the problem and defining the components of an optimal intervention (Fig. 1).

Specifying the context

The activities focused on understanding disinvestment from the local health service perspective and identifying potential mechanisms for a systematic organisation-wide approach [23, 45]. No models, methods or practical advice regarding an organisation-wide approach to disinvestment were identified. Hence, a conceptual list of issues to consider was compiled and a framework of six potential mechanisms to systematically introduce disinvestment decisions within health service infrastructure was developed to provide direction for further investigation (Additional file 1: Table S1 and Figure S1) [23].

Understanding the problem

In order to introduce the proposed organisation-wide program for disinvestment, knowledge of existing decision-making systems and processes for investment within Monash Health was required. While there was a broad understanding of where resource allocation decisions were made, detailed knowledge of who made them and how they were made, implemented and evaluated was lacking, and this information was also unavailable in the literature [24]. This investigation identified, and enabled development of classifications for, groups and individuals authorised to make decisions on behalf of the organisation, decision-making settings, and type and scope of decisions (Additional file 1: Table S2). The findings also included recognition of eight components in the resource allocation process, the elements of structure and practice for each component and the relationships between them represented as a framework for resource allocation in the local setting. The eight components are Governance, Administration, Stakeholder engagement, Resources, Decision-making, Implementation, Evaluation and, where appropriate, Reinvestment of savings (Additional file 1: Figure S3 and Table S3). Strengths, weaknesses, barriers and enablers to the resource allocation process; examples of criteria used by different decision-making groups; the types and sources of data used in evaluation; and differences in the decisionmaking processes and information needs of medical, nursing, allied health and management/support groups were reported (Additional file 1: Tables S4-S7).

The term 'disinvestment' was generally unfamiliar to local decision-makers; but the concept was readily understood. At Monash Health, removal, reduction or restriction of current practices or reallocation of resources were initiated by quality and safety issues, evidence-based practice (EBP), or a need to find resource savings, and not by a primary aim 'to disinvest' [24].

Consumer engagement was integral to the proposed program; however there was a lack of guidance about systematic approaches to identify, capture and incorporate consumer perspectives into resource allocation decisionmaking, implementation and evaluation [25]. Findings from the literature and local research were used to develop a model to integrate consumer values and preferences into organisation-wide decision-making based on the framework for resource allocation noted above (Additional file 1: Figure S4 and Tables S8-S11) [25].

Defining the components

The findings of the investigations above (Fig. 1) were synthesised and analysed to identify the most sustainable, effective and appropriate approach to disinvestment at Monash Health [26]. Multiple factors for consideration in establishment of the new program were extracted (Additional file 1: Table S12). This led to definition of the program elements: four components, their aims and objectives, relationships between the components, principles that underpin the program and preconditions for success and sustainability. The principles were agreed upon, the preconditions were established, and implementation and evaluation plans were developed. The program elements were incorporated into a model for sustainability in health care by allocating resources effectively (SHARE) in the local healthcare setting (Fig. 2) [26].

Phase Two

Phase Two involved a series of exploratory trials assessing acceptability and feasibility of the four components (Fig. 2) to determine which were effective, appropriate and sustainable at Monash Health and to identify methodological issues for implementation and evaluation [32].



Funding was reduced in the final year of the program resulting in limitation of some implementation and evaluation activities due to the shortened timelines.

Summaries of the activities in Aims 1 and 2 are provided in Fig. 3.

Aim 1. Systems and processes

The focus of Aim 1 was to explore the six proposed decision-making mechanisms with potential to systematically identify opportunities for disinvestment within organisational systems and processes [23].

Aim 1.1 Purchasing and procurement Incorporating prompts, triggers and mandatory requirements to consider disinvestment within existing systems and processes for purchasing of drugs and clinical consumables and capital procurement of equipment was proposed [23]. The SHARE activities resulted in some positive outcomes related to introduction of new TCPs, but no changes regarding identification of opportunities for disinvestment were implemented [27]. This was due to local barriers; in particular that the relevant processes were outside the control of the SHARE team.

Aim 1.2 Guideline and protocol development Similarly, prompts, triggers and mandatory requirements to consider disinvestment could be introduced into docudevelopment and authorisation ment processes, implementation and evaluation activities for local guidelines and protocols that determine use of drugs and equipment, diagnostic tests, surgical procedures, clinic capacity, etc. [23]. The SHARE team included a prompt in the instructions to document developers to consider whether any current practices could be discontinued in the new Monash Health Policy and Procedure Framework [46], however this was removed by the implementers (from another department with responsibility for governance of the new framework) who felt the process was too onerous [27].

Aim 1.3 Proactive use of published research Proactive searches for evidence-based disinvestment opportunities from the research literature could be undertaken and the findings delivered directly to decision-makers [23].



The SHARE team developed a catalogue of potential disinvestment targets from known sources of high quality synthesised evidence [47–51] and evidencebased publications focused on disinvestment [52, 53]. Use of the catalogue to identify disinvestment projects is discussed in Aim 2.1 below [27]. A broader approach to proactive use of research evidence was piloted as an Evidence Dissemination Service which is discussed in Aim 3.1 below [29].

Aim 1.4 Proactive use of local data Similarly, routinely-collected health service data could be searched proactively to identify areas where disinvestment might have the greatest impact such as high cost, high volume, high rates of adverse events, etc.; and to investigate variations in practice between campuses, departments or individuals within the health service, or with other equivalent institutions, to identify inappropriate or suboptimal practices [23]. These approaches were to be explored within the Data Service which is discussed in Aim 3.2 [28].

Aim 1.5 Economic approaches to priority setting Priority setting exercises use economic principles to weigh up options for investment and disinvestment and select preferred alternatives using pre-determined criteria [23]. Four methods of priority setting met the criteria of economic analysis applicable at the local health service level; however all had limitations in their ability to identify disinvestment opportunities in this context [27]. The lack of in-house health economics capability was the key factor in the decision that economic approaches to priority setting were not feasible at Monash Health [27].

Aim 1.6 System redesign System redesign describes a range of methods and tools to review whole systems of care. It is a familiar process in health services, it offers a well-accepted context to introduce practice change, and it could be integrated into a systematic organisation-wide approach to disinvestment [23]. No examples of system redesign specifically related to disinvestment were identified from the literature or by Monash Health respondents with expertise in this area [27]. The SHARE Steering Committee decided that system redesign methods would not be used to identify opportunities for disinvestment, but may be useful in implementing decisions to disinvest.

Aim 2. Disinvestment projects

Investigation of pilot disinvestment projects was proposed to understand the processes involved, assess the resources required, provide practical guidance for future projects and, if successful, be used as positive examples to promote subsequent disinvestment activities.

Aim 2.1 Identification of disinvestment opportunities

An 'Expression of Interest' (EOI) process where health service staff nominated their own disinvestment projects was added to the six methods to be investigated in Aim 1 [27].

Although an evidence-based catalogue of disinvestment opportunities had been developed, an ad hoc process whereby SHARE Steering Committee members submitted disinvestment proposals at meetings dominated the decision-making process and the catalogue was not used [27]. An algorithm for identifying disinvestment projects from the catalogue was developed (Additional file 1: Figure S7), however the planned development of transparent criteria to be used in its application was not undertaken [27]. Two EOIs and 17 ad hoc proposals were investigated as potential pilot disinvestment projects (Additional file 1: Table S14) [27].

Aim 2.2 Prioritisation and decision-making A literature review found guidelines and systematic reviews for prioritisation of new and existing TCPs. These were adapted into a tool which was to be piloted in the annual capital expenditure funding round. The tool was not tested; the capital expenditure process was cancelled as Monash Health had no spare capital [27].

Prioritisation tools primarily focus on characteristics intrinsic to the TCP. However additional criteria may influence whether a TCP is selected for a local practice change initiative; for example likelihood of success or sustainability, availability of external funds, or value of the evaluation to other processes (Additional file 1: Tables S15 and S16). Due to the dominance of the ad hoc process, no explicit decision-making criteria were developed. Decisions were pragmatic, based on likelihood of 'quick wins' and other unspecified factors related to the proposed TCPs.

Of the 19 proposed TCPs, four were not investigated as subsequent proposals were thought to have greater potential; two had incomplete investigations for the same reason; nine were rejected for a range of issues; and four were accepted as pilot projects (Additional file 1: Table S14).

Aim 2.3 Development, implementation and evaluation of disinvestment projects No published guidance for disinvestment projects in the local context was identified; however Monash Health staff provided details of strengths, weaknesses, barriers and enablers in these processes (Additional file 1: Table S4) [24] and needs for assistance to undertake projects [28]. Implementation and evaluation methods were planned for the SHARE disinvestment pilot projects, however only one reached the implementation stage and evaluation was limited due to the reduction of funding in the final year [27].

Influencing factors Factors influencing the SHARE process for identification, prioritisation and decision-making, implementation and evaluation of potential projects and those influencing the single pilot project are outlined in Additional file 1: Tables S17 and S18.

Aim 3. Support services

Local research confirmed the findings of other studies that evidence from research and local data is not used systematically or proactively to drive decisions; that health service personnel usually lack the time, knowledge, skills and resources to access and identify the information they require and appraise it for quality and relevance; that clinicians charged with undertaking projects commonly do not know how to implement and evaluate change or manage projects effectively; and that projects are generally under-resourced [28, 29]. Respondents were aware of their limitations and those of their colleagues in undertaking projects and they welcomed advice and support [28]. Four support services were proposed to address these barriers in Aim 3 (Fig. 2). An overview of the investigation is provided (Fig. 4) and summaries of factors that influenced development, processes and outcomes of the support services are found in Additional file 1: Tables S19 and S20.

Aim 3.1 Evidence Dissemination Service The Evidence Dissemination Service (EDS) was conceived as a method of identifying disinvestment opportunities by delivering recently published, high quality, synthesised evidence directly to decision-makers [29]. It became clear during development that this could also be a way to ensure that all practice at Monash Health was consistent with current evidence. Two models were implemented (Additional file 1: Figure S9).

Model 1 sent weekly email 'Evidence Alerts' containing citations, hyperlinked to abstracts, hyperlinked to full text, to EDS subscribers. This model could not achieve its aims. The main factor was lack of governance; there was no process to ensure that the appropriate person with authority in the area affected by the evidence had considered the information, made a decision or taken any action. The second factor was lack of time to undertake the steps required in production and utilisation of the Evidence Alerts; this was reported by both the EDS team who captured, processed and disseminated the publications and the decision-makers who were required to appraise for quality and applicability and take appropriate action. In addition, many publications were already known to recipients, not relevant to their area of

OBJECTIVES	COMPONENTS TO BE INVESTIGATED	ACTIVITIES	APPLICATION AT MONASH HEALTH	CONCLUSIONS
Evidence Service To provide high quality synthesised research evidence to clinicians, managers and policy makers for use in decision-making	 Identification, capture and process of synthesised evidence Translation into user friendly formats Dissemination to decision-makers 	Development Assessment of current practice Analysis of barriers, enablers and needs Ascertainment of 	Two models implemented	 'Self-selected participants in a voluntary framework' has limitations 'Designated decision-makers in a mandatory governance framework' achieved objectives
Data Service To provide health service data to clinicians, managers and policy makers for use in decision-making	 Identification of high risks and variations in practice Translation into user friendly formats Dissemination to decision-makers 	preferred content, format and methods of service delivery – Literature review – Surveys – Interviews	Four models explored None implemented	 Lack of success due to incorrect assumptions and local factors beyond control of SHARE project All four models have potential and warrant further investigation
Capacity Building Service To educate, train and support clinicians, managers and policy makers to use research and data in decision-making and implement and evaluate evidence-based change	 Training in accessing and using evidence and data Training in implementation and evaluation Mentoring and support Stakeholder involvement Evaluation 9 Parameter 	 Some training delivered successfully, some not implemented Support delivered but limited participation Online resources not explored due to reduced funding 	 Short term objectives achieved but long term outcomes not evaluated due to reduced funding Proposed model has potential and warrants further investigation 	
 Methodological advice Assistance with project development and administration Assistance with data capture, data entry and analysis Methodological advice Outcomes measured Application of framework for evaluation of change 	 Only one project Implementation not complete due to reduced funding 	 Short term objectives achieved but long term outcomes not evaluated due to reduced funding Proposed model has potential and warrants further investigation 		

practice, not applicable at Monash Health, consistent with current practice, not important enough to instigate change, or reported lack of evidence; hence required no action. This resulted in time wasted by both the EDS team and the decision-makers.

Model 2 addressed these issues (Additional file 1: Figure S10). Publications were limited to those demonstrating evidence of harm, lack of effect, and availability of a cost-effective alternative, which were priorities of Monash Health at the time and consistent with the aim of identifying opportunities for disinvestment. The findings of these studies were compared with current documented practice in local policies and procedures. If there was no local documentation, or it was inconsistent with the evidence, the publication was appraised for quality and forwarded to the governing body, the Technology/Clinical Practice Committee, to assess local applicability and identify the relevant organisational decision-maker, usually a department head or committee chair. An 'Evidence Bulletin' which included information extracted from the publication, the quality appraisal findings and a reporting template was then sent to the relevant authorised decision-maker (Additional file 1: Figure S11). This became an organisational priority; when there was evidence of harm, responses were required within one month and were reported to the Chief Executive the following month at her request.

There are other services disseminating evidence to subscribers. The unique characteristics of the EDS are outlined in Additional file 1: Table S21).

While this was successful in aligning local practice with current evidence, it was a very resource-intensive process and CCE had insufficient staff capacity to maintain it while meeting other commitments. The EDS was suspended in the last few months of the SHARE Program, however it has subsequently been reinstated and is focused on the 'Choosing Wisely' literature [54].

Aim 3.2 Data Service The Data Service was initiated to complement the EDS by delivering local data to decision-makers. Four models of a Data Service were explored, but none were implemented due to local factors such as limited staff capacity and problems with access and coordination of local data [28]. As a result, proactive use of health service data was not employed to identify disinvestment targets for pilot projects.

Aim 3.3 Capacity Building Service The aim of this service was to train and support staff to use research evidence and local data in decision-making and then implement and evaluate these decisions in successful projects [28]. A summary of the education and support programs provided is included in Additional file 1: Table S22. Evaluation immediately after workshops showed participants' knowledge and confidence improved in all aspects of the evidence-based change process and the concepts of EBP, implementation and evaluation. There were further improvements after three months, however there were only a small number of responses. Participants reported high rates of satisfaction and noted that the workshops met or exceeded their expectations [28]. Due to the reduced funding in the final year of the SHARE Program, the service was not expanded beyond the pilot.

Aim 3.4 Project Support Service The Project Support Service was established to support the clinical staff undertaking SHARE disinvestment pilot projects [27]. It was anticipated that methodological advice and support would be delivered in a range of activities related to project planning, governance and administration; implementation and evaluation and practical assistance would be provided for data capture, entry and analysis (Additional file 1: Table S23). One of the four clinical teams required support in all of these areas. The other three were still in the decision-making and development phase and needed assistance in finding evidence and data, determining the nature and scope of the problem, clarifying the intervention and assessing feasibility and risk. These projects were subsequently withdrawn based on the outcomes of this process.

Each of the teams acknowledged their lack of skills and experience in using evidence in decision-making, project management, implementation and evaluation. They were appreciative that support was available and were willing to accept guidance.

Aim 4. Program evaluation and research

Although each of the first three aims included evaluation in their pilot and implementation phases, a fourth aim was specified to highlight the importance of evaluation, research and dissemination in capturing and understanding what happened and sharing this with others interested in developing similar models.

Aim 4.1 Evaluation and explication An evaluation framework and plan was developed for the overall SHARE Program and included evaluation domains, audience, scope, evaluation questions, outcomes hierarchy, sources of data, methods of collection and analysis, reporting and timelines [55]. More detailed evaluation plans were developed for individual projects. Factors that influenced development, processes and outcomes of individual projects were identified using four adaptations of an existing framework and taxonomy for evaluation and explication of evidence-based innovations [56] which were used in a range of applications in the SHARE Program (Additional file 1: Figure S12).

Aim 4.2 Action research Action research was undertaken based on the "researcher as facilitator for change" model defined by Meyer [57, 58]. An agenda item for 'Learnings' was scheduled at the beginning of every team meeting. Participants were invited to consider anything that had affected the project since the last meeting using the framework 'what worked, what didn't, why and how it could be improved'. Each issue, its effect on the project, and potential changes that would build on positive outcomes or remove or minimise future problems were discussed. The learnings and actions were documented; actions were assigned, given timeframes and followed up. These methods worked well.

Aim 4.3 National workshop The first Australian national workshop on disinvestment was conducted to share knowledge and develop links for future collaboration. Disinvestment was considered from three perspectives: health policy researchers, health economists and health service decision-makers. All findings and presentation materials were published [59, 60].

Aim 4.4 Dissemination To address some of the gaps in knowledge and contribute to the understanding of systematic approaches to disinvestment and resource allocation in the local healthcare context, the SHARE Program activities are presented in this thematic series and a review of the current literature incorporating the SHARE findings was undertaken in Phase Three.

Phase Three

The literature reviews are presented in two debate papers (Table 1). Paper 9 considers the conceptual elements of disinvestment from the perspective of local healthcare services and proposes a new definition and two potential approaches to disinvestment [8]. Paper 10 presents the operational elements in the context of a new framework for disinvestment in the local setting [30].

Terminology and concepts

There are multiple definitions for the terms 'disinvestment' and 'health technology', a lack of common understanding of the reasons or objectives that underpin the concepts, and disparity in use of the terms between the research and practice settings (Additional file 1: Tables S25 and S26). This creates difficulties in the interpretation of disinvestment, application of

 Table 1
 Contents of the literature reviews (Reproduced with permission from SHARE Paper 9 [8])

Conceptual review (Paper 9)	Operational review (Paper 10)
 Terminology and concepts Health technologies Disinvestment Resource allocation Optimising health care Reinvestment Motivation and purpose Impetus for disinvestment Rationale for disinvestment Relationships with other health paradigms Evidence based health care Quality improvement System redesign Health economic approaches New approach to disinvestment 	 Existing theories, frameworks and models New framework Audience Application Definitions Concepts Components Principles of decision-making Settings Decision-making infrastructure Specific initiatives Individual decision-makers Prompts and triggers Steps in the disinvestment process Methods and tools Barriers and enablers

research findings, and establishment of a systematic approach in the local healthcare setting.

In the absence of common terminology, there is one notably consistent message: that the word 'disinvestment' has negative connotations and is likely to be a barrier to successful implementation of disinvestmentrelated change. To reduce undesirable effects, other terms have been intentionally introduced to replace 'disinvestment' (Additional file 1: Table S27) and other concepts such as 'resource allocation,' 'optimisation of healthcare' and 'safely doing less' have been proposed as alternative approaches [8, 61].

Motivation and purpose

The reasons underpinning specific disinvestment activities are not widely discussed although many of the definitions include or imply a reason for disinvestment which can be summarised in seven main themes. An eighth option, 'for any reason,' is added for completeness (Additional file 1: Table S28 and Figure S13). There are many more reasons for removing, reducing or restricting use of TCPs from the perspective of a local healthcare service than those captured in the definitions for disinvestment (Additional file 1: Table S29). Understanding the rationale for a disinvestment initiative is crucial to project planning as it is likely to affect all aspects of the process from identification and prioritisation through to implementation and evaluation.

Relationship with other healthcare improvement paradigms

Disinvestment is frequently portrayed as if it is a new paradigm for health improvement. It has been described as an 'emerging field'. Disinvestment approaches, processes and initiatives are discussed; 'research agendas' are considered; and a need for mechanisms, frameworks, methods and tools is noted. Although there are existing health improvement paradigms that address disinvestment-type activities, these are not routinely promoted in implementation and evaluation of disinvestment. For example, EBP, quality improvement and system redesign all have mature frameworks with validated methods that are widely-used and well-accepted in local health services. It is not clear why there is a need for new methods specific to disinvestment in preference to building on existing familiar processes.

Challenges

The nature of disinvestment brings some particular challenges to achieving change. These include a sense of loss; challenges to professional expertise and autonomy; need for more convincing evidence; possibility of benefit in some cases; heterogeneity of outcomes; lack of data and formal methods for quantifying savings and benefits; lack of standardised methods for disinvestment decisions; lack of transparency in disinvestment processes; nomination of disinvestment targets by 'outsiders'; lack of clarity and rationale and insufficient information to support disinvestment proposals; and difficulties for those who make decisions in multiple roles with potentially conflicting perspectives.

Redefining disinvestment

There is little evidence of active and successful implementation of specific 'disinvestment initiatives' in the local healthcare setting and specifically seeking out targets when the expressed aim is 'to disinvest' has not been effective. Yet successful removal, reduction, restriction and replacement of technologies, clinical practices, programs and services are commonplace at the health service level. This suggests that the construct of 'disinvestment' may be problematic in the local healthcare setting. To stimulate research and debate, we put forward two options that address some of the issues identified in Paper 9 [8].

The first proposed that if the concept of 'disinvestment' is to remain as a specific aim and activity, the terminology, research paradigm and methods of application must be clarified, consolidated and agreed upon.

The second proposed that the concept of disinvestment is simplified, so that it is not a specific aim or activity, and assimilated within familiar health improvement paradigms so that it builds on existing knowledge and expertise in the health workforce. The term 'disinvestment' would be used in the broadest sense, effectively the opposite of investment; as 'removal, reduction or restriction of any aspect of the health system for any reason'. Unlike most of the research definitions for disinvestment, this version is not constrained by a specified purpose, defined criteria or anticipated outcomes. Disinvestment becomes the outcome of, rather than the reason for, a resource allocation decision. In contrast, we propose that 'health technologies' is defined in the narrowest sense; as products, devices and equipment used to deliver health care (eg prostheses, implantable devices, vaccines, pharmaceuticals, surgical instruments, telehealth, interactive IT and diagnostic tools) which reflects common use by health service staff and consumers.

Theories, frameworks and models

There is little discussion of the role of theory or theoretical approaches to disinvestment in the literature, however 15 frameworks and models related to disinvestment, resource allocation and priority setting were identified (Additional file 1: Table S30) [30].

New framework for an organisation-wide approach to disinvestment in the local healthcare setting

There is no overarching framework for disinvestment in this setting. However, there are clear and consistent messages in the literature which, along with the detailed findings from the SHARE projects, were used as the basis for a new framework for operationalising disinvestment (Fig. 5).

The framework is proposed as an organisation-wide application, embedded within existing systems and processes, which can be responsive to local needs and priorities, and employed in policy, management or clinical contexts.

It brings together the definitions, concepts, principles, decision-making settings, potential prompts and triggers to consider disinvestment, and steps in the disinvestment process found in the literature.

The framework is composed of three interconnected and interdependent components: 1) a program for organisation-wide decision-making, 2) projects to implement decisions and evaluate outcomes, and 3) research to understand and improve the program and project activities. The program consists of principles for decision-making and settings that provide opportunities to introduce systematic prompts and triggers



Paper 10 [30])

to initiate disinvestment. The projects follow the steps in the disinvestment process. Each component has a number of elements which are outlined in detail in Paper 10 and summarised in Additional file 1: Tables S31-S35. There is potential for research in all elements of the program and projects.

Potential methods and tools are presented and discussed in Paper 10, however the framework does not stipulate project design or conduct; allowing application of any theories, methods or tools at each step. Barriers are discussed and examples illustrating constituent elements are provided (Additional file 1: Table S36).

Strengths and limitations

The main strengths of the SHARE Program were the explicit evidence-based approach, adequate resources for most of the program, support at the highest levels, favourable timing, and strong, consistent messages from a diverse range of stakeholders.

Views of Monash Health staff and consumers were sought including executives, senior managers, clinical managers, clinicians, project staff with experience in disinvestment-type activities, and representatives of committees with responsibility for resource allocation decisions. Participants represented all clinical disciplines, all levels of seniority and all campuses.

Decisions were based on information from the research literature and local data, integrated with the views of experts in the field and local health service staff and consumers. This approach facilitates development of strategies that are more likely to be sustainable, effective and appropriate [21, 33]. Stakeholder feedback was sought during development, implementation and evaluation of interventions and revisions were made accordingly.

This rigorous approach was possible due to the provision of funding from the Victorian DHS and Monash Health. The SHARE team had appropriate skills for most of the activities and adequate time was allocated to undertake it; consultants were engaged to add specific expertise that was not available in-house. Loss of funding towards the end of the program is noted below as a limitation.

The 20 member SHARE Steering Committee included broad senior representation from executives, clinical and non-clinical program directors, committee chairs, legal counsel and consumer representatives. Major strategic decisions were approved by the Executive Management Team and the Monash Health Board, the program was an organisational priority, and the activities were integrated into the health service Business Plan.

The timing of the program was opportune as internal and external environments were amenable to exploration of disinvestment. The disinvestment literature was building, the DHS was exploring disinvestment at state level and local stakeholders were constructive in their responses. Monash Health had already demonstrated commitment and leadership to evidence-based decisionmaking (EBDM) by establishing the program for introduction of new TCPs [9]. The SHARE Program was able to capitalise on this momentum.

Staff and consumers were in agreement in their responses. Themes regarding current practice, proposals for change and barriers and enablers were strong and consistent across all participant groups. The key messages from participants were consistent with publications at the time and remain consistent with the current literature [8, 30].

The main limitations of the SHARE Program relate to generalisability, internal evaluation and loss of funding.

SHARE is a series of case studies from a single institution and there may be many points of difference with other health services. In particular, Australian public hospitals operate under a state-allocated activity-based fixed-budget model of financing [62], staff are salaried and are bound by organisational policies and procedures; all limiting the generalisability to other settings and models of health service delivery.

The SHARE model utilised in-house expertise in EBDM, knowledge brokerage and data analysis and engaged a health program evaluator and health economist as consultants; this level of expertise is unusual in the local health service context. While this was noted as a strength for SHARE, it limits generalisability to other settings that do not have access to this expertise. Although hospital-based resources for knowledge brokering are becoming more common [63, 64], they are not widespread, and the additional skills in implementation, evaluation and health economics are less common.

The project team delivering the SHARE Program were also the researchers investigating it. This has the potential to introduce subjectivity into evaluations and limit insight if organisational assumptions are accepted without challenge. Extensive stakeholder involvement, transparency of methods and participation of an external evaluator in the role of 'critical friend' [55] were included in the SHARE processes to minimise these limitations.

Funding was reduced in the final year of the program. As a result, some planned implementation and evaluation activities were not completed when the program concluded prematurely, limiting our ability to draw firm conclusions in some areas. Although Monash Health provided funding for the EDS after the loss of program funding, processing the volume of literature in the governance model was not sustainable.

Contribution of the SHARE Program

These investigations in one local health service have produced important new contributions in several areas, which are captured in the tables and figures in Additional file 1. Some of these findings can be summarised as key messages or recommendations (Table 2).

Some of the contributions have been utilised at the source. We are pleased to report that many changes have been implemented at Monash Health following the SHARE Program. These are anecdotal findings, no additional evaluation has been conducted.

New approaches

There are several differences in the way SHARE was conducted compared to other frequently reported approaches to disinvestment in the literature.

It is common for local healthcare facilities to make decisions within organisation-wide frameworks such as development and authorisation of policies and procedures, capital expenditure and clinical purchasing, introduction of new TCPs and models of care, and delivery of programs and services. However many published examples of disinvestment initiatives report individual standalone projects where the target has been identified in an isolated process independent of existing decision-making and project infrastructure. While this approach can potentially be successful, it can also contribute to lack of coordination, duplication, inconsistent messages and change fatigue within an organisation [1] and may result in unsuitable or unsustainable outcomes [26]. Monash Health chose to take an integrated, organisation-wide approach; using existing systems and processes to identify disinvestment opportunities or, when required, incorporating new methods into the existing infrastructure. The aims were to facilitate systematic identification of disinvestment opportunities, encourage consideration of disinvestment in routine decision-making and ensure the processes were transparent and accountable. This approach has been reiterated in more recent publications which propose that disinvestment activities are more likely to be successful if decisions are made at the local level, integrated into everyday decision-making and central to local planning [17, 20, 65, 66].

The concept of investment is rarely discussed in the disinvestment literature, yet in practice investment and disinvestment exist together [15, 16, 26]. Introduction of a new TCP provides a trigger to explore opportunities for disinvestment [13]. Investment without appropriate disinvestment can be wasteful and decisions about disinvestment made in isolation can be artificial and potentially counterproductive [23, 26]. The SHARE Program considered investment and disinvestment together as 'resource allocation' [24, 67]. This is an inclusive term that encompasses financial and other resources. It also draws the focus away from the negative perception that decisions to remove or reduce things are always about money and redirects it towards the more constructive

approach that limited resources should be employed to achieve the best outcomes [26]. Many national and regional policies are now based on resource allocation and address both investment and disinvestment [68, 69].

Discussions about disinvestment and reinvestment are frequently focused on decisions about spending money, but many decisions in healthcare at the local level are about allocation of non-monetary resources such as staff time, capacity in clinics and operating suites, and use of tests and procedures; and they are often driven by considerations other than financial constraint [23]. Decisions about use of non-monetary resources are made by different people in different settings to financial decisions and opportunities for disinvestment will be overlooked if these are not addressed [24, 27, 28]. The SHARE Program investigated opportunities to identify TCPs suitable for disinvestment in settings allocating both monetary and non-monetary resources.

Due to the negative perceptions associated with the term 'disinvestment' Monash Health stakeholders and others propose that it is avoided [1, 15, 21, 26, 45, 70–72]. Systematic errors, organisational waste and inappropriate use of TCPs that are safe, effective and cost-effective when used correctly are also important at the local level, and in these cases many authors propose that consideration of 'optimising health care' is preferable to 'disinvesting' [15, 16, 71, 73–76]. The name and underpinning principles of the SHARE Program (Fig. 2) were designed to avoid the term 'disinvestment' and focus on the positive aspects of effective allocation of resources to optimise health outcomes.

We were not successful in avoiding the term 'disinvestment' in all aspects of the program, which contributed to one of the major learnings. In order to pilot disinvestment projects within the SHARE timelines we could not wait for the new systems and processes to be established to identify opportunities, hence we actively sought targets 'to disinvest'. This process did not work in SHARE, or for others [13, 20, 27, 66, 77, 78]. Monash Health participants reported that previous projects to remove, reduce or restrict use of TCPs were established to reduce patient harm, medication error and unnecessary tests; standardise care; and save money and time; usually with more than one of these aims [24]. The SHARE literature review identified that, although there are few published examples of successful 'disinvestment' at the local level, there are many examples in the EBP and quality and safety literature where unsafe or ineffective TCPs have been discontinued [30]. While aiming 'to disinvest' does not appear to be effective at local level, cessation or limitation of current practices for more constructive reasons has been achieved successfully. Yet some of the current literature continues to encourage national health programs and local health

Table 2 Key messages and recommendations

Disinvestment in general – key messages Source^a • Understanding of systems, processes and influencing factors at the local health service level are important for successful disinvestment. А • Single definitions for disinvestment and health technologies, are needed with agreement between researchers, policy makers and health C service decision-makers [8, 30]. We propose the following definitions. - Disinvestment is removal, reduction or restriction of any aspect of the health system for any reason. Removal indicates complete cessation, reduction is a decrease in current volume or delivery sites, and restriction is narrowing of current indications or eligible populations. This is a broad definition, in essence the conceptual opposite of investment. It is an outcome of, rather than a reason for, a resource allocation decision. It is not burdened with the explanations and caveats of current research definitions. This could apply equally to products, devices and equipment; clinical practices and procedures; health services and programs; information technology and corporate systems. - Health technologies are products, devices and equipment used to deliver health care (eq prostheses, implantable devices, vaccines, pharmaceuticals, surgical instruments, telehealth, interactive IT and diagnostic tools). This is a narrow definition which reflects the common use by decision-makers and consumers in the local health care setting. Clinical practices, support systems, and organisational and managerial systems are not considered to be health technologies in this context. - Health technologies and clinical practices (TCPs) are therapeutic, diagnostic and preventative interventions (eg use of products, devices and equipment PLUS medical, surgical, nursing, allied health and population health activities). This is a pragmatic definition that reflects the scope of most resource allocation decisions related to delivery of health care in the local setting. - Health programs and services are agencies, facilities, institutions and the components within them that deliver acute health care, rehabilitation or population health practices such as health promotion and education. Disinvestment in general - recommendations • Avoid the term 'disinvestment', it is viewed negatively and perceived as 'cost-cutting'. [8, 23, 26, 30] А • Do not to aim 'to disinvest' [8, 27] А TCPs, services and programs that harm patients, diminish health outcomes, impair health care delivery, increase costs unnecessarily or result in organisational waste should be removed, reduced or restricted to address these adverse outcomes. - If there are opportunities to replace TCPs, services and programs that are safe, effective and cost-effective with others that offer greater advantage no explanation is needed other than the expected benefit. - If budgets are cut or funding is required for high priority activities it is worth remembering that health service staff place a high value on transparency and are disillusioned by attempts to disguise cost reduction methods. • Do not develop 'disinvestment' as a health improvement strategy or research domain [8, 27]. А • Expand existing healthcare improvement paradigms and research domains (eg EBP, health technology assessment, guideline development, implementation science, knowledge translation, quality improvement, system redesign, health economics, etc) to address the need for theories, frameworks, methods and tools for [8, 23, 24, 26-30]: - systematic and proactive identification of harmful, ineffective and inefficient TCPs, services and programs - implementation of interventions to remove, reduce or restrict TCPs, services and programs - evaluation of the process, impact and outcomes of these changes - measurement of savings if possible - reallocation of resources if appropriate • The principles for a rigorous, evidence-based approach to decision-making for disinvestment in the context of all resource allocation А decisions are incorporated into the Framework for an organisation-wide approach to disinvestment in the local healthcare setting (Figure 5) Disinvestment in the local health service setting - key messages • Decisions to proceed with a project to implement change are often made without consideration of research evidence and local data and A are not well-defined in terms of the intervention, practitioner group, patient population, indications, etc. Clinicians are frequently asked to undertake projects in their area of clinical expertise but they lack knowledge and skills in project management, implementation and evaluation. - Clinicians are usually required to conduct a project in addition to their normal duties but without additional time or resources. - Health service staff are well aware of their limitations and those of their colleagues in undertaking projects and they welcome advice and support. - There are many decision-making settings and processes within health services - There are many components in the research allocation process in addition to decision-making that need to be addressed - There are insufficient resources and skills in decision-making, implementation and evaluation - Staff need support • Decision-making for resource allocation at the local level is not homogenous. Contrary to some assumptions in previous studies, there are D multiple layers of decision-making with different actors, criteria, systems and processes. [24] • There is a need for proactive methods to access and utilise high quality synthesised evidence in the research literature, routinely-collected A local health service data and sources of consumer information to identify and drive disinvestment initiatives [23, 25, 30] Disinvestment in the local health service setting - recommendations • Introduce a framework for an organisation-wide approach to disinvestment underpinned by evidence-based principles [30] А · Focus on optimising health care and using resource effectively rather than cost-cutting А

• Implement systematic, transparent, evidence-based methods that integrate with, or build upon, existing decision-making systems and processes to identify TCPs that should be removed, reduced or restricted. [23, 30]

Table 2 Key messages and recommendations (Continued)

• Consider settings for decisions about both monetary (eg capital procurement and clinical purchasing) and non-monetary (eg development and authorisation of guidelines and protocols that stipulate use of drugs or equipment, recommend diagnostic tests, specify referral mechanisms etc) resources as opportunities to identify TCPs that should be removed, reduced or restricted. [23, 26, 27, 30]	D
• If seeking opportunities to save money by removing, reducing or restricting TCPs, use a systematic transparent process rather than <i>ad hoc</i> nominations from individuals. [8, 27]	A
• Ensure that proposals are fully developed before making decisions to proceed including consideration of research evidence and local data to determine the nature and scope of the problem and the most effective solution; clarification of the intervention and scope of the project in terms of practitioner group, patient population, indications, etc; and assessment of feasibility, risk and cost of implementation and evaluation. [28]	D
• Ensure appropriate knowledge and skills and adequate resources are available for effective project design, management and governance; implementation and evaluation	А
• Integrate activities to remove, reduce or restrict TCPs within the language and methods and tools of familiar health service improvement paradigms such as EBP, quality improvement and system redesign rather than the construct of 'disinvestment'. [8, 24, 30]	A
• Include appropriate stakeholder consultation and involvement in making, implementing and evaluating decisions to disinvest. [25, 30]	А

a Key

• Develop mechanisms to receive and act upon consumer or community-initiated feedback on resource allocation decisions. [25]

A: Based on findings from literature reviews, and local and/or expert respondents, and outcomes of SHARE investigations

B: Based on findings from literature reviews, and local and/or expert respondents, (SHARE investigations incomplete due to local barriers or reduced timelines) C: Based on findings from literature reviews alone [8, 30], (not investigated in SHARE projects)

D: Based on findings of SHARE investigations alone, (not found in other literature)

services 'to disinvest' and promotes 'disinvestment' as a health improvement paradigm and research domain [30].

New knowledge

The SHARE papers provide practical information from actual experiences in a local health service to guide others in similar situations and the case study format provides a level of detail not generally reported. The two literature reviews contribute to the body of knowledge regarding disinvestment and resource allocation from the perspective of the local healthcare setting.

Many of the findings of the SHARE Program were unexpected. The activities in Phase One were not originally planned but became necessary due to the lack of knowledge about local processes both within Monash Health and in the literature. It was anticipated that new systems and processes would be established to identify opportunities for disinvestment and successful disinvestment projects would be carried out in Phase Two. With a few exceptions, this did not happen. Yet SHARE was successful in meeting its aims (Fig. 2). The aims were to explore the nature of the innovations and methods to deliver them, evaluate the outcomes and understand what happened. Those thought to be feasible would be piloted and those found to be sustainable, effective and appropriate would be established as ongoing processes. Although some of the objectives were not achieved within the program timeframe, SHARE was successful in assessing acceptability and feasibility of the components and identifying methodological issues for implementation and evaluation. The findings of all these investigations provide a rich source of new information about decision-making in a local health service; methods to avoid in attempting disinvestment in this context; and settings, frameworks, models, methods and tools that have potential to enhance health care and warrant further exploration.

To the best of our knowledge, the SHARE papers are the first to report the following new findings.

Organisational decision-making

Little has been written about the systems and processes for organisational decision-making regarding resource allocation at the local level. The SHARE Program identified potential settings and mechanisms to integrate disinvestment into existing organisational infrastructure [23]; the type and scope of decisions and decisionmakers authorised to act on behalf of the organisation and a taxonomy to classify them [24]; eight components of the resource allocation process, the structure and practice elements underpinning each component and the relationships between them [24]; strengths and weaknesses, barriers and enablers; and examples of decision-making criteria and evaluation data used in a healthcare setting [24].

In many studies of decision-making, participants were selected from the most senior positions in an organisation who are asked about resource allocation as if it was a homogenous process within their institution. SHARE identified that these decisions were made throughout the organisational hierarchy, different processes and criteria were used, and senior staff were often unaware of processes at other levels within the organisation [24].

Many types of decisions that are not generally discussed in the literature were also identified, all of which offer potential to explore and initiate disinvestment. Use

D

of non-monetary resources is noted above. While much of the literature considers decision-making related to purchases of multi-million dollar equipment, little attention has been paid to decisions that spend millions of dollars on low-cost but frequently-used items such as cannulae, catheters, dressings and similar consumables which also offer disinvestment opportunities with potential for improved outcomes and significant cost saving.

Consumer participation

In contrast, much has been written about consumer participation, including resource allocation and disinvestment decisions. However the SHARE investigations identified two aspects of consumer participation in this context that were not found elsewhere [25]. Firstly, the literature focuses on consumer and community responses to health service initiatives, but the Monash Health consumer and community participants noted the additional need for mechanisms within health services to receive and act upon consumer-initiated contributions. Secondly, the concept of consumer evidence that could be searched in the same way as health research evidence was introduced. These are sources of consumer views and perspectives found in publications and data sources that can be used systematically and proactively to inform health service decisions [25]. These new findings were drawn together with findings from the literature into a model for consumer participation in resource allocation decision-making in the local setting.

Disinvestment process

Theoretical issues to consider in development of a disinvestment program in a local facility were collated in the SHARE planning phase [23] and then detailed implications for a program at Monash Health were ascertained from document analyses and interviews, surveys, workshops, and consultations with local stakeholders and external experts [26].

It has been proposed that in-depth research taking a longitudinal approach from project inception to completion of the disinvestment process at the health service level is needed [1, 20, 21, 74, 79]. The SHARE experience of disinvestment from identification, through prioritisation and decision-making, to implementation, evaluation and explication in one local health service is described in detail [27]. Unfortunately for the SHARE Program, the main messages arising from the process of identifying and deciding to proceed with a disinvestment project were about 'what not to do'. Fortunately for others, this will enable them to avoid the mistakes, barriers and unanticipated events reported. On a more positive note, evaluation of the single project implemented found that it was underpinned by a rich list of enabling factors. The literature review focusing on operationalising disinvestment reports definitions, concepts, principles, decision-making settings, potential prompts and triggers to consider disinvestment, and steps in the disinvestment process found in the literature and brings them together into a framework for organisation-wide application [30].

Addressing and understanding barriers and enablers

The barriers to EBDM and successful project management, implementation and evaluation of the resultant decisions are well documented and relate to all contexts, not just disinvestment and resource allocation. The SHARE Program piloted four in-house support services to address the lack of knowledge and skills in decisionmakers and project staff and insufficient resources for project delivery [28, 29]. The education and training in EBP delivered by the Capacity Building Service is a wellresearched area and there are other services disseminating evidence to subscribers. However we are unaware of other models similar to the Project Support Service or Evidence Dissemination Services being delivered inhouse in a governance framework to facilitate disinvestment and ensure local practice is up-to-date. The local factors influencing decisions to develop these services and those influencing the processes and outcomes are provided in detail [28, 29].

The barriers and enablers to initiatives in the SHARE Program were investigated and reported using a framework and taxonomy for evaluation and explication adapted for use in decision-making processes, disinvestment projects and an in-house EDS, contributing to new knowledge in these areas.

New resources

There are many resources arising from SHARE activities that may be useful for decision-makers, change agents, knowledge brokers and researchers to inform decisions, planning, implementation and evaluation in disinvestment and resource allocation programs (Table 3).

The new knowledge arising from the SHARE findings was used to create four frameworks, three models and an algorithm, and develop several adaptations of an existing framework.

Inconsistent use of terminology was common in several of the areas investigated, and in other areas new terminology was needed to fill a gap. Definitions were provided for terms used in SHARE projects, frameworks and models.

The protocols and instruments used in SHARE surveys, interviews, workshops and literature reviews may be useful to others wishing to ascertain similar information.

Summaries, lists and tables capture the findings across a range of areas including current practice; staff knowledge, skills, confidence and needs; factors influencing decision-making; and barriers and enablers.

Implications for policy, practice and research

Some of the implications for policy, practice and research can be summarised as key messages or recommendations (Table 2).

Recognising the relevance of the local healthcare perspective

Resource allocation and disinvestment decisions can be made centrally, but implementation is likely to require change locally [65, 80, 81]. In addition, national recommendations cannot take into account local factors such as population needs, organisational priorities, budgets, capacity or capability; hence many decisions about the use of TCPs, programs and services have to be made at the local level [9]. The challenges inherent in disinvestment processes [8], particularly those related to implementation, may have the greatest impact in the local setting.

The importance of exploring disinvestment at the local level is noted in the disinvestment literature [17, 20, 79, 82–84]. Specific examples include: identifying determinants for disinvestment [18, 20, 85]; implementing change management [15, 84]; drafting and refining frameworks, methods and tools [12, 13, 15, 16, 18, 19, 70, 85]; and measuring impact, potential unintended consequences and factors contributing to success or failure of disinvestment initiatives [13, 74, 83].

The SHARE Program provides some early work to build on by reporting disinvestment projects from inception to implementation [27]; identifying determinants for disinvestment, potential unintended consequences and factors contributing to success or failure [27]; and developing frameworks, models and algorithms [23–27, 29] and evaluation frameworks and plans [28, 29, 55]. These outputs of the SHARE Program are discussed in Paper 1 [44] and summarised in Table 3.

Aligning definitions

The SHARE literature reviews highlight the lack of agreement of not only the definitions, but the concepts underpinning the definitions of 'health technologies' and 'disinvestment'. A common understanding is required for successful decision-making and communication in policy and practice settings. A consistent definition is also important for implementation and evaluation of change in the practice setting and activities in the research domain to enable replication and comparison with others.

Definitions that reflect use of these terms at the local level are quite different from current research definitions. This disparity may lead to confusion or misunderstanding and hamper knowledge translation in this area. Definitions developed from the local perspective are included in Table 2 and the Additional file.

Enhancing organisational decision-making, implementation and evaluation

Although quality improvement processes for clinical practice and service delivery are well-established and routinely conducted in healthcare facilities, ongoing evaluation and enhancement of organisational decisionmaking processes is not common practice [9]. Similarly, much of the research in evidence-based health care has been conducted in the clinical domain resulting in a substantial body of knowledge translation strategies for health professionals, but the main focus of disinvestment has been in policy and management activities where the evidence for knowledge translation is much weaker [86–88]. The frameworks, models, methods and tools; classifications of decision-makers, decision-making settings, type and scope of decisions; and lists of strengths, weaknesses, barriers, enablers and needs that emerged from the SHARE research could assist policy makers, managers, clinicians and researchers to improve these processes.

The SHARE findings confirmed the importance of appropriate skills and adequate time and resources for development, implementation and evaluation of innovations; yet this remains a constant tension in health services [77, 89–94]. Responses to emerging problems are frequently urgent and reactive, delivered by staff with limited experience in project management or change strategies, with inadequate resources and inappropriate timelines, resulting in projects that are not implemented or evaluated effectively [21, 24, 27–29]. The SHARE findings reinforce the need for expertise and practical support; access to relevant methods and tools; and education, training and capacity-building within a local health service [17, 19, 82, 95, 96].

The lack of explicit criteria and limited use of evidence in decision-making; lack of skills and resources to make, implement and evaluate evidence-based decisions; and minimal consumer involvement that were identified in the SHARE investigations are not unique to Monash Health and have been reported in health services around the world [1, 11, 21, 76, 97–100]. The prevalence of these issues highlights the extent of the problem and the considerable potential for improvement in these areas.

Developing proactive processes to initiate evidencebased disinvestment

Although a lack of frameworks, models, methods and tools for disinvestment is reported in the literature [12, 13, 16, 18, 19, 70, 74, 101–103], the SHARE reviews identified some frameworks and models specifically for disinvestment, and many methods and tools

Table 3	Outputs of	the SHARE Program	(Reproduced with	permission from	n SHARE Paper 1 [44])
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Research questions	Outputs
SHARE 2: Identifying opportunities for disinvestment in a local healthcare se	etting
 What concepts, definitions and perspectives underpin disinvestment? What models or methods of disinvestment have been implemented in hospitals or health services? Where are the opportunities for systematic decisions about disinvestment in a local health service network? 	 Framework and detailed discussion of potential settings and methods for disinvestment in the local healthcare context Summary of issues to consider in development of an organisational program for disinvestment Interview protocol for ascertaining local implications for disinvestment
SHARE 3: Examining how resource allocation decisions are made, implemen	nted and evaluated in a local healthcare setting
 Where, how and by whom are decisions about resource allocation made, implemented and evaluated at Monash Health? What factors influence these processes? What knowledge or experience of disinvestment exists within Monash Health? 	 Framework of eight components in the research allocation process, the elements of structure and practice for each component, and the relationships between them Classification of decision-makers, decision-making settings, type and scope of decisions, strengths and weaknesses, barriers and enablers Examples of decision-making criteria and types and sources of evaluation data used Interview and workshop protocols for ascertaining local decision-making systems and processes
SHARE 4: Exploring opportunities and methods for consumer engagement	in resource allocation in a local healthcare setting
 How can consumer and community values and preferences be systematically integrated into organisation-wide decision-making for resource allocation? 	 Model for integrating consumer values and preferences into decision-making for resource allocation Definitions for consumer engagement terminology Examples of sources of consumer information and data Examples of consumer-related activities generating proactive decisions to drive change
SHARE 5: Developing a model for evidence-driven resource allocation in a le	ocal healthcare setting
 What are the implications for disinvestment at Monash Health? What is the most appropriate and effective approach to organisation-wide, systematic, integrated, evidence-driven disinvestment at Monash Health? Can a model for evidence-driven resource allocation in the local healthcare setting be derived from the Monash Health program to enable replication and testing? 	 Model for exploring Sustainability in Health care by Allocating Resources Effectively in the local healthcare setting Definition of four program components, aims and objectives, relationships between components, principles that underpin the program, implementation and evaluation plans, and preconditions for success and sustainability. Summary of implications for disinvestment in the local setting and resulting decisions for program development Summary of factors for program sustainability Evaluation framework and plan
SHARE 6: Investigating methods to identify, prioritise, implement and evaluate	ate disinvestment projects in a local healthcare setting
 What methods are available to identify potential disinvestment opportunities in a local health service? What methods are available for prioritisation and decision-making to initiate disinvestment projects in a local health service? What methods are available to develop, implement and evaluate disinvestment projects in a local health service? What were the processes and outcomes of application of these methods at Monash Health? What factors influenced the decisions, processes and outcomes? 	 Framework for evaluation and explication of a disinvestment project Examples of criteria for selection of disinvestment projects Methods for developing an evidence-based catalogue of potential disinvestment opportunities Algorithm for selecting a disinvestment project from an evidence-based catalogue of potential disinvestment opportunities Summary of barriers and enablers to implementation and evaluation Summary of factors related to determinants of effectiveness arising in SHARE process and disinvestment projects
SHARE 7: Supporting staff in evidence-based decision-making, implementation	ion and evaluation in a local healthcare setting
 What is current practice in accessing and using evidence for making, implementing and evaluating decisions at Monash Health? What decisions were made and outcomes achieved in the piloting of support services? What factors influenced the decisions, processes and outcomes? 	 Matrix of barriers, enablers, additional needs and evidence-based interventions mapped to their corresponding components in four support services to enable evidence-based decision-making, implementation and evaluation Summary of factors influencing decision-making for development of support services Summary of factors influencing the outcomes of the SHARE support services piloting process Summaries of current practice, knowledge, skills, confidence and needs in finding, accessing and using evidence for making, implementing and evaluating decisions; and preferred formats for education and training Summaries of nature, type and availability of local health service data; data sources; uses and expertise available Evaluation framework and plan

Table 3	Outputs of	the SHARE Program	(Reproduced w	/ith permission fi	rom SHARE Paper 1	[44]) (Continued)
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Research questions	Outputs
SHARE 8: Developing, implementing and evaluating an Evidence Dissemi	nation Service in a local healthcare setting
 What are the potential features of an Evidence Dissemination Service in a local healthcare setting? How can high quality synthesised evidence be identified, captured, classified, stored, repackaged and disseminated? How can disseminated evidence be used to enhance current practice and how can use of evidence be reported? What are the processes and outcomes of disseminating evidence to self-selected and targeted participants in a voluntary framework? What are the processes and outcomes of disseminating evidence to designated decision-makers in a mandatory governance framework? What factors influenced the decisions, processes and outcomes? 	 Two models for an Evidence Dissemination Service (EDS) in a local healthcare service Methods for identification, capture, classification, storage, repackaging and dissemination of evidence Methods to facilitate use of disseminated evidence and reporting of outcomes Taxonomy for categorising publications Framework for evaluation and explication of implementation of health information products and services Summaries of factors influencing decisions, processes and outcomes in development and delivery of the EDS
SHARE 9: Conceptualising disinvestment in a local healthcare setting	
 Aims: To discuss the current literature on disinvestment from a conceptual perspective, consider the implications for local healthcare settings and propose a new definition and two potential approaches to disinvestment in this context to stimulate further research and discussion. 	 Discussion of the disinvestment literature in relation to terminology and concepts, motivation and purpose, relationships with other health improvement paradigms, challenges, and implications for policy, practice and research in local healthcare settings
SHARE 10: Operationalising disinvestment in a conceptual framework for	resource allocation
 Aims: To discuss the current literature on disinvestment from an operational perspective, combine it with the experiences of the SHARE Program, and propose a framework for disinvestment in the context of resource allocation in the local healthcare setting. 	 Discussion of the disinvestment literature from an operational perspective in local healthcare settings Summary of theories, frameworks and models used in disinvestment-related activities Framework for evidence-based disinvestment in the context of resource allocation Standardised definitions and concepts to underpin framework Principles for resource allocation decision-making Potential activities and settings for disinvestment Potential prompts and triggers to initiate disinvestment decisions Methods and tools for disinvestment Barriers to disinvestment
SHARE 11: Reporting outcomes of an evidence-driven approach to disinv	estment in a local healthcare setting
 Aims: To consolidate the findings, discuss the contribution of the SHARE Program to the knowledge and understanding of disinvestment in the local healthcare setting, and consider the implications for policy, practice and research. 	 Summary of outcomes of the SHARE Program Key messages Implications for research, policy and practice
SHARE National Workshop	
 Aim: To share knowledge of disinvestment and develop links for future collaborative work opportunities 	 Summary of disinvestment activities from health policy, health economics and health service perspectives Tools for group activities discussing disinvestment concepts and decision-making Tools for individual activities to capture information about current practice and research in disinvestment Workshop presentations Workshop evaluation tool and findings Summary of key messages

from other research disciplines which are relevant for disinvestment projects [30]. However there is a lack of proactive mechanisms, prompts and triggers to drive disinvestment initiatives [11, 13, 21, 27, 29, 82, 104]. High quality synthesised evidence is available in systematic reviews, HTAs and evidence-based guidelines and there are rigorous methods for analysis of routinely-collected health service data [23]; but no systematic proactive methods to access existing information, initiate the processes or draw the results to the attention of health service decisionmakers were identified [30]. It is also not clear who is, or should be, responsible for instigating and making decisions and taking action [23].

The SHARE model for exploring resource allocation in the local setting [26], algorithm for identifying suitable projects from a database of disinvestment opportunities [27], and methods for proactively delivering research evidence and local data to decision-makers [28, 29] could be used to inform future work and address the recognised gaps in these areas.

Adapting, testing and refining SHARE innovations

Many of the SHARE findings are the first of their kind and therefore require confirmation or refutation in subsequent studies. The new framework for resource allocation provides a basis on which to build a systematic approach to further investigation of disinvestment processes [30].

Although some of the original aims of the SHARE Program were not achieved, the barriers were largely due to unique local circumstances at the time of implementation. Since the planned interventions were all based on evidence from rigorous reviews of published literature and extensive local research, and most of the barriers were local and project-specific, these initiatives still hold promise as systematic ways to reduce practices that are harmful, of little benefit or where there are more effective or cost-effective alternatives in the local setting. In other situations, or with other methods of investigation and implementation, they may prove to be effective tools. In contrast, some of the unplanned activities undertaken in the SHARE Program highlight approaches that should probably be avoided in development of future interventions. The evaluation and explication processes have identified the positive and negative influencing factors for each of the SHARE innovations. These details could inform future replication, adaptation, testing and refinement in a range of policy, practice and research contexts.

The frameworks and models can be tested in clinical, management or policy contexts at the local level; for disinvestment, resource allocation or other decisionmaking processes. They are each based on multiple components and the relationships between them. A range of hypotheses could be developed for the components and their relationships which could be tested in a number of ways using various methodologies.

Conclusion

The SHARE papers provide practical information from actual experiences in a local health service to inform others in similar situations and the case study format provides a level of detail not generally reported. Although some of the objectives were not achieved, SHARE was successful in assessing acceptability and feasibility of multiple innovations related to disinvestment in the local health service setting and identifying factors influencing implementation and evaluation. The findings of these investigations provide a rich source of new information about decision-making in a local health service; methods to avoid in attempting disinvestment in this context; and settings, frameworks, models, methods and tools that have potential to enhance health care and warrant further exploration.

Additional file

Additional file 1: Summary of findings. (PDF 3336 kb)

Abbreviations

CCE: Centre for Clinical Effectiveness; EBDM: Evidence-based decision-making; EBP: Evidence-based practice; EDS: Evidence Dissemination Service; EOI: Expression of Interest; SHARE: Sustainability in Health care by Allocating Resources Effectively; TCPs: Technologies and clinical practices

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Availability of data and materials

Many of the datasets supporting the conclusions of the articles in the SHARE series are included within the articles and/or the accompanying additional files. Some datasets provide information for more than one article and are only provided once; where they are not included within an article and/or the accompanying additional file, the relevant citations to the articles in which they are provided are included. Datasets have not been made available where it is impossible to de-identify individuals due to the nature of survey or interview responses or where the data is published in confidential internal reports.

Authors' contributions

CH, KA, WR and RK contributed to project design and delivery, decision-making and direction throughout the SHARE Program. CH and SG developed the frameworks, models and other products arising from analysis and synthesis of SHARE findings. CH drafted the initial manuscript. KA, WR, RK and SG provided feedback. All authors read and approved the final manuscript.

Authors' information

CH was the Director of the Centre for Clinical Effectiveness and the SHARE Program Director. CH completed the SHARE publications as part of an unfunded PhD. KA was the SHARE Project Manager. WR was Executive Director of Medical Services and Chair of SHARE Steering Committee. RK is Director of Medicine Program, member of the SHARE Steering Committee, Chair of Technology/Clinical Practice Committee and co-supervisor of CH's PhD. SG is Professorial Fellow, School of Public Health and Preventive Medicine, Monash University and co-supervisor of CH's PhD.

Ethics approval and consent to participate

The Monash Health Human Research and Ethics Committee (HREC) approved the SHARE Program as a Quality Assurance activity. Further ethical review was not required as the program met the following criteria [105]:

- "The data being collected and analysed is coincidental to standard operating procedures with standard equipment and/or protocols;
- The data is being collected and analysed expressly for the purpose of maintaining standards or identifying areas for improvement in the environment from which the data was obtained;
- The data being collected and analysed is not linked to individuals; and
- None of the triggers for consideration of ethical review are present." [105]

Participation was based on the 'opt-out approach' [105]. "The opt-out approach is a method used in the recruitment of participants into an activity where information is provided to the potential participant regarding the activity and their involvement and where their participation is presumed unless they take action to decline to participate." [105] Consent to participate was approved by the HREC based on the following criteria:

- Health care providers, managers, consumer representatives, and officers within government health departments will be informed about the project and the processes and invited to participate.
- Participation in interviews, workshops and/or surveys will be considered to be implied consent.

These conditions were met.

Competing interests

The authors declare that they have no competing interests.

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Author details

¹School of Public Health and Preventive Medicine, Monash University, Melbourne, VIC, Australia. ²Centre for Clinical Effectiveness, Monash Health, Melbourne, VIC, Australia. ³Medical Services and Quality, Monash Health, Melbourne, VIC, Australia. ⁴Medicine Program, Monash Health, Melbourne, VIC, Australia.

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"In addition to the use of theory and evidence from systematic reviews, pilot and feasibility studies are an essential step in the development and testing of an intervention, prior to a large-scale evaluation."

Craig et al 2008 [50]

The SHARE papers provide practical information from actual experiences in a local healthcare setting and the case study format provides considerable detail to allow replication or adaptation.

The first two phases of the UK MRC framework for design and evaluation of complex interventions were achieved.

Specifying the context, understanding the problem and defining the components of an optimal intervention were accomplished in SHARE Phase One. This resulted in a model for exploration of an organisation-wide, systematic, integrated, evidence-based program for disinvestment in a local healthcare setting.

Assessing acceptability and feasibility of the components of the intervention and identifying methodological issues for implementation and evaluation were undertaken in SHARE Phase Two. The Evidence Dissemination, Capacity Building and Project Support Services achieved their aims but were not continued beyond the SHARE Program. The Data Service and some proposed changes to other organisational systems and processes were not achieved, mainly due to local factors. All of these initiatives were based on evidence from the literature and extensive local research and still hold promise as methods to enhance evidence-based practice in disinvestment and resource allocation.

Findings from the SHARE investigations can be used to retest and refine these innovations and inform the subsequent phases of the UK MRC framework leading to future definitive trials and implementation of long term interventions.

"Disinvestment is a particularly local affair."

Pearson and Littlejohns 2007 [51]

For me, the most significant message arising from this investigation into disinvestment in the local healthcare setting relates to the notion of disinvestment itself.

There is little evidence of successful 'disinvestment initiatives' at the local level. However hospitals and other health facilities have always redirected resources to achieve better outcomes and successfully removed, reduced or restricted use of technologies, clinical practices, programs and services for a variety of reasons. But these changes were not called disinvestment. This suggests that the recent construct of 'disinvestment' may be problematic in the local healthcare setting.

There is lack of agreement, not only on a definition for disinvestment, but also on the concepts that underpin the multiple definitions in current use. The term 'disinvestment' is known to have negative connotations and there are discrepancies in use of the term between academics and health service staff. Methods to identify, develop, implement and evaluate disinvestment initiatives already exist in familiar health service improvement paradigms such as evidence-based health care, quality improvement and system redesign, and research areas including health technology assessment, health economics, knowledge translation and implementation science.

My advice to local health service decision-makers would be to avoid the term 'disinvestment' and not seek 'to disinvest'. Aiming to reduce harm, improve health outcomes, decrease waste, meet changing needs and address local priorities is likely to be more successful.

The opportunities to improve on historical practice lie in proactively seeking evidence of harm, lack of effectiveness or lack of cost-effectiveness and rigorous decision-making, implementation and evaluation informed by evidence from research and local data, local knowledge and expertise, and consumer values and perspectives.

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Appendix 1. Collation of data collection aims, methods and sources

AIMS	SOURCES/PARTICIPANTS	
LITERATURE REVIEWS		
To understand the concepts related to disinvestment and their implications in a local health service and to ascertain examples of existing decision-making systems and processes in this setting (SHARE 1)	Medical databases (Ovid Medline, All EBM Reviews, EMBASE, Cochrane Library), the internet (via the Google search engine) and guideline websites. These methods were supplemented by follow up of reference lists in key publications and searches for publications by identified authors in the field	
To find evidence-based strategies that are effective in engaging consumers for health service organisation-wide decision-making processes. To find tools that can enable the implementation of these consumer engagement strategies. To find examples from other health services that employ evidence-based consumer engagement for organisation-wide decision-making processes (SHARE 4)	A two-step systematic review protocol was used. 1) To identify existing synthesised evidence and appraise it for quality and applicability. 2) If no suitable publications were identified then a search of the primary research literature would follow. Relevant high-quality synthesised evidence for consumer engagement was identified in the first step, hence no further searches were undertaken. All EBM (including Cochrane Database of Systematic Reviews, DARE, CENTRAL, and ACP Journal Club), Medline(R) 1950 to present with daily updates and Medline(R) in-process and other non-indexed citations, CINAHL, and EMBASE. Additional searches were undertaken in Guidelines websites (n=8), Databases and search engines (n=4), Government and consumer health organisation websites (n=7). Checking of reference lists of articles, reports and links on websites was also undertaken.	
To identify examples of economic approaches to priority setting relevant to resource allocation for TCPs, decision-making criteria, and challenges of priority setting for disinvestment (SHARE 6)	Medical databases (Ovid Medline, Cochrane Library, Cinahl), the internet (via the Google search engine), and prospective searches of identified review articles (in the Web of Science online search engine). These methods were supplemented by snowball searching for additional relevant articles from reference lists.	
To investigate system redesign examples and their applicability to resource allocation decision-making for TCPs at Monash Health (SHARE 6)	Medical databases (Ovid Medline, EMBASE, CINAHL, Cochrane Library), the internet (via the Google search engine) and specific websites including the UK National Health Service, the UK National Institute for Health and Clinical Excellence (NICE) and the US Institute for Healthcare Improvement (IHI). Key references, authors, organisations and reports highlighted in the literature were also investigated.	
To identify existing frameworks and tools for prioritisation relevant to resource allocation for TCPs (SHARE 6)	Medical databases (Ovid Medline, Cochrane Library) and the internet (via the Google search engine).	
To identify the information needs of decision-makers in local healthcare services to facilitate development of support services for evidence-based decision-making, implementation and evaluation (SHARE 7&8)	Medline, CINAHL, EMBASE, LISA, LISTA and Google	
To consider the current literature on disinvestment from the perspective of the local healthcare setting (SHARE 7&8)	The initial search was conducted in medical databases (Ovid Medline, Ovid EMBASE, All EBM Reviews, and The Cochrane Library) and the internet (via the Google search engine). Repeat searches were conducted in PubMed, The Cochrane Library and the internet via Google.	

INTERVIEWS		
To identify opportunities for disinvestment in existing or potential decision-making settings and consider implications for disinvestment at Monash Health (SHARE 2)	Pragmatic sample (initiators of the SHARE Program): Executive of the Technology/Clinical Practice Committee (TCPC) included Executive Director, Medical Director, Clinical Program Director and Research Director	4 senior managers
To test preliminary thoughts regarding direction of the SHARE Program with front line staff and consumers (SHARE 2)	Six participants selected purposefully and pragmatically to seek the views of a range of Monash Health decision-makers: the five senior clinicians were program directors and department heads representing medicine, surgery, nursing, allied health and diagnostic services and the consumer representative had experience on committees that made organisation-wide decisions	5 senior clinicians 1 consumer representative
To identify and document current processes for making, implementing and evaluating decisions and the factors that influence them; to ascertain current practice in consumer involvement in organisational decision-making and implementation and evaluation of change; to identify decision-makers ongoing and intermittent needs from local data (SHARE 3&6)	Purposive, convenience and snowball sampling methods were used, alone or in combination, to identify staff and consumers authorised to make decisions regarding resource allocation for health technologies and clinical practices at organisation-wide level in group or individual settings. 1) Representatives of committees with mandate to make organisation-wide decisions; 2) Managers of Approved Purchasing Units (APUs); 3) Program Directors, Medical Department Heads, Nurse Unit Managers and a Quality Manager in a clinical program with high use of TCPs	13 committee representatives 5 APU managers 9 clinical managers
To learn from previous experiences of disinvestment at Monash Health (SHARE 3&6)	Purposive and snowball sampling was used. Relevant projects were initially identified by members of the SHARE Steering Committee and interviewees in the committee review process noted above. A snowballing method was employed by asking participating project representatives if they knew of any other relevant projects. Representatives of current or completed projects that involved disinvestment-related activities	10 project managers
To identify consumer-related activities within Monash Health (SHARE 4)	Director of Quality and Consumer Engagement Manager	2 senior managers
To clarify purchasing and procurement processes; discuss proposals for change and identify additional opportunities; and discuss feasibility of proposals considered, implementation and evaluation (SHARE 6)	Managers of Procurement, Clinical Purchasing and Health Technology Services	3 senior managers
To investigate system redesign examples and their applicability to resource allocation decision-making for TCPs at Monash Health (SHARE 6)	Experts in system redesign were initially identified by the Director of Quality; snowball sampling was used with respondents to identify others. Directors or senior managers in the areas of Strategic Planning; Access,	8 managers with expertise in system redesign

	Innovation and Service Improvement; Acute Ambulatory Services; Chronic Disease Management; Service Improvement, Quality and Projects, Mental Health; Diagnostic Imaging; General Medicine Model of Care Redesign; and Clinical Performance and Service Reconfiguration participated	
To document government and local decision-making requirements for purchase of new and replacement of existing capital equipment and identify current practice at Monash Health (SHARE 6)	Director of Business Support Services and Manager of Health Technology Services	2 senior managers
To identify opportunities and methods for accessing and using data to drive disinvestment decision- making (SHARE 7)	Director of Clinical Information Management	1 senior manager
To discuss use of local data in quality initiatives (SHARE 7)	Director of Quality	1 senior manager
To identify current sources of data at Monash Health and the processes involved (SHARE 7)	Purposive sampling was used to identify departments involved in collection, storage and use of data. Departments were identified by the Head of Clinical Information Management and a concept paper on knowledge transfer at Monash Health. Snowball sample was used with respondents to identify others. Departments invited included Clinical Information Management, Health Information Systems, Pharmacy, Pathology, Diagnostic Imaging, Research Directorate, Infection Control, Infectious Diseases and the Clinical Audit and Clinical Risk groups within the Quality Unit	10 managers of departments that collected local data
SURVEYS		
To ascertain unpublished experiences or examples of models or methods for disinvestment in the local healthcare setting (SHARE 2)	1) Disinvestment researchers initially identified from publications and websites about disinvestment and subsequently using a snowballing technique based on feedback from respondents. 2) Subscribers to the Health Technology Assessment (HTA) email list	11 researchers 4 librarians
To identify the information needs of decision-makers at Monash Health to facilitate development of support services and gather baseline data for evaluation purposes (SHARE 7&8)	Staff who made decisions regarding resource allocation for technologies and clinical practices were invited to participate through the Monash Health 'All Managers' and 'Senior Medical Staff' email lists. Members of these lists were asked to forward the survey to others who made decisions about resource allocation but might not be on the list. Clinicians and senior managers representing all sites, clinical programs and professional groups (nursing 28%, allied health 25%, medical 24% and other including pharmacy, diagnostic services, corporate and clinical	141 respondents, 103 surveys fully completed

	program management, and administration 23%)	
To identify pharmacists and members of pharmacy-related committees who make, implement and/or evaluate decisions regarding pharmaceuticals and related equipment; identify those who would like to receive training in evidence-based practice change; and ascertain their preferred formats for training (SHARE 7&8)	Pharmacy staff and members of pharmacy- related committees (Therapeutics, Medication Safety and Adverse Drug Reaction Committees; High Cost Drugs Working Party). 60 staff members responded to the survey for a response rate of 34% (60/177). A broad range of pharmacist's roles (including management, clinical and technical responsibilities) and all committees were represented.	60 staff members from Pharmacy and pharmacy- related committees
To evaluate the activities of the Capacity Building Program (SHARE 7)	Participants in training and support activities completed questionnaires based on the RE- AIM framework ¹ and the UCSF-Fresno Medical Education Tool ² . Four workshops were delivered: Evidence Based Practice (n=11 participants), Evidence-Based Change (n=11), Introduction to Implementation (n=8), and Introduction to Evaluation (n=9).	39 workshop attendances (some attended more than one workshop)
To ascertain how participants enrolling in an Evidence Dissemination Service (EDS) currently use evidence in decision-making (SHARE 7&8)	Staff members enrolling to participate in an Evidence Dissemination Service. 46 staff members enrolled to participate in EDS during the survey period. Respondents represented all clinical groups and all health service programs and sites	46 staff members
WORKSHOPS		
Workshop 1: To identify the need for change (opportunities for disinvestment in existing or potential decision-making settings) Workshop 2: To develop a proposal for change (SHARE 2,3,5&6)	Convenience sampling was used to include members of the SHARE Steering Committee comprising Executive Directors (Medical, Nursing, Support Services), Program Directors (Medical, Nursing, Allied Health, Pharmacy, Diagnostic Services), Committee chairs (Technology/Clinical Practice, Therapeutics, Human Research and Ethics, Clinical Ethics), Managers (Information Services, Clinical Information Services, Procurement, Biomedical Engineering, Research Services), Legal counsel and two Consumer representatives. Two representatives from the Department of Human Services Technology Division also participated	13 participants 9 (1 st workshop) 11 (2 nd workshop) Non-attenders also completed the worksheets

¹ Glasgow RE, Klesges LM, Dzewaltowski DA, Estabrooks PA, Vogt TM. Evaluating the impact of health promotion programs: using the RE-AIM framework to form summary measures for decision making involving complex issues. Health education research. 2006;21(5):688-94. doi:10.1093/her/cyl081.

² Ramos KD, Schafer S, Tracz SM. Validation of the Fresno test of competence in evidence based medicine. BMJ. 2003;326(7384):319-21.

To explore, develop and authorise all program elements, frameworks and plans, documents and proposals (SHARE 2–8)	SHARE Steering Committee (as noted above): Executive Directors, Senior Managers, Clinical Program Directors, Consumers	20 committee members (multiple workshops)
To capture the actual process of capital equipment purchasing and identify how an ideal process for this decision-making might differ from current practice (SHARE 3&6)	Purposive sampling was used to identify clinical managers involved in decisions regarding purchase of new or replacement equipment. A large multi-campus diagnostic service was selected based on their use of equipment and the interest in the project expressed by the Director.	18 departmental decision- makers
To identify potential opportunities and methods for consumer participation and sources of consumer information (SHARE 4)	Convenience sampling was used to identify consumer representatives with experience in organisation-wide decision-making related to resource allocation. Three consumer representatives – two were members of the committee overseeing introduction of new TCPs, one was a member of the committee for development of policies and procedures	3 consumer representatives at 2 workshops
To identify current consumer engagement activities, barriers and enablers to effective participation in these situations and the needs of consumers in order to contribute effectively; to identify sources of consumer information and data and how these sources can be used to drive decision-making; and to seek feedback on a draft model for consumer engagement in generic health service decision-making (SHARE 4)	The Community Advisory Committee is a legislated advisory body to the health service Board providing consumer, carer and community perspectives. This group provides a consultation service to health service staff engaging in consumer-related activities.	6 community representatives (members of the Community Advisory Committee)
To incorporate feedback from Monash Health leaders (SHARE 8)	Presentations and discussions with individuals and groups Individuals: All Medical Program Directors and General Manager of Allied Health Groups: Nursing Executive	6 Program Directors 8 members of Nursing Executive
To seek endorsement and support at the highest levels (SHARE 5–8)	Presentations and discussions with Executive Management Team (EMT) and Monash Health Board	9 members of EMT 9 Board members
DOCUMENT ANALYSIS		
To provide evidence for the stated positions and methods of administration of decision-making systems and processes for resource allocation at Monash Health and the state health department (SHARE 3)	Documents that guided decision-making or implementation of resource allocation decisions were identified. 1) State government: Victorian Government Purchasing Guidelines, Medical Equipment Asset Management Framework, Targeted Equipment Replacement Program and Health Purchasing Victoria Product Management Guidelines. 2) Monash Health: Purchasing Policy, Purchasing Policy Guidelines, Authority Delegation Schedule, Code of Conduct, Conflict of Interest Protocol, Guidelines for management of Gifts and Benefits, Terms of Reference for committees that make resource allocation decisions, Application forms, Business case template Requisition forms and checklists.	

To determine which factors influenced the decisions, processes and outcomes (SHARE 6–8)	Documents that recorded decisions, processes and outcomes were identified. 1) Minutes of the SHARE Steering Committee meetings. 2) Documents that recorded the action research process and project team reflections including minutes, reports, spreadsheets and templates developed for this purpose
CONSULTATION	
To incorporate high level expertise	Health Program Evaluator and Health Economist
To determine communication issues and requirements	Monash Health Public Affairs and Communication Department
To enhance compatibility and alignment with state health department objectives and funding strategies	Victorian Department of Human Services Health Technology Unit

Appendix 2a. Paper 3 Additional file: Methods

The SHARE Program (Sustainability in Health care by Allocating Resources Effectively) 3: Examining how resource allocation decisions are made, implemented and evaluated in a local healthcare setting

Additional File 1

Methods

Contents

Table A. Data collection, analysis and response rates	2
Table B. Interview questions for committee decision-making mapped to scanning taxonomy	5
Table C. Interview questions for previous disinvestment projects mapped to scanning taxonomy	6
Table D. SHARE Steering Committee Workshop Proformas	7
Abbreviations	8
References	8

Table A. Data collection, analysis and response rates

STRUCTURED INTERVIEWS

Staff authorised to make decisions on behalf of the organisation

Aim: To identify and document current processes for making, implementing and evaluating decisions and the factors that influence them.

Inclusion criteria: Staff and consumers authorised to make decisions regarding resource allocation for health technologies and clinical practices at organisation-wide level in group or individual settings.

Sampling: Purposive and snowball sampling was used.

- Twenty-two committees were initially identified from a governance structure diagram. A further 20 were identified through a snowballing method by asking participants in the subsequent interview process, senior managers and Quality Unit staff if they were aware of others. Fourteen of the 42 potential committees met the inclusion criteria (Capital Expenditure, Falls Prevention, Information Systems Governance, Joint Program Quality and Safety, Medication Safety, Operating Suite Product Evaluation, Nurse Standardisation of Practice, Resuscitation, Skin Integrity and Pressure Ulcer, Sterilising Services, Technology and Clinical Practice, Therapeutics and Transfusion Committees and the Executive Management Team).
- Approved Purchasing Units (APUs) have delegated authority from the Board to commit the organisation to a legal and/or financial obligation such as issuing a purchase order or signing a contract. Of the
 nine APUs, two had been included in the group decision-making committees (Capital Expenditure Committee and Executive Management Team) and five others met the inclusion criteria (Pharmacy, Health
 Technology Services, Equipment Services, Procurement and Clinical Purchasing, and Materials Management).
- Clinical managers from one clinical program selected for its high use of health technologies were identified from the program's intranet page. Individuals were selected purposively to represent all levels
 within the program's decision-making hierarchy; medical and surgical sub-specialties, nursing and quality management; and a range of campuses.

Approach: Personalised email invitations from the project team were sent to the Chair, Executive Sponsor and/or Secretary of 14 committees, managers of 5 APUs and 9 managers from the selected clinical program. Approval from the Nursing and Medical Program Directors was sought before approaching individuals from the selected program.

Interview schedule: Questions were based on the scanning taxonomy (Figure 2). They were piloted with one committee and refined before being used in subsequent interviews. The full interview schedule is available in Table B.

Data collection: Interviews were approximately 1 hour long and were conducted in the interviewee's office or suitable meeting room. Interviews were not taped or transcribed but detailed notes were taken. Two CCE staff members attended, one as interviewer and one as note taker.

Respondent validation: Drafts were sent to the interviewees for clarification, comment and/or amendment as required.

Analysis: Final interview notes were collated and organised in MS Word and Excel using the elements of the scanning taxonomy. Emergent themes were identified by framework analysis.

Response rate: Representatives of 13 of the 14 committees, all 5 APU managers and 9 clinical managers participated. One committee Chair did not respond to the invitation for interview; due to lack of time no representative of this committee was interviewed. A surgical sub-specialty department head was unable to attend their interview and was replaced by a medical sub-specialty department head who was available at short notice.

Representativeness of sample: Almost all eligible committees and all eligible APUs were represented. The clinical managers represented Program Directors, Department Heads, Unit/Ward Managers and ancillary services; medical (n=4), nursing (n=4) and quality management (n=1) staff; in a range of sub-specialties across multiple campuses.

Staff members with experience in disinvestment projects

Aim: To learn from previous experiences of disinvestment at Monash Health.

Inclusion criteria: Staff who had undertaken projects to remove, reduce or restrict current practices (the term 'disinvestment' was not used in Monash Health projects).

Sampling: Purposive and snowball sampling was used. Relevant projects were initially identified by members of the SHARE Steering Committee and interviewees in the committee review process noted above. A snowballing method was employed by asking participating project representatives if they knew of any other relevant projects. Nineteen potential projects were identified, 13 met the inclusion criteria.

Approach: Personalised email invitations from the project team were sent to project managers of 13 relevant projects. Project managers or Department/Unit Heads were sought as key contacts; however a representative of the project team was accepted when a senior staff member was unavailable.

Interview schedule: Questions were designed to explore project governance, use of routinely-collected hospital data, other local data and research evidence in the development and implementation of projects; barriers and enablers to successful project implementation; what staff would do again and what they would do differently. The full interview schedule is available in Table C.

Data collection: Interviews were approximately 1 hour long and were conducted in the interviewee's office or suitable meeting room. Interviews were not taped or transcribed but detailed notes were taken.

Two CCE staff members attended, one as interviewer and one as note taker.

Respondent validation: Drafts were sent to the interviewees for clarification, comment and/or amendment as required.

Analysis: Final interview notes were collated and organised in MS Word and Excel using the elements of the scanning taxonomy. Emergent themes were identified by framework analysis.

Response rate: Representatives of 10 projects participated based on interviewee's and interviewer's availability

Representativeness of sample: The process was designed to be illustrative and did not seek to comprehensively identify all projects. A number of project topics across a range of clinical areas were included.

STRUCTURED WORKSHOPS

SHARE Steering Committee

Aim: The workshops had several aims, those relevant to the research questions in this paper include: To draw on the knowledge and expertise of senior staff to identify systems, processes and people relevant to resource allocation decision-making at Monash Health; to analyse and interpret the findings from these sources; and to make recommendations based on the outcomes.

Inclusion criteria: Senior decision-makers at Executive and Director level and health service consumers

Sampling: Convenience sampling was used to include members of the SHARE Steering Committee comprising Executive Directors (Medical, Nursing, Support Services), clinical Program Directors (Medical, Nursing, Allied Health, Pharmacy, Diagnostic Services), Committee chairs (Technology/Clinical Practice, Therapeutics, Human Research and Ethics, Clinical Ethics), Directors of non-clinical services (Information Services, Clinical Information Services, Procurement, Biomedical Engineering, Research Services), Legal counsel and two consumer representatives. Two representatives from the Department of Human Services Technology Division also participated.

Approach: Workshops were conducted at scheduled Steering Committee meetings.

Design: Workshops were based on the first two steps in the SEAchange model for evidence-based change [1]; identifying the need for change and developing a proposal for change. Presentations outlining the background and aims of the workshops were made by the project team, discussion was structured around the questions to be addressed and decisions were based on consensus. Questions included:

Workshop 1: Where and how are decisions made, documented, communicated, implemented and evaluated and what are the related system issues? Where is change required? Why? What is the problem? How can the need for change be measured? What are the factors enabling sustainability of the current system? How is it integrated?

Workshop 2: What existing systems/processes work well that we could maintain as they are, should be ceased, could be kept but require improvement? What new systems/processes should be introduced? What structures, skills, resources, commitment and leadership are required? Are they available? If not, how can they be obtained? What existing systems can be utilised? What is the solution to the problem? What are the options? What is known about best practice in this area? What is required to ensure sustainability of the proposed system? How can it be integrated?

Data collection: Participants completed prepared worksheets and discussed the findings. Discussion and decisions were documented in minutes.

Respondent validation: Minutes were approved at the following meeting.

Analysis: Data from the worksheets and findings from the discussion were collated and organised in MS Word and Excel. Emergent themes were identified by framework analysis.

Response rate: Thirteen members participated, 9 attended the first workshop, 11 attended the second, and some non-attenders also completed the worksheets.

Representativeness of sample: A range of senior decision-makers were represented at each workshop, plus representatives from the state health department.

Clinical decision-makers from a large diagnostic service

Aim: To capture the actual process of capital equipment purchasing and identify how an ideal process for this decision-making might differ from current practice.

Inclusion criteria: Clinical managers involved in decisions regarding purchase or new or replacement equipment.

Sampling: Purposive sampling was used. A large multi-campus diagnostic service was selected based on their use of equipment and the interest in the project expressed by the Director.

Approach: The Director and Research Director of the department identified 18 suitable participants representing all health professional groups, all campuses and most units within the service. Personalised email invitations were sent by the Executive Director of Medical Services and Quality.

Design: An experienced facilitator from CCE who had no involvement in the SHARE project developed and delivered the workshop. A presentation on the background of the project and its relevance to the workshop was made by a SHARE project team member. Two other project team members were present to assist with logistics and note taking. The session was run over 1½ hours in the departmental seminar room. Five domains were identified a priori: how do we get an idea; what is the process (application, approval, feedback, who, timing); is it a good idea; is it the best idea; and monitoring and evaluation.

Data collection: Using a nominal group technique, participants were asked to describe the ideal process for purchasing large capital equipment. Responses were collected on 'sticky-notes'. This method was

repeated to identify gaps in the current process and included prioritisation of key areas for improvement.

Respondent validation: A workshop report was provided to participants for comment.

Analysis: Responses on the 'sticky notes' and additional workshop notes were collated and organised in MS Word and Excel using the domains identified a priori. Emergent themes were identified by framework analysis.

Response rate: 17 of the 18 invitees attended. An additional staff member from a clinical area not represented on the invitation list was included at the commencement of the workshop.

Representativeness of sample: Participants represented all campuses, sub-specialties and health professionals (medicine, nursing, allied health, technical, quality improvement, business management, research) within the department.

DOCUMENT ANALYSIS

Aim: To provide evidence for the stated positions and methods of administration of decision-making systems and processes for resource allocation at Monash Health and the state health department.

Inclusion criteria: Documents that guided decision-making or implementation of resource allocation decisions

Identification: Documents were identified by key informants and searches within the Monash Health Policy and Procedure database.

Documents included: 1) State government: Victorian Government Purchasing Guidelines, Medical Equipment Asset Management Framework, Targeted Equipment Replacement Program and Health Purchasing Victoria Product Management Guidelines. 2) Monash Health: Purchasing Policy, Purchasing Policy Guidelines, Authority Delegation Schedule, Code of Conduct, Conflict of Interest Protocol, Guidelines for management of Gifts and Benefits, Terms of Reference for committees that make resource allocation decisions, Application forms, Business case templates, Requisition forms and checklists.

Data collection: Documents were retrieved or sourced online. Data were extracted based on the scanning taxonomy.

Analysis: Findings were collated and organised in MS Word and Excel using the elements of the scanning taxonomy.

Table B. Interview questions for committee decision-making mapped to scanning taxonomy

Characteristics of the external environment (Monash Health) and organisation (Committee)

- What is the role of this committee?
- In what ways do your decisions impact on TCPs?
- Does the committee approve capital expenditure or procurement? And if so, what is the committee's definition of capital?
- Does the committee have a role in developing or approving guidelines or protocols?
- Do any other committees report to this committee?
- Does the committee interact with or refer decisions/applications to other committees?
- Who sits on the committee eg units, departments, professional groups, consumer representation?
- Do committee members have any specific training to sit on this committee? Do you think they require any specific training?
- Are meetings regularly scheduled?
- Is your ability to make decisions affected by attendance?

Characteristics of the potential adopters

Who would be affected by your decisions?

Characteristics of the innovation (Decision)

- How do issues make the committee's agenda eg application process, referral?
- Does the committee have a conflict of interest procedure for members? For applicants? What is it?
- Are there templates or pro-formas available for applications? Are these easily accessible?
- How are decisions made?
- Are there established, documented criteria for making a decision? If so, are they used?
- Do applicants have to provide evidence for any proposed change? How does the committee judge the quality of the evidence?
- Does the committee use routinely-collected local data eg number of procedures, cost, etc for decision making? Does the committee use data for benchmarking eg department versus department or Monash Health versus other health service?
- What other information or data is considered eg access, equity, legal, financial, etc?
- Does the committee use any priority setting processes in making decisions eg Monash Health strategic plan or DHS initiatives or priorities?
- How are your decisions disseminated? Are minutes or other documents eg decision summaries accessible to non-committee members?
- Is there a process of appeal in dispute of decisions?

Characteristics of the implementation strategy, barriers and enablers

- If a decision is made that changes practice who is responsible for implementing that decision?
- Are support and resources available for implementing decisions?
- Does the committee or Monash Health provide any funding for implementation of major changes?
- Are there any specific barriers or enablers to the committee's work?
- If you have an application process do you think people bypass the system, either deliberately or through lack of knowledge?

Process – degree of implementation

- How do you know if your decisions are being acted upon/followed?
- Is there any evaluation of the committee processes eg user feedback on application forms or resources? Do you have KPIs?

Impact – degree of practice change

- How do you know if your decisions have affected practice?
- How do you monitor and/or evaluate? Do you have KPIs?

Patient outcomes

- Do you collect/measure data about patient outcomes?
- What data are collected/measured and how? Do you collect data on costs to patients? Are existing databases/systems used?
- Who collects the data?

Practitioner outcomes

Are any outcome data collected from health professionals regarding practice change or satisfaction related to your decisions?

System outcomes

Can impact be traced to areas other than target areas?

Economic outcomes

- Do you measure any financial outcomes and if so, what?
- Does the committee have sufficient resources to perform its duties?

Reflections

- Is there anything else you want to tell us about your committee?
- Overall, how well do you think the system works?

Snowballing for other interviewees

- Does the committee receive or distribute any alerts from their own research or monitoring or from a third party, eg. TGA recall advice?
- (Other than this list....) Are you aware of any other committees or processes within MH that make decisions that impact on use of TCPs?
- Are you aware of any projects, past or present, within MH that address resource allocation related to new or existing TCPs?

Table C. Interview questions for previous disinvestment projects mapped to scanning taxonomy

Characteristics of the external environment and organisation Please briefly describe the project.

- Tell us a bit about the aims of the project.
- Who initiated the project? (eg Management? Consumer?)
- What are the reasons the project came about? (external influences/drivers related to the project)
 - Internal strategy or priority
 - Funding or resource reasons (internal and external)
 - Responding to patients factors or influences
 - External Policy. Has the project been implemented due to DHS or other government requirements?
- Where does the project fit within the Monash Health reporting structure?

Characteristics of the potential adopters

- Who was the target?
- Why was this group of clinicians/department/behaviour chosen?
- Was any specific training required for the target group?
- Did project staff require education/ training to implement the project?

Characteristics of the innovation

- What type of innovation was implemented? Note: Refer to EPOC definitions
 - Professional
 - Organisational
 - Patient orientated
 - Regulatory
 - Financial (eg funding reliant of results, incentive payment)
 - Structural (eg clinical path)
- Did the project involve the removal of an ineffective, inefficient or unsafe TCP?
- Was there reassessment or restriction of a TCP?
- Was there a reallocation of resources?
- Was your project linked to others that address effective resource allocation?
- Was the project identified through an existing process, such as regular audit, or was it identified independent of such processes (eg just someone's idea)?

Project learnings

- What would you do the same way in future projects? Why?
- What would you do differently? Why?

Other questions as per committee decision-making interview schedule

WORKSHOP ONE

Presentation and Discussion

Background

Step 1. Identify the need for change

Where is change required? Why? What is the problem? How can the need for change be measured? What are the factors enabling sustainability of the current system? How is it integrated?

Worksheet questions

Section 1: Consider decision-making for Capital Procurement and Clinical Purchasing (expenditure) and Guidelines and Protocols (allocation of non-monetary resources)						
Where are decisions made?	How are decisions made?	How are decisions documented?	How are decisions communicated/implemented?	How are decisions evaluated?	What are the relevant system issues?	Contact person/s
Eg Standing Committees	Are there explicit decision- making criteria? Is there explicit use of evidence (research literature or local data)? Is there a priority setting process? Is there an application process?	How are decisions documented? Are minutes accessible to non-committee members? (or something similar such as a decision summary or other documentation?)	How are decisions disseminated? Who is responsible for implementing that decision? Are support/resources available for implementing decisions?	How do you know if your decisions are being acted upon/followed? Is there any evaluation of the committee processes? Are any outcome data collected?	What structures, skills, resources, leadership and commitments are involved currently? What communication systems are in place? How well does this integrate with other MH processes?	People who could provide additional information

Section 2: System-wide or Specific (examples from Section 1 or other settings)

Decision-making setting	What works well?	What doesn't work well?	How can we improve it?	Where are the gaps?	What can we learn from current or previous work?	Contact person/s

WORKSHOP TWO

Presentation and Discussion

Findings from Workshop One

Step 2. Develop a proposal for change

What is the solution to the problem? What are the options? What is known about best practice in this area? What is required to ensure sustainability of the proposed system? How can it be integrated?

Worksheet questions

	System or process	Details/thoughts	What structures, skills, resources, commitment and leadership are required? Are they available? If not, how can they be obtained?	Contact person/s
			What existing systems can be utilised?	
What existing systems/processes work well that we could maintain as they are?				
What existing systems/processes should be ceased?				
What existing systems/processes could be kept but require improvement?				
What new systems/processes should be introduced?				

Abbreviations

APU Approved Purchasing Unit
CCE Centre for Clinical Effectiveness
DHS Department of Human Services
MH Monash Health
SHARE Sustainability in Health care by Allocating Resources Effectively
TCP Technology and clinical practice
TGA Therapeutic Goods Administration

References

1. Harris C, Turner T, Wilkinson F. SEAchange: Guide to a pragmatic evidence-based approach to Sustainable, Effective and Appropriate change in health services. 2015. Available from: <u>http://arrow.monash.edu.au/hdl/1959.1/1225377</u>. Accessed: October 2016

Appendix 2b. Paper 3 Additional file: Strengths and weaknesses, barriers and enablers

The SHARE Program (Sustainability in Health care by Allocating Resources Effectively) 3: Examining how resource allocation decisions are made, implemented and evaluated in a local healthcare setting

Additional File 2

Strengths and weaknesses, barriers and enablers for resource allocation processes

Contents

External environment	2
General	2
International	2
National	2
State	2
Monash Health environment: General	2
Monash Health environment: Governance	3
Oversight	3
Policies and procedures	3
Transparency and accountability	3
Conflict of interest	4
Monitoring, evaluation and improvement of systems and processes	4
Reporting	4
Monash Health environment: Administration	4
Relationships, coordination, collaboration and communication	4
Monash Health environment: Stakeholder engagement	4
Monash Health environment: Resources	5
Funding and staff time	5
Expertise and Training	5
Information	5
Decision-makers	6
Potential adopters	6
Decision-making process	6
Identification of need/application	6
Decision criteria	6
Ascertainment and use of evidence	6
Reminders and prompts to consider disinvestment	7
Deliberative process	7
Documentation and dissemination	7
Implementation	7
Purchasing	7
Policy and guidance	8
Implementers	8
Practice change	8
Evaluation of outcomes of decisions	9
General	9
Evaluators	9
Requirements for evaluation	9
Reinvestment	9

Strengths and weaknesses in decision-making for resource allocation

Factors identified in response to a specific question about barriers and enablers are noted in italics

STRENGTHS	WEAKNESSES
External environment	
General	
 Good relationships with external agencies such as Australian Council of Healthcare Standards, Victorian Department of Human Services (DHS) Projects initiated by external organisations such as Australian Quality Council, NSW Therapeutics Advisory Group and Clinical Excellence Commission 	
 Legislation, regulations, national and international standards, and professional standards must be followed. This provides clarity and certainty for some decisions. 	 Some decision-makers are unaware of mandatory requirements.
International	 Decision-makers are frequently unaware of these resources.
 International bodies and national agencies of other countries provide evidence-based recommendations for use of health technologies, clinical practices, models of care, etc. Systematic reviews and Health Technology Assessments are also available. 	 Due to lack of time, knowledge and skills decision-makers do not actively seek these resources when making decisions and do not differentiate between high and low quality resources. Cost-effectiveness data is often based on modelling which is perceived not to reflect reality
National	
 The Medical Services Advisory Committee and Pharmaceutical Benefits Advisory Committee provide evidence-based recommendations for use of medical and surgical procedures and drugs. 	Not all medical and surgical procedures and drugs are covered by these processes.Nursing and allied health practices, models of care and clinical consumables are not covered.
State	 DHS requirements and processes are cumbersome
 Guidance for introduction of new health technologies and clinical practices (TCPs) is provided by DHS. This includes reporting requirements. Monash Health has developed tools to implement these processes. DHS has recommended these tools to other health services. Monash Health Decision Summaries are published on the health service website. 	 There is no sharing of information or decisions. Individual health services duplicate the process of finding and appraising relevant evidence, developing business cases, etc. DHS declined to coordinate sharing of information through a central database or website.
 The Victorian Policy Advisory Committee on Technology (VPACT) has an annual funding round for introduction of new high cost TCPs 	 Respondents unaware of any long term state-wide strategic planning for equipment purchases Lack of coordination of equipment use and procurement at state level and no communication between health networks.
 Some guidance for purchasing is provided through the Victorian Government Purchasing Guidelines, Medical Equipment Asset Management Framework (MEAMF), Targeted Equipment Replacement Program (TERP) and Health Purchasing Victoria (HPV). HPV is responsible for bulk purchasing of pharmaceuticals, clinical equipment and consumables to streamline ordering and reduce costs. If the item required is in the HPV catalogue the specified brand must be purchased from the designated suppliers at the cost and conditions noted. The processes are transparent and accountability is clear. 	 HPV catalogue only covers 30% of Monash Health consumables Inclusion of items in the HPV catalogue is not always based on a rigorous evidence-based process Safer, more effective or more cost-effective alternatives may not be included in the catalogue HPV does not cover large items so MEAMF and TERP have no benefits from bulk purchasing and hospitals have to negotiate their own arrangements with suppliers Decision-makers do not know which of these multiple systems are relevant to a particular situation Terminology differs between systems and they are difficult to navigate
 The Victorian Aids and Equipment Program is administered by Monash Health on behalf of the DHS. The application process is standardised based on tight explicit criteria for transparency and accountability. 	 This is a 'last resort' process after other sources of funding have been exhausted. Clinicians waste valuable time writing funding applications for multiple programs which could be integrated and allocated centrally.
The Department of Treasury is interested in supporting disinvestment initiatives but requires details	 It is hard to measure the savings
of savings. If savings or reinvestments can be quantified the department may provide more funding.	 The savings are rarely realised because they are absorbed and used to treat more patients
Monash Health environment: General	
 Enthusiastic and dedicated staff Staff commitment to quality improvement 	• High staff turnover in the organisation, particularly agency nurses and junior staff, increases difficulty in communication and implementation

 Organisational support 	High staff turnover in projects diminishes organisational knowledge and expertise and increases
 Support from the Executive Management Team 	training requirements
 Support from Directors of Nursing 	 Organisational culture is difficult to change
 Involvement of people who are outside of, or uninterested in, the politics of the organisation 	 Organisational politics
	 Incident reporting software (Riskman) is flawed, does not cover all requirements and does not enable valid aggregation of data related to consumer information
 Strategic planning provides an opportunity for integrating disinvestment decisions into organisational practices. Monash Health had transparent strategic and business planning processes 	 Lack of strategic planning for large equipment purchases
 The Board, Executive Management Team (EMT) and Senior Managers have expressed 'patient- centred care' as a priority. 	 Considerable pressures on the health service to reduce costs. Perceived distinction between 'what the hospital is concerned about (finances, organisational capacity and risk management) and what the clinician is concerned about (patients)'.
Monash Health environment: Governance	
Oversight	
 Overall accountability sat with the Monash Health Board. The Board and EMT determined the decision-making structures within the organisation. 	 No central resource for oversight, coordination or provision of information about committee processes
The Quality Unit maintained an organisational chart of committees related to quality and safety.	 No complete list of committees operating at an organisation-wide level
The Board Secretary also had a list of some committees	 No lists of committees operating within programs or sites
Policies and procedures	
 Robust policies and guidelines for purchasing 	
 Relevant Terms of Reference for committees 	
 Nature and scope of decisions was stipulated in the Purchasing Policy, Purchasing Policy Guidelines 	Confusion about 'who does what'
and Authority Delegation Schedule to prevent gaps, overlap and ambiguity.	 Duplication of some committee and project activities
 In addition to policies and guidelines there were supporting documents such as application forms, 	 Too much paperwork and existing paperwork is confusing and ambiguous
business case templates, requisition forms and checklists governing activities related to resource	 Some documents were not well organised, not easily accessible, multiple versions were available and
allocation such as purchasing and procurement and development of clinical guidance documents.	some required considerable skills and resources to complete
	Emphasis on 'business' aspects and less consideration of evidence of safety, effectiveness and cost- effectiveness in many of these documents
Transparency and accountability	Lack of transparency in all aspects
Transparency and accountability in decision-making was highly valued by respondents	 Lack of transparency and accountability in decision-making reduces confidence
Improved transparency and accountability at Monash Health was desired by most respondents	 Inadequate transparency and accountability was one of the strongest messages from respondents
 Clear documented lines of accountability and reporting requirements in some areas 	 Many individual and group decision-makers lower down the respective hierarchies admitted they
 Individuals and members of committees at the top of their respective decision-making hierarchies 	were unsure of the processes. Others who said they were sure gave answers that were inconsistent
reported that they had clear understanding of how the processes should work, who is accountable,	with each other. Some reported ambiguities and inconsistencies in the systems and processes.
who makes the decision, etc and knew the difference between recommendations, decisions and	• Confusion between the concepts of 'decision' and 'recommendation' which may lead to uncertainty
authorisation.	in accountability. Some committees saw their role as 'recommending' a course of action with the
 Many of these respondents also reported that all decision-makers have the same understanding as the order 	decision being made by a higher level committee. In contrast, the higher level committees saw
they do.	which they expected to occur at the lower level (decision-making' committees
	 Individual decision-makers did not always know who to report a decision to and whether formal
	authorisation was required.
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Conflict of interest	
 Conflict of Interest required as a standing item on the agendas of relevant committees. Ten of 13 	 Only one committee, the Technology/Clinical Practice Committee (TCPC), considered the effect of
committees interviewed had a process for conflict of interest for committee members, and two of	conflict of interest in the provision of evidence used in decision-making
the four committees with an application process had a similar procedure for applicants.	
Monitoring, evaluation and improvement of systems and processes	
 Quality improvement of systems and processes was supported by respondents 	No formal requirements for quality improvement of decision-making at Monash Health
• Only one committee (TCPC) had an ongoing process of monitoring, evaluation and improvement of	• At the program level it was noted that 'since there was no formal decision-making process there was
its systems and processes, however some committees had undergone a single evaluation/review and	no process of review'.
some were developing or planning to develop quality improvement processes.	
• Committees that authorise or support decisions made by other committees expected that a rigorous	No system to check or regulate this
process of decision-making and prioritisation had occurred	
Reporting	The structure and process of reporting varied with site, department/unit and health professional
 Quality Unit chart of committees related to quality and safety included lines of reporting 	group making the decisions across and between sites, programs, units, etc difficult
 Most committees had reporting requirements included in their Terms of Reference 	 No systematic or documented process for reporting of projects
Monash Health environment: Administration	
Relationships, coordination, collaboration and communication	Lack of knowledge and awareness about
Knowing who to go to for information	 decision-making systems and processes and where to go to find out about them
Knowing who to go to for support	 information sources and tools and where to go to find them
 Networks within the organisation, particularly nursing 	Lack of information regarding how the system works and what processes need to be followed
 Quality and Risk Managers are good at sharing information across the organisation 	 Lack of central resource/identified role to provide information about committees
 Good communication at site level (nursing) 	 Lack of organisational processes for knowledge transfer
 Robust and regular communication 	Lack of coordination and collaboration between decision-making individuals and groups
	 Lack of communication about decisions between programs, departments and other stakeholders
	Lack of communication about impending decisions and projects to enable stakeholder input
 Quality Unit chart of committees included relationships (but only for reporting purposes). 	Lack of awareness of other committees within Monash Health
Some committees recognised the overlap in their work and the potential to work together. These	 Other than reporting, there were no documented relationships between committees
were in two groups, those considering introduction of new TCPs and those involved in purchasing.	• Other than the committees considering new TCPs, there were no formal processes of referral for
People who were members of more than one committee often provided the links between them.	issues that might affect, or should be addressed by, other committees
• There were many examples of cross-unit/department consultation and collaboration for policy and	Decision-making 'in isolation' was noted to be a problem in multiple settings. 'Fragmentation' and a
protocol development and implementation.	'silo mentality' were used in relation to decisions made without consideration of the areas they will
 Four projects were linked to others with similar aims 	impact upon or consultation with relevant stakeholders.
	 No systematic processes to link projects across the organisation
Monash Health environment: Stakeholder engagement	
 Involvement of broad range of stakeholders from multiple sites and a range of health professional 	 Lack of consultation with clinicians in decisions made by managers
disciplines	 Lack of consideration of impact of change on others when making decisions or planning projects
• Reported benefits of broad stakeholder involvement in decision-making included improved decision-	• Lack of consideration of downstream or lateral impacts eg 'cost saving measures in one area can
making, more effective dissemination of decisions and informing and encouraging others about the	result in increased costs in another area'
need to consult with the groups represented	Limited input from the Quality and the Education Units
• Many respondents supported increased consumer participation and were planning to act upon this	 Only one committee (TCPC) included consumer representation in decision-making.
	 Several respondents thought that consumer representation on their committees would be
	inappropriate or that consumers had insufficient technical understanding to participate.

Monash Health environment: Resources	
 Funding and staff time Provision of extra staff Availability of extra funds enhanced implementation and evaluation, eg introduction of the National Inpatients Medication Chart had external funding specifically for implementation and evaluation Some clinical pathways involve no additional costs 	 Lack of/inadequate funding resulted in lack of/inadequate administration lack of/inadequate evaluation and research compromised building cost estimates, hindering capacity to house/operate equipment properly Funding for new equipment frequently did not include funding for training staff to use it or the consumables required. Lack of information about available funding Staff dissatisfaction with the expectation of their superiors that they will do more work within existing resources Insufficient allocation of staff time impairs research and preparation for decisions project delivery training Lack of/inadequate coordination of current resources
 Some committees had a Secretariat comprised of 1-2 officers from named roles within the organisation. These positions were allocated sufficient time to complete the required tasks. Some projects were provided with adequate resources for implementation and evaluation Some wards had additional staffing for education support and clinical nurse support. These were invaluable resources for practice change, protocol development and implementation. Some projects had external funding from DHS, universities, etc for staff or infrastructure costs 	 Some committees used the Personal Assistant of the committee Chair in an administrative role. If a new Chair did not have a personal assistant there would be no resources to support the committee. Some respondents found it difficult to separate the role of the committee from the role of their department. Committee work significantly increased their overall workload, particularly administrative matters, and it was not always clear if these duties were part of, or additional to, their normal duties and what they could cut back in order to accommodate committee obligations. Many projects were to be carried out 'within existing resources'. Respondents noted that they either did unpaid overtime or aspects of the project were not undertaken.
Expertise and Training	 Lack of/inadequate skills in use of information technology finding and appraising evidence from research and data project management change management
 Staff in Centre for Clinical Effectiveness (CCE) and Clinical Information Management (CIM) were available to decision-makers to provide expertise in research evidence and local data respectively. CCE ran training programs in finding and using evidence, implementation and evaluation Six of 10 projects had training for project staff in change management, leadership or IT skills. 	 CCE's funding for training was redirected due to budget cuts so it was unable to provide free inhouse programs (however many staff attended the fee-paying courses CCE provided) Lack of understanding of information systems and project management in senior decision-makers was reported and training for committee members was suggested Most projects used a staff member from the department involved to deliver the project, most of these did not have project skills or expertise. Education and training is not well provided for part-time and night staff
Information	 Lack of computers and/or access to computers, particularly for nurses Difficulties using intrapet to find organisational data
 CCE and CIM were available to provide information to decision-makers Monash Health libraries provided access to health databases and electronic journals, as well as 	 Lack of research evidence and local data to inform decisions Many decision-makers chose not to use these sources of information
advice in searching the health literature	 Priority was given to senior decision-makers and high level decisions; sometimes decisions at lower levels could not be provided with information due to limited resources

Decision-makers	
 Broad committee membership 	Clinical autonomy
 Dedication of committee members 	 High workload in running a committee with lack of administrative staff
 Depth and range of experience of committee members 	 Difficulty taking off 'clinician hat' and replacing it with 'manager or decision-maker hat'
 Proactive clinicians who think about improving and moving forward 	
 High level of skill within medical staff acting as leaders in their specialties 	
 Committee membership included a range of relevant stakeholders (except consumers) invited to participate because of their role in the organisation or their knowledge and skills in relevant areas. 	 Some clinicians feel that if they are experts in a particular area they should not have to justify operational decisions
Potential adopters	
• Having the appropriate profession engaging others in change process, for example nurses should be	Resistance to change
implementing projects with nurses, not pharmacists.	 Staff cynicism about the importance of changes and relevance to them
	 Some clinicians insist on autonomy in their areas of expertise
Decision-making process	
Identification of need/application	 General perceptions that
 Decisions were instigated by 'top down' direction and 'bottom up' invitation. 	financial drivers were stronger than clinical drivers
	 impetus for change was ad hoc, there was no systematic or proactive approach
	 internal bureaucracy and red tape stifled ideas
Some committees had a well-documented application process.	 Complex and time consuming nature of application processes
	People by-pass the system, usually not deliberate but due to lack of awareness of the process
	 Some applications are driven by pharmaceutical or equipment manufacturers
Decision criteria	 Only one committee (TCPC) and one individual used explicit, documented decision-making criteria.
 Documenting explicit criteria was generally viewed positively. 	 Some committees had no decision-making criteria.
 The committees with application forms had some documentation of criteria. 	 Some individual decision-makers strongly rejected documentation of explicit criteria as 'another
• Other decision-making groups and individuals had 'mental checklists' of criteria they considered.	form of paperwork that will waste clinician's time'.
 Most committees considered the Monash Health Strategic Plan, quality, safety, access and equity. 	 Organisational priorities dominated eg
 All committees considered financial factors. 	'Sound practice is not always affordable practice'
	• 'The operational aspects of nursing (Key performance indicators that are reported to DHS) come
	first and professional aspects comes second'
	There was a perception that there was 'too much emphasis on financial return for investment'
Ascertainment and use of evidence	 Amount of time needed to search the literature or collect data
 Strong knowledge of the literature 	 Access to evidence is not easy or coordinated
 Attendance at conferences 	Lag time between what universities teach and latest research evidence so new staff are not always
 Using research evidence and local data in decision making was considered to be important. 	aware of best practice
 All respondents reported using research evidence and data in decision-making to some extent. 	 Drug company marketing
 Most committees sought a broad membership in order to utilise expertise in the consideration of research evidence and for decision-making with limited evidence. 	 Only one committee (TCPC) required explicit inclusion of research and local data and considered the quality and applicability of this evidence. Only one of the projects appraised the evidence used.
 Four out of ten projects sought research evidence from the literature to inform the project. 	 The other committees had no process to seek evidence from research. When evidence from research and data was used it was not usually appraised for quality or applicability.
	 Due to difficulty finding uninterrupted blocks of time, slow computers and lack of skills in finding and analysing evidence, decision-makers relied on clinical expertise and advice from colleagues.
	Appropriate local data was frequently reported to be lacking, unavailable and 'manipulated'.

 One application form (TCPC) had an explicit question about what the new technology will replace 'It's all very well to ask the question but it's very hard to get a clinician to say they will stop doing something'
and what can be disinvorted
Deliberative process Process not seen as priority for some
 Robust and honest conversations Some committee members do not attend
 Autonomous decision-making Meetings too short for proper deliberation
 Decision-makers expressed a desire for a documented standard process. Some decisions made reactively, 'on the run', due to lack of consultation or not following process
 Many respondents noted that the main goal of discussion was to reach decisions by consensus. Long lag time between application and decision
 Lack of standardised process
Many of the current processes were perceived to be unclear, 'ad hoc' and lacking objectivity
Lobbying, both covert 'behind the scenes' and overt 'squeaky wheels', was perceived to result in
favourable decisions.
• Most committees required not only the presence of a quorum to make decisions but also attendance • Not all committees had a defined quorum. Of those that did, some made decisions in the absence
of members with relevant knowledge or expertise to the decision at hand a quorum and some made decisions even if a meeting was cancelled due to lack of a quorum
 Some decisions were made outside committee meetings or by the Chair only
Documentation and dissemination Large size, nature and diversity of the organisation increases
 One committee (TCPC) published Decision Summaries which were formally distributed to the <i>difficulty in dissemination of information</i>
Therapeutics Committee, EMT, DHS, the Applicant, Department Head and Program Head and made • frequency and range of communication methods required
publicly available on the internet. Not everyone uses email
 Most committees recorded minutes; these were considered to be confidential and were not Using email too often dilutes the effect
published, but were available to appropriate requestors by contacting the committee secretariat The majority of committees did not publish minutes or anything similar.
 All of the individual decision-makers interviewed reported disseminating decisions to people they One committee did not keep any records.
Considered appropriate and, when deemed necessary, disseminating decisions organisation-wide.
 Many respondents reported others disseminating decisions to them. across committees.
 Documentation and dissemination of decisions made by individuals was informal and ad hoc.
 Not all projects communicated decisions to other staff members or the wider organisation. Unless
people were directly involved, some projects appeared not to make project work or associated
decisions public knowledge.
 Lack of processes for knowledge transfer, especially across sites.
Implementation
Purchasing
 Robust organisational processes that met annual audit requirements Use of evidence in purchasing decisions was not outlined in the Purchasing Policy Guidelines.
 Electronic ordering was controlled through an approval hierarchy with delegation thresholds. Those making the decision of 'whether to buy' were responsible for ascertaining evidence of safety
It was assumed that the decision to purchase was made with due process before reaching the effectiveness and cost-effectiveness in the first stage; however there was no system to check that this has been done to fear the second stage.
this has been done before the second stage.
 Health Technology Services, the Product Evaluation Committee and working parties set up to Difficulty managing expectations eg 'once something is approved people want it immediately'
evaluate large individual capital purchases considered appropriateness of equipment to Monash Health availability of space parts, life expectancy, convision requirements, related consumables
availability of technical expertise and fit with the DHS Asset Management Framework. They also had to be availability of technical expertise and fit with the DHS Asset Management Framework. They also had to be available to be added to
expertise in contract negotiation
creates bad feeling and wastes lots of time.

 Purchasing of clinical consumables within budget allocation is done electronically. Electronic authorisation is required for items above individual limits (eg Nurse Unit Manager approval up to \$10,000, items above this require authorisation) 	 There is little assessment of safety, effectiveness or cost-effectiveness of clinical consumable items
 Policy and guidance Monash Health was developing a new Policy and Procedure Framework Broad support for increased standardisation of practice through policies and procedures Development process seen as a communication tool between professional groups and across sites Implementers Finding others who have done the same work for support, advice and information Establishing Working Parties and Steering Committees for support, endorsement, troubleshooting Project leader whose primary role is 'at the coal face' Decisions made at program level that involve multiple wards, departments or sites are usually implemented by multidisciplinary teams 	 Lack of structure and standardisation of processes, especially between sites Some project staff felt isolated and would have liked support from others who had done the same or similar work It was not always clear who was responsible for project management Lack of/inadequate project management and communication resulted in multiple people making inconsistent changes contacting equipment vendors with requests and ideas for change
 Practice change At site level there is good 'buy-in' for change and people are keen to make things work (nursing) Allowing wards to nominate themselves for participation in projects 'Bottom up' approach to develop individual implementation plan in each ward 'Bottom up' training to gain staff 'buy in' combined with 'top down' supportive strategy Flexible and adaptable staff Lots of preparation including training and communication with all stakeholders Use of pre-existing (and pre-tested) tools from other organisations Some committees provide an approval process only and the applicant is responsible for implementing the decision. In most cases the applicant has control over the process (eg head of department implementing a new procedure) and is motivated to implement the change 	 Unrealistic project timelines Variability in current practice and lack of standardisation increases number of practices to change Large size, nature and diversity of the organisation increases complexity of implementation across departments with different needs Lack of effective implementation pathways Things take a long time to implement, to the point that they 'fall off the agenda' Staffing issues, including leave, mean that a lot of projects are on hold Project-specific barriers such as logistical challenges with product being implemented Sometimes practice change is required beyond the applicant and their department. Committees do not require applicants to have or acquire knowledge and skills in implementation.
 Training and education activities and 'champions' were reported as the two key strategies used to effect change and encourage sustainability of the intervention. Most projects had a champion and/or Executive sponsor. Project champions were generally the head of the relevant department; others included the Chief Executive Officer, Executive Directors who were Steering Committee Chairs and 'Ward Champions' selected to encourage and promote change. Those with champions unanimously considered champions important to the success of the project. Training or education included passive methods using posters and memos, interactive learning on new equipment and participatory approaches involving staff in design and implementation. Seven projects involved training for the target group, most of which was done by external providers of new equipment. 	 Lack of knowledge and skills in project management, change management and use of information technology were exacerbated when interventions were complex and required high levels of training Lack of known, standardised processes for implementation at Monash Health
 Most considered their project sustainable and believed the change was embedded in the system. This was reportedly achieved by involving a variety of staff and 'bottom-up' approaches to change. 	 Only two considered sustainability in the design of the project.
 Half of the projects tailored the implementation plan to anticipated barriers and enablers sourced from other health services, literature searches and personal experiences of project staff. Half reported that implementation was conducted as planned. Some noted that it mostly went to plan but 'amendments were made continually to improve the process'. 	 One project had no implementation plan Half of the projects did not consider barriers and enablers
 The benefit of the proposed practice change is clear and observable 	 Lack of baseline data meant that potential adopters were unable to see the benefit or relevance to their situation resulting in less 'buy in' and poor uptake.

Evaluation of outcomes of decisions		
General	• Quality and Risk Managers are not included at the beginning to help with collection of baseline data	
 Use of pre-existing (and pre-tested) tools from other organisations eg audit tools 	and evaluation design	
Evaluation and monitoring were considered important and had broad support	 Lack of baseline data 	
 Monitoring of projects after implementation was thought to increase sustainability 	A lack of data was seen to contribute to the current state of 'little or no process of evaluation'.	
	 Limited funds, knowledge and/or skills inhibited both the planning and conduct of evaluation. 	
Evaluators		
 CCE was establishing an in-house Evaluation Service at the time of these interviews. 	 No specified evaluators with appropriate training or expertise had been utilised by the respondents 	
Requirements for evaluation		
 Monitoring, evaluation and reporting of outcomes was required by DHS sponsored projects and 	 Monash Health had no requirements for evaluation of outcomes of decisions or projects. 	
TCPC. The Therapeutics Committee requested reports for some decisions.	 Most committees had no planned evaluation of outcomes of decisions or implementation projects. 	
 Routine clinical audits and monitoring of adverse events undertaken for hospital accreditation 	• The purpose of reports for TCPC and Therapeutics was questioned by some respondents who noted	
purposes provided indirect evaluation of decisions in some situations.	that it may be inconsistent with the knowledge needed for program staff.	
 Half of the completed projects had been evaluated; all but one project reported achieving its planned objectives. 	 Only 2 projects planned evaluation as a project component. Some were evaluated post hoc. 	
Reinvestment		
Reinvestment or reallocation of resources would be an incentive to disinvestment	 Lack of planning for resource reallocation 	
SHARE Steering Committee keen to establish and support methods for reinvestment/reallocation	 Lack of transparency and consultation in reallocation of savings creates disillusionment 	
Flexibility and thinking laterally to include novel methods/indicators such as reducing waiting lists,	 Staff dissatisfaction that savings generated are not reallocated 	
getting patients out of Emergency Department faster, freeing up time in procedural/operating suites,	A health economist is required to do this properly, Monash Health had no resources for this	
freeing up bed days that are used to treat another patient group faster (eg X procedure saved	• 'We don't look far enough for downstream effects; we're too simplistic in assessment of savings'.	
Y\$/bed days which was used by Z patients).	 It was noted that savings made in a project in one area sometimes increased costs in other areas; 	
	hence reallocation of the savings to the project department would be unfair.	
	 Savings of bed days or time in procedural/operating suites were used immediately to treat another patient group so were never realised 	
	• Accounting practices did not enable measurement and/or reallocation of savings in some areas, for	
	example changes to one TCP may affect multiple cost centres eg department, ward, ICU, pharmacy	

Appendix 3. Paper 5 Additional file

Sustainability in Health care by Allocating Resources Effectively (SHARE) 5: Developing a model for evidence-driven resource allocation in a local healthcare setting

Additional File: Methods

Contents

Table A	2
What are the concepts, definitions and perspectives that underpin disinvestment?	2
What models or methods of disinvestment have been implemented in hospitals or health services?	2
Where are the opportunities for systematic decisions about disinvestment in a health service?	2
Table B	4
How are decisions about resource allocation currently made at Monash Health?	4
What factors influence decision-making for resource allocation?	4
What knowledge or experience of disinvestment exists within Monash Health?	4
Table C	6
How can consumer values and preferences be integrated into organisation-wide decision-making processes?	6
Table D	8
What do Monash Health decision-makers need to enable access and utilisation of evidence in decision-making?	8
Table E	9
Program development	9
References	10

Table A

What are the concepts, definitions and perspectives that underpin disinvestment?

What models or methods of disinvestment have been implemented in hospitals or health services?

Where are the opportunities for systematic decisions about disinvestment in a health service?

Reproduced with permission from SHARE Paper 2 [1]

Literature review

Aim: To understand the concepts related to disinvestment and their implications in a local health service and to ascertain examples of existing decision-making systems and processes in this setting.

Search terms: Medical Subject Headings (Health Care Rationing, Resource Allocation, Health Priorities and Health Services Needs and Demand) and Text words (disinvestment, decommissioning, defunding, resource release, allocation, reallocation, hit list, ineffective services, low value services, wish list, exclusions, priority setting, program budget marginal analysis, PBMA, resource scarcity, rationing, invest to save) were used with truncations appropriate to the databases utilised. The search strategy was iterative with new terms added as they were identified.

Sources: Medical databases (Ovid Medline, All EBM Reviews, EMBASE, Cochrane Library), the internet (via the Google search engine) and guideline websites. These methods were supplemented by follow up of reference lists in key publications and searches for publications by identified authors in the field.

Inclusion criteria: English language publications including guidelines, reviews, research studies, technical reports or policy documents that addressed the issue of disinvestment from a conceptual (terminology, definitions and operational criteria) or policy perspective.

Data Collection and Analysis: Inclusion, exclusion and appraisal criteria were established a priori. Publications that did not meet the criteria were excluded on review of title and abstract. When a decision could not be made based on abstract alone, full text was retrieved. Critical appropriate to study design was planned but no research studies were identified.

Search results: Nineteen documents met the inclusion criteria. These were mainly publications providing a statement of the policy context, the rationale or need for disinvestment and/or a critique of existing processes. A small number of case reports were included but no research studies were identified.

Synthesis: Information from articles which met the inclusion criteria was summarised based on content relevant to the themes of conceptual and policy perspectives determined a priori.

Full details are in the review publication [2].

Interviews with members of the Technology/Clinical Practice Committee

Aim: To identify opportunities for disinvestment in existing or potential decision-making settings and consider implications for disinvestment in the Monash Health setting

Participants: The Executive of the Technology/Clinical Practice Committee (TCPC), the initiators of the SHARE Program, included an executive director, medical director, clinical program director and research director.

Data collection: Semi-structured group and individual discussions were conducted using prompts based on the two aims; discussions were documented in the minutes.

Collation: Responses were collated and added to findings from the other sources which were then analysed thematically by content analysis.

Response rate: All 4 informants participated.

Representativeness of sample: Participants represented senior decision-makers from a range of contexts

Survey of external experts

Aim: To ascertain unpublished experiences or examples of models or methods for disinvestment in the local healthcare setting.

Participants: 1) Disinvestment researchers initially identified from publications and websites about disinvestment and subsequently using a snowballing technique based on feedback from respondents. 2) Subscribers to the Health Technology Assessment (HTA) email list.

Design: The organisation-wide systematic approach to disinvestment proposed in the SHARE Program was described in an email. Participants were asked if they had experiences of disinvestment in the local healthcare context that could inform Monash Health decision-making, any unpublished reports or other documents on this topic, and current or planned research in this area.

Data collection: Responses were received by return email.

Analysis: Responses were collated and added to findings from the other sources which were then analysed thematically by content analysis.

Response rate: Eleven of the 14 researchers and four health librarians from the HTA list (denominator unknown) responded to the survey.

Structured workshops with the SHARE Steering Committee

Aim: The workshops had several aims, the component reported in this paper relates to identification of opportunities for disinvestment in existing or potential decision-making settings.

Inclusion criteria: Senior decision-makers at Executive and Director level and health service consumers

Sampling: Convenience sampling was used to include members of the SHARE Steering Committee comprising Executive Directors (Medical, Nursing, Support Services), clinical Program Directors (Medical, Nursing, Allied Health, Pharmacy, Diagnostic Services), Committee chairs (Technology/Clinical Practice, Therapeutics, Human Research and Ethics, Clinical Ethics), Directors of non-clinical services (Information Services, Clinical Information Services, Procurement, Biomedical Engineering, Research Services), Legal counsel and two consumer representatives. Two representatives from the Department of Human Services Technology Division also participated.

Approach: Workshops were conducted at scheduled Steering Committee meetings.

Design: Workshops were based on the first two steps in the SEAchange model for evidence-based change [3]; identifying the need for change and developing a proposal for change. Presentations outlining the background and aims of the workshops were made by the project team, discussion was structured around the questions to be addressed and decisions were based on consensus. Questions included:

Workshop 1: Where and how are decisions made, documented, communicated, implemented and evaluated and what are the related system issues? Where is change required? Why? What is the problem? How can the need for change be measured? What are the factors enabling sustainability of the current system? How is it integrated?

Workshop 2: What existing systems/processes work well that we could maintain as they are, should be ceased, could be kept but require improvement? What new systems/processes should be introduced? What structures, skills, resources, commitment and leadership are required? Are they available? If not, how can they be obtained? What existing systems can be utilised? What is the solution to the problem? What are the options? What is known about best practice in this area? What is required to ensure sustainability of the proposed system? How can it be integrated?

Data collection: Participants completed prepared worksheets and discussed the findings. Discussion and decisions were documented in minutes.

Respondent validation: Minutes were approved at the following meeting.

Analysis: Data from the worksheets and findings from the discussion were collated and organised in MS Word and Excel. Emergent themes were identified by framework analysis.

Response rate: Thirteen members participated, 9 attended the first workshop, 11 attended the second, and some non-attenders also completed the worksheets.

Representativeness of sample: A range of senior decision-makers were represented at each workshop, plus representatives from the state health department.

Interviews with key local informants

Aim: To test preliminary thoughts regarding direction of the SHARE Program with front line staff and consumers

Participants: Six participants selected purposefully and pragmatically to seek the views of a range of Monash Health decision-makers: the five senior clinicians were program directors and department heads representing medicine, surgery, nursing, allied health and diagnostic services and the consumer representative had experience on committees that made organisation-wide decisions.

Interview schedule

Disinvestment: Have you heard about the concept of disinvestment?

Potential settings/methods: Are you aware of any of these? Do you do any of these sorts of things? What could you do in your Unit? What could be done in your Program/Division? What could be done by your colleagues eg referrers? Any opportunities for quick wins? Incentives to change? Barriers to change? Potential to link into advanced trainee projects?

Research evidence: What information do you use? Where from? How do you access it? What do you do with it? Could you use more? What would you like? How would you like it? What would you do with it?

Local data: Do you use Monash Health data? How? What for? Do you use external data? What? How? What for? Could you use it? How?

General discussion: How could we get wider feedback? Should we survey, etc? Should this be driven top down or bottom up? Would you be interested in piloting something?

Data collection: Structured interviews were conducted using the interview schedule above; one CCE staff member attended and took notes.

Analysis: Responses were collated and added to findings from the other sources which were then analysed thematically by content analysis.

Response rate: All 6 informants participated.

Representativeness of sample: Interviewees represented senior decision-makers from a range of contexts

Table B

How are decisions about resource allocation currently made at Monash Health?

What factors influence decision-making for resource allocation?

What knowledge or experience of disinvestment exists within Monash Health?

Reproduced with permission from SHARE Paper 3 [4]

Structured interviews with staff authorised to make decisions on behalf of the organisation

Aim: To identify and document current processes for making, implementing and evaluating decisions and the factors that influence them.

Inclusion criteria: Staff and consumers authorised to make decisions regarding resource allocation for health technologies and clinical practices at organisation-wide level in group or individual settings.

Sampling: Purposive and snowball sampling was used.

- Twenty-two committees were initially identified from a governance structure diagram. A further 20 were identified through a snowballing method by asking participants in the subsequent interview process, senior managers and Quality Unit staff if they were aware of others. Fourteen of the 42 potential committees met the inclusion criteria (Capital Expenditure, Falls Prevention, Information Systems Governance, Joint Program Quality and Safety, Medication Safety, Operating Suite Product Evaluation, Nurse Standardisation of Practice, Resuscitation, Skin Integrity and Pressure Ulcer, Sterilising Services, Technology and Clinical Practice, Therapeutics and Transfusion Committees and the Executive Management Team).
- Approved Purchasing Units (APUs) have delegated authority from the Board to commit the organisation to a legal and/or financial obligation such as issuing a purchase order or signing a contract. Of the
 nine APUs, two had been included in the group decision-making committees (Capital Expenditure Committee and Executive Management Team) and five others met the inclusion criteria (Pharmacy, Health
 Technology Services, Equipment Services, Procurement and Clinical Purchasing, and Materials Management).
- Clinical managers from one clinical program selected for its high use of health technologies were identified from the program's intranet page. Individuals were selected purposively to represent all levels
 within the program's decision-making hierarchy; medical and surgical sub-specialties, nursing and quality management; and a range of campuses.

Approach: Personalised email invitations from the project team were sent to the Chair, Executive Sponsor and/or Secretary of 14 committees, managers of 5 APUs and 9 managers from the selected clinical program. Approval from the Nursing and Medical Program Directors was sought before approaching individuals from the selected program.

Interview schedule: Questions were based on a theoretical framework [4] and included details of the characteristics of the external environment; organisation; potential adopters; decisions; implementation strategies; barriers and enablers; degree of implementation; degree of practice change; patient, practitioner, system and economic outcomes; and respondents reflections on the current system. They were piloted with one committee and refined before being used in subsequent interviews. The full interview schedule is available [4].

Data collection: Interviews were approximately 1 hour long and were conducted in the interviewee's office or suitable meeting room. Interviews were not taped or transcribed but detailed notes were taken. Two CCE staff members attended, one as interviewer and one as note taker.

Respondent validation: Drafts were sent to the interviewees for clarification, comment and/or amendment as required.

Analysis: Final interview notes were collated and organised in MS Word and Excel using the elements of the theoretical framework. Emergent themes were identified by framework analysis.

Response rate: Representatives of 13 of the 14 committees, all 5 APU managers and 9 clinical managers participated. One committee Chair did not respond to the invitation for interview; due to lack of time no representative of this committee was interviewed. A surgical sub-specialty department head was unable to attend their interview and was replaced by a medical sub-specialty department head who was available at short notice.

Representativeness of sample: Almost all eligible committees and all eligible APUs were represented. The clinical managers represented Program Directors, Department Heads, Unit/Ward Managers and ancillary services; medical (n=4), nursing (n=4) and quality management (n=1) staff; in a range of sub-specialties across multiple campuses.

Structured interviews with staff members with experience in disinvestment projects

Aim: To learn from previous experiences of disinvestment at Monash Health.

Inclusion criteria: Staff who had undertaken projects to remove, reduce or restrict current practices (the term 'disinvestment' was not used in Monash Health projects).

Sampling: Purposive and snowball sampling was used. Relevant projects were initially identified by members of the SHARE Steering Committee and interviewees in the committee review process noted above. A snowballing method was employed by asking participating project representatives if they knew of any other relevant projects. Nineteen potential projects were identified, 13 met the inclusion criteria.

Approach: Personalised email invitations from the project team were sent to project managers of 13 relevant projects. Project managers or Department/Unit Heads were sought as key contacts; however a

representative of the project team was accepted when a senior staff member was unavailable.

Interview schedule: Questions were designed to explore project governance, use of routinely-collected hospital data, other local data and research evidence in the development and implementation of projects; barriers and enablers to successful project implementation; what staff would do again and what they would do differently. The full interview schedule is available in Table C.

Data collection: Interviews were approximately 1 hour long and were conducted in the interviewee's office or suitable meeting room. Interviews were not taped or transcribed but detailed notes were taken. Two CCE staff members attended, one as interviewer and one as note taker.

Respondent validation: Drafts were sent to the interviewees for clarification, comment and/or amendment as required.

Analysis: Final interview notes were collated and organised in MS Word and Excel using the elements of the theoretical framework noted above. Emergent themes were identified by framework analysis.

Response rate: Representatives of 10 projects participated based on interviewee's and interviewer's availability

Representativeness of sample: The process was designed to be illustrative and did not seek to comprehensively identify all projects. A number of project topics across a range of clinical areas were included.

Structured workshops with the SHARE Steering Committee

Aim: Workshop 1: To identify the need for change. Workshop 2: To develop a proposal for change

Additional details as above in Table A

Structured workshop with clinical decision-makers from a large diagnostic service

Aim: To capture the actual process of capital equipment purchasing and identify how an ideal process for this decision-making might differ from current practice.

Inclusion criteria: Clinical managers involved in decisions regarding purchase or new or replacement equipment.

Sampling: Purposive sampling was used. A large multi-campus diagnostic service was selected based on their use of equipment and the interest in the project expressed by the Director.

Approach: The Director and Research Director of the department identified 18 suitable participants representing all health professional groups, all campuses and most units within the service. Personalised email invitations were sent by the Executive Director of Medical Services and Quality.

Design: An experienced facilitator from CCE who had no involvement in the SHARE project developed and delivered the workshop. A presentation on the background of the project and its relevance to the workshop was made by a SHARE project team member. Two other project team members were present to assist with logistics and note taking. The session was run over 1½ hours in the departmental seminar room. Five domains were identified a priori: how do we get an idea; what is the process (application, approval, feedback, who, timing); is it a good idea; is it the best idea; and monitoring and evaluation.

Data collection: Using a nominal group technique, participants were asked to describe the ideal process for purchasing large capital equipment. Responses were collected on 'sticky-notes'. This method was repeated to identify gaps in the current process and included prioritisation of key areas for improvement.

Respondent validation: A workshop report was provided to participants for comment.

Analysis: Responses on the 'sticky notes' and additional workshop notes were collated and organised in MS Word and Excel using the domains identified a priori. Emergent themes were identified by framework analysis.

Response rate: 17 of the 18 invitees attended. An additional staff member from a clinical area not represented on the invitation list was included at the commencement of the workshop.

Representativeness of sample: Participants represented all campuses, sub-specialties and health professionals (medicine, nursing, allied health, technical, quality improvement, business management, research) within the department.

Document analysis

Aim: To provide evidence for the stated positions and methods of administration of decision-making systems and processes for resource allocation at Monash Health and the state health department.

Inclusion criteria: Documents that guided decision-making or implementation of resource allocation decisions

Identification: Documents were identified by key informants and searches within the Monash Health Policy and Procedure database.

Documents included: 1) State government: Victorian Government Purchasing Guidelines, Medical Equipment Asset Management Framework, Targeted Equipment Replacement Program and Health Purchasing Victoria Product Management Guidelines. 2) Monash Health: Purchasing Policy, Purchasing Policy Guidelines, Authority Delegation Schedule, Code of Conduct, Conflict of Interest Protocol, Guidelines for management of Gifts and Benefits, Terms of Reference for committees that make resource allocation decisions, Application forms, Business case templates, Requisition forms and checklists.

Data collection: Documents were retrieved or sourced online. Data were extracted based on the theoretical framework noted above.

Analysis: Findings were collated and organised in MS Word and Excel using the elements of the theoretical framework.

Table C

How can consumer values and preferences be integrated into organisation-wide decision-making processes?

Reproduced with permission from SHARE Paper 4 [5]

Literature review

Aim: To find evidence-based strategies that are effective in engaging consumers for health service organisation-wide decision-making processes. To find tools that can enable the implementation of these consumer engagement strategies. To find examples from other health services that employ evidence-based consumer engagement for organisation-wide decision-making processes.

Protocol: A two-step systematic review protocol was developed. The first step was to identify existing synthesised evidence and appraise it for quality and applicability; if no suitable publications were identified then a search of the primary research literature would follow. Relevant high-quality synthesised evidence in the form of guidance documents for consumer engagement were identified in the first step hence no further searches were undertaken. The full protocol is available [5]

Search terms: Search string for websites consisted of a combination of a 'consumer' term and an 'engagement' term. Where website search engines could not support truncation all terms were entered in full. Consumer terms: Consumer, Consumers, Community, Communities, Citizen, Citizens, Patient, Patients, Public. Engagement terms: Engagement, Engaging, Engage, Participation, Participating, Participate, Involvement, Involving, Consultation, Consulting, Deliberating, Deliberation, Deliberate, Input

Sources: All EBM (including Cochrane Database of Systematic Reviews, DARE, CENTRAL, and ACP Journal Club), Medline(R) 1950 to present with daily updates and Medline(R) in-process and other non-indexed citations, CINAHL, and EMBASE. Additional searches were undertaken in Guidelines websites (n=8), Databases and search engines (n=4), Government and consumer health organisation websites (n=7). Details of these websites are in the full protocol [5]. Checking of reference lists of articles, reports and links on websites was also undertaken.

Selection criteria: Detailed inclusion and exclusion criteria based on Population, Intervention/indicator, Comparison/control, Outcomes, Setting, Study design, Language and Time period were established a priori and applied by a single reviewer. Details of selection criteria are in the full protocol [5].

Data Collection and Analysis: All quality appraisals were conducted by a single reviewer in consultation with colleagues as required using criteria appropriate to the study design.

Synthesis: Findings were summarised by emergent themes and presented in detailed reports used for project decision-making and planning. Definitions, concepts related to consumer engagement for resource allocation in the local healthcare context and relationships between these concepts were extracted and collated with findings from the other sources and developed into a framework.

Search results: Eleven documents met the inclusion criteria and the requirement of step 1 as high quality synthesised evidence. These included systematic reviews, frameworks, toolkits and guidance for consumer engagement.

Semi-structured workshops with SHARE Consumer Working Group

Aim: To identify potential opportunities and methods for consumer participation and sources of consumer information.

Inclusion criteria: Consumer representatives with experience in organisation-wide decision-making related to resource allocation.

Sampling: Convenience sampling was used. Three consumer representatives meeting the inclusion criteria were known to the project team (as members of committees overseeing introduction of new TCPs and development of policies and procedures), two of them were on the SHARE Steering Committee.

Approach: The three representatives were approached personally and invited to participate.

Design: Workshop 1 addressed the question: How can we capture consumer perspectives and include in decisions related to organisation-wide systems and processes? Prompts for discussion included

Methods of involvement: Who? How? Use of research literature and local/other data: What? Where? How? Who else to talk to? and Things we haven't thought of? Workshop 2 considered and refined the findings of Workshop 1 and added further detail.

Data collection: Group discussions were held at meetings convened for this purpose. Project team members took notes.

Respondent validation: Drafts were sent to the interviewees for clarification, comment and/or amendment as required.

Analysis: Responses were collated and added to findings from the other sources which were then analysed thematically by content analysis. Responses were summarised by emergent themes and presented in detailed reports used for project decision-making and planning. Concepts related to consumer engagement for resource allocation in the local healthcare context and relationships between these concepts were extracted and collated with findings from the other sources and developed into a framework.

Response rate: All members of the Consumer Working Group participated in both workshops.

Representativeness of sample: The consumer representatives were experienced in health service decision-making and familiar with organisational systems and processes.

Semi-structured interviews with staff responsible for consumer-related activities

Aim: To identify consumer-related activities within the organisation

Inclusion criteria: Staff with responsibility for consumer-related activities

Approach: Invitations for interview were sent to the Monash Health Quality Manager and Consumer Engagement Manager.

Interview schedule: What consumer-related activities occur within the organisation? What are your thoughts on findings from Consumer Working Group and interviews with Monash Health staff? Who else to talk to? Things we haven't thought of?

Data collection: Individual interviews were held at meetings convened for this purpose in the interviewee's office. One member of the project team was both interviewer and note taker.

Respondent validation: Drafts were sent to the interviewees for clarification, comment and/or amendment as required.

Analysis: Responses were collated and added to findings from the other sources which were then analysed thematically by content analysis. Responses were summarised by emergent themes and presented in detailed reports used for project decision-making and planning. Concepts related to consumer engagement for resource allocation in the local healthcare context and relationships between these concepts were extracted and collated with findings from the other sources and developed into a framework.

Response rate: Both invitees participated.

Representativeness of sample: The interviewees represented senior staff responsible for consumer participation in the organisation

Structured interviews with decision-makers

Aim: To ascertain current practice in consumer involvement in organisational decision-making and implementation and evaluation of change.

Participants: Monash Health staff authorised to make decisions on behalf of the organisation and project staff who had undertaken disinvestment-type projects (previously described in Table B).

Interview schedule: Questions regarding consumer participation in decision-making at Monash Health were a subset of the broader interviews which are reported in Table B.

Table D

What do Monash Health decision-makers need to enable access and utilisation of evidence in decision-making?

Reproduced with permission from SHARE Papers 7 and 8 [6, 7]

Literature review

Aim: To identify the information needs of decision-makers in local healthcare services

Questions: What are the information needs of clinicians and managers to support evidence-based decision making regarding the introduction or removal of technologies and clinical procedures?

How have assessments to determine these needs been conducted in the past?

Sources: Medline, CINAHL, EMBASE, LISA, LISTA and Google

Medline Search (adapted for other databases): (exp Needs Assessment/) AND (Information Dissemination/ or Information Services/ or Information Management/) limit to (english language and humans) Google Search: (information OR evidence) AND (need OR assessment) AND (health OR nurs OR doctor OR med). Preferences were set to English language

Inclusion criteria: Articles describing information needs assessments in similar health service contexts examining how clinicians and managers make evidence-based decisions regarding the introduction or removal of technologies and clinical practices; articles published in English from 1996

Exclusion criteria: Information needs of students; continuing professional education needs; point of care decision-making needs; assessments of information needs in resource poor health settings

Data Collection and Analysis: Inclusion, exclusion and appraisal criteria were established a priori. Studies to be reviewed by one reviewer in consultation with colleagues when necessary. Critical appraisal relevant to study design to be conducted using standard CCE templates.

Search results: No studies were found to meet the inclusion criteria. The limitations of the very specific question and narrow selection criteria were acknowledged. Earlier broad searches resulted in unmanageable numbers of returned articles, however limiting the search returned none. Since the purpose of the review was to inform development of the support services, and not to be a systematic review providing a definitive answer for others, a decision was made to take a pragmatic, iterative approach by accessing relevant publications already known to the project team, pursuing articles from reference lists, etc.

Structured interviews with Program, Department and Unit Heads

Aim: To identify relevant issues and pilot draft questions for needs analysis survey

Participants: 9 managers including Program Directors, Medical Department Heads, Nurse Unit Managers and a Quality and Risk Manager from medical and surgical sub-specialties across a range of campuses Interview schedule: Questions were designed to identify training and support needs for decision-making, implementation and evaluation and preferred formats for delivery. These were added to the schedule for interviews conducted to investigate organisational decision-making more broadly described in Table B above.

Electronic survey of local decision-makers

Aim: To identify the information needs of decision-makers at Monash Health to facilitate development of support services and gather baseline data for evaluation purposes

Participants: Staff who made decisions regarding resource allocation for technologies and clinical practices were eligible

Design and content: An electronic questionnaire was designed and delivered using SurveyMonkey [8]. Questions were developed to identify current use of evidence; confidence in searching for, accessing and appraising evidence; difficulties in using evidence and implementing evidence-based change; preferred content and format of bulletins disseminating research evidence; and preferred formats for education and training in these areas. Some questions were adapted from Taylor et al [9].

Pretesting and piloting: The survey was pre-tested with colleagues at a co-located research institute, piloted with the SHARE Steering Committee, and refined based on feedback from these groups Distribution: An email with an embedded link to the survey was distributed to senior staff using the Monash Health 'All Managers' and 'Senior Medical Staff' email lists. Members of these lists were asked to forward the survey to others who made decisions about resource allocation but might not be on the list.

Data collection: Data were collected over a four week period from the time of distribution. No reminders were sent.

Analysis: Results were downloaded into Excel from the survey provider. Qualitative data from the three free text answers were copied into NVivo [10] where they were coded according to themes presented in Michie et al [11]. Data were reviewed by two investigators to ensure agreement of coding. Discrepancies were discussed with a third investigator until consensus was reached. There were insufficient categories in the Michie et al framework to address some of the organisational issues; additional sub-themes were created as required.

Response rate: 141 staff members responded. 118 were eligible to complete the survey having answered 'yes' to the screening question asking if they made decisions about resource allocation. 103 completed the entire survey. The response rate could not be calculated in the absence of denominator information; the total number of staff on the email lists and the number of additional staff to whom the survey was forwarded were unknown.

Representativeness of sample: All programs and service sites were represented in proportions consistent with the size of the program or campus. A range of professional disciplines were represented: nursing (28%), allied health (25%), medical (24%) and other (23%) including pharmacy, diagnostic services, corporate and clinical program management, and administration.
Program development

Structured workshops with SHARE Steering Committee

Aims: To review and refine draft proposals, frameworks and plans and make final decisions.

Participants: SHARE Steering Committee members including Executive Directors (Medical, Nursing, Support Services), Program Directors (Medical, Nursing, Allied Health, Pharmacy, Diagnostic Services), Committee chairs (Technology/Clinical Practice, Therapeutics, Human Research and Ethics, Clinical Ethics), Managers (Information Services, Clinical Information Services, Procurement, Biomedical Engineering, Research Services), Legal counsel and two Consumer representatives.

Design

Provision of pre-reading materials and/or workshop presentation of background, issues to consider, draft proposals, etc

Agenda including points for discussion and decisions required

Decisions made by consensus

Documentation of discussion, decisions and actions in minutes

Structured workshop with Community Advisory Committee (reproduced with permission from SHARE Paper 4 [5])

Aims: To identify current consumer engagement activities, barriers and enablers to effective participation in these situations and the needs of consumers in order to contribute effectively; to identify sources of consumer information and data and how these sources can be used to drive decision-making; and to seek feedback on a draft model for consumer engagement in generic health service decision-making

Inclusion criteria: The Community Advisory Committee is a legislated advisory body to the health service Board providing consumer, carer and community perspectives. This group provides a consultation service to health service staff engaging in consumer-related activities.

Approach: A request for consultation was completed on the required template. A workshop was held at a meeting convened for this purpose.

Design: The project team delivered a presentation that included the background and aims of SHARE, potential decision-making settings identified in earlier SHARE work, and findings from the literature review, interviews and consultation with staff and consumers regarding current and potential consumer participation in decision-making at Monash Health. This was followed by a structured discussion on the following topics:

Committees and Working Parties: What would consumers need to contribute effectively? What are the barriers and enablers to effective participation? Other thoughts?

• Consultation: Are there particular areas we should focus on? What would consumers need to contribute effectively? What are the barriers and enablers to effective participation? Other thoughts?

• Using our consumer data: Sources we have identified. Are there others? Should there be others? How can we use this information to drive decision-making? How should consumers be involved in this process?

• Using our other data: Sources we have identified. How can we use this information to drive decision-making? How should consumers be involved in this process?

• Consumer literature: Suggestions. How can we use this information to drive decision-making? How should consumers be involved in this process?

Is there anything else we have missed?

Data collection: Project staff took notes.

Analysis: Responses were collated and added to findings from the other sources which were then analysed thematically by content analysis.

Response rate: 6 of the 14 committee members attended the workshop

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Appendix 4. Paper 6 Additional file

Sustainability in Health care by Allocating Resources Effectively (SHARE) 6: Investigating methods to identify, prioritise, implement and evaluate disinvestment projects in a local healthcare setting

Additional File: Methods

Contents

Table B. Investigation of methods for identification of disinvestment opportunities at Monash Health	4
Table C. Investigation of methods for prioritisation and decision-making at Monash Health	8
Table D. Investigation of methods for implementation and evaluation at Monash Health	8
Table E. Deliberative process	9
Table F. Interview schedule System Redesign	9
References1	0

Table A. Identification of potential methods

Literature review

Aim: To understand the concepts related to disinvestment and their implications in a local health service and to ascertain examples of existing decision-making systems and processes in this setting.

Search terms: Medical Subject Headings (Health Care Rationing, Resource Allocation, Health Priorities and Health Services Needs and Demand) and Text words (disinvestment, decommissioning, defunding, resource release, allocation, reallocation, hit list, ineffective services, low value services, wish list, exclusions, priority setting, program budget marginal analysis, PBMA, resource scarcity, rationing, invest to save) were used with truncations appropriate to the databases utilised. The search strategy was iterative with new terms added as they were identified.

Sources: Medical databases (Ovid Medline, All EBM Reviews, EMBASE, Cochrane Library), the internet (via the Google search engine) and guideline websites. These methods were supplemented by follow up of reference lists in key publications and searches for publications by identified authors in the field.

Inclusion criteria: English language publications including guidelines, reviews, research studies, technical reports or policy documents that addressed the issue of disinvestment from a conceptual (terminology, definitions and operational criteria) or policy perspective.

Data Collection and Analysis: Inclusion, exclusion and appraisal criteria were established a priori. Publications that did not meet the criteria were excluded on review of title and abstract. When a decision could not be made based on abstract alone, full text was retrieved. Critical appraisal appropriate to study design was planned but no research studies were identified.

Search results: Nineteen documents met the inclusion criteria. These were mainly publications providing a statement of the policy context, the rationale or need for disinvestment and/or a critique of existing processes. A small number of case reports were included but no research studies were identified.

Synthesis: Information from articles which met the inclusion criteria was summarised based on content relevant to the themes of conceptual and policy perspectives determined a priori.

Full details are in the review publication [1].

Interviews with members of the Technology/Clinical Practice Committee

Aim: To identify opportunities for disinvestment in existing or potential decision-making settings and consider implications for disinvestment in the Monash Health setting

Participants: The Executive of the Technology/Clinical Practice Committee (TCPC), the initiators of the SHARE Program, included an executive director, medical director, clinical program director and research director.

Data collection: Semi-structured group and individual discussions were conducted using prompts based on the two aims; discussions were documented in the minutes.

Collation: Responses were collated and added to findings from the other sources which were then analysed thematically by content analysis.

Response rate: All 4 informants participated.

Representativeness of sample: Participants represented senior decision-makers from a range of contexts

Survey of external experts

Aim: To ascertain unpublished experiences or examples of models or methods for disinvestment in the local healthcare setting.

Participants: 1) Disinvestment researchers initially identified from publications and websites about disinvestment and subsequently using a snowballing technique based on feedback from respondents. 2) Subscribers to the Health Technology Assessment (HTA) email list.

Design: The organisation-wide systematic approach to disinvestment proposed in the SHARE Program was described in an email. Participants were asked if they had experiences of disinvestment in the local healthcare context that could inform Monash Health decision-making, any unpublished reports or other documents on this topic, and current or planned research in this area.

Data collection: Responses were received by return email.

Analysis: Responses were collated and added to findings from the other sources which were then analysed thematically by content analysis.

Response rate: Eleven of the 14 researchers and four health librarians from the HTA list (denominator unknown) responded to the survey.

Structured workshops with the SHARE Steering Committee

Aim: The workshops had several aims, the component reported in this paper relates to identification of opportunities for disinvestment in existing or potential decision-making settings.

Inclusion criteria: Senior decision-makers at Executive and Director level and health service consumers

Sampling: Convenience sampling was used to include members of the SHARE Steering Committee comprising Executive Directors (Medical, Nursing, Support Services), clinical Program Directors (Medical, Nursing, Allied Health, Pharmacy, Diagnostic Services), Committee chairs (Technology/Clinical Practice, Therapeutics, Human Research and Ethics, Clinical Ethics), Directors of non-clinical services (Information Services, Procurement, Biomedical Engineering, Research Services), Legal counsel and two consumer representatives. Two representatives from the Department of Human Services Technology Division also participated.

Approach: Workshops were conducted at scheduled Steering Committee meetings.

Design: Workshops were based on the first two steps in the SEAchange model for evidence-based change [2]; identifying the need for change and developing a proposal for change. Presentations outlining the background and aims of the workshops were made by the project team, discussion was structured around the questions to be addressed and decisions were based on consensus. Questions included:

Workshop 1: Where and how are decisions made, documented, communicated, implemented and evaluated and what are the related system issues? Where is change required? Why? What is the problem? How can the need for change be measured? What are the factors enabling sustainability of the current system? How is it integrated?

Workshop 2: What existing systems/processes work well that we could maintain as they are, should be ceased, could be kept but require improvement? What new systems/processes should be introduced? What structures, skills, resources, commitment and leadership are required? Are they available? If not, how can they be obtained? What existing systems can be utilised? What is the solution to the problem? What are the options? What is known about best practice in this area? What is required to ensure sustainability of the proposed system? How can it be integrated?

Data collection: Participants completed prepared worksheets and discussed the findings. Discussion and decisions were documented in minutes.

Respondent validation: Minutes were approved at the following meeting.

Analysis: Data from the worksheets and findings from the discussion were collated and organised in MS Word and Excel. Emergent themes were identified by framework analysis.

Response rate: Thirteen members participated, 9 attended the first workshop, 11 attended the second, and some non-attenders also completed the worksheets.

Representativeness of sample: A range of senior decision-makers were represented at each workshop, plus representatives from the state health department.

Interviews with key local informants

Aim: To test preliminary thoughts regarding direction of the SHARE Program with front line staff and consumers

Participants: Six participants selected purposefully and pragmatically to seek the views of a range of Monash Health decision-makers: the five senior clinicians were program directors and department heads representing medicine, surgery, nursing, allied health and diagnostic services and the consumer representative had experience on committees that made organisation-wide decisions.

Interview schedule

Disinvestment: Have you heard about the concept of disinvestment?

Potential settings/methods: Are you aware of any of these? Do you do any of these sorts of things? What could you do in your Unit? What could be done in your Program/Division? What could be done by your colleagues eg referrers? Any opportunities for quick wins? Incentives to change? Barriers to change? Potential to link into advanced trainee projects?

Research evidence: What information do you use? Where from? How do you access it? What do you do with it? Could you use more? What would you like? How would you like it? What would you do with it?

Local data: Do you use Monash Health data? How? What for? Do you use external data? What? How? What for? Could you use it? How?

General discussion: How could we get wider feedback? Should we survey, etc? Should this be driven top down or bottom up? Would you be interested in piloting something?

Data collection: Structured interviews were conducted using the interview schedule above; one CCE staff member attended and took notes.

Analysis: Responses were collated and added to findings from the other sources which were then analysed thematically by content analysis.

Response rate: All 6 informants participated.

Representativeness of sample: Interviewees represented senior decision-makers from a range of contexts

Table B. Investigation of methods for identification of disinvestment opportunities at Monash Health

1. Purchasing and procurement

Structured interviews with staff authorised to make decisions on behalf of the organisation

Aim: To identify and document current processes for making, implementing and evaluating decisions and the factors that influence them.

Inclusion criteria: Staff and consumers authorised to make decisions regarding resource allocation for health technologies and clinical practices at organisation-wide level in group or individual settings.

Sampling: Purposive and snowball sampling was used.

- Twenty-two committees were initially identified from a governance structure diagram. A further 20 were identified through a snowballing method by asking participants in the subsequent interview process, senior managers and Quality Unit staff if they were aware of others. Fourteen of the 42 potential committees met the inclusion criteria (Capital Expenditure, Falls Prevention, Information Systems Governance, Joint Program Quality and Safety, Medication Safety, Operating Suite Product Evaluation, Nurse Standardisation of Practice, Resuscitation, Skin Integrity and Pressure Ulcer, Sterilising Services, Technology and Clinical Practice, Therapeutics and Transfusion Committees and the Executive Management Team).
- Approved Purchasing Units (APUs) have delegated authority from the Board to commit the organisation to a legal and/or financial obligation such as issuing a purchase order or signing a contract. Of the
 nine APUs, two had been included in the group decision-making committees (Capital Expenditure Committee and Executive Management Team) and five others met the inclusion criteria (Pharmacy, Health
 Technology Services, Equipment Services, Procurement and Clinical Purchasing, and Materials Management).
- Clinical managers from one clinical program selected for its high use of health technologies were identified from the program's intranet page. Individuals were selected purposively to represent all levels
 within the program's decision-making hierarchy; medical and surgical sub-specialties, nursing and quality management; and a range of campuses.

Approach: Personalised email invitations from the project team were sent to the Chair, Executive Sponsor and/or Secretary of 14 committees, managers of 5 APUs and 9 managers from the selected clinical program. Approval from the Nursing and Medical Program Directors was sought before approaching individuals from the selected program.

Interview schedule: Questions were based on a theoretical framework for the process of change [3] and included details of the characteristics of the external environment; organisation; potential adopters; decisions; implementation strategies; barriers and enablers; degree of implementation; degree of practice change; patient, practitioner, system and economic outcomes; and respondents reflections on the current system. The full interview schedule is available [4].

Data collection: Interviews were approximately 1 hour long and were conducted in the interviewee's office or suitable meeting room. Interviews were not taped or transcribed but detailed notes were taken. Two CCE staff members attended, one as interviewer and one as note taker.

Respondent validation: Drafts were sent to the interviewees for clarification, comment and/or amendment as required.

Analysis: Final interview notes were collated and organised in MS Word and Excel using the elements of the scanning taxonomy. Emergent themes were identified by framework analysis.

Response rate: Representatives of 13 of the 14 committees, all 5 APU managers and 9 clinical managers participated. One committee Chair did not respond to the invitation for interview; due to lack of time
no representative of this committee was interviewed. A surgical sub-specialty department head was unable to attend their interview and was replaced by a medical sub-specialty department head who was
available at short notice.

Representativeness of sample: Almost all eligible committees and all eligible APUs were represented. The clinical managers represented Program Directors, Department Heads, Unit/Ward Managers and ancillary services; medical (n=4), nursing (n=4) and quality management (n=1) staff; in a range of sub-specialties across multiple campuses.

Structured workshop with clinical decision-makers from a large diagnostic service

Aim: To capture the actual process of capital equipment purchasing and identify how an ideal process for this decision-making might differ from current practice.

Inclusion criteria: Clinical managers involved in decisions regarding purchase or new or replacement equipment.

Sampling: Purposive sampling was used. A large multi-campus diagnostic service was selected based on their use of equipment and the interest in the project expressed by the Director.

Approach: The Director and Research Director of the department identified 18 suitable participants representing all health professional groups, all campuses and most units within the service. Personalised email invitations were sent by the Executive Director of Medical Services and Quality.

Design: An experienced facilitator from CCE who had no involvement in the SHARE project developed and delivered the workshop. A presentation on the background of the project and its relevance to the workshop was made by a SHARE project team member. Two other project team members were present to assist with logistics and note taking. The session was run over 1½ hours in the departmental seminar room. Five domains were identified a priori: how do we get an idea; what is the process (application, approval, feedback, who, timing); is it a good idea; is it the best idea; and monitoring and

evaluation.

Data collection: Using a nominal group technique, participants were asked to describe the ideal process for purchasing large capital equipment. Responses were collected on 'sticky-notes'. This method was repeated to identify gaps in the current process and included prioritisation of key areas for improvement.

Respondent validation: A workshop report was provided to participants for comment.

Analysis: Responses on the 'sticky notes' and additional workshop notes were collated and organised in MS Word and Excel using the domains identified a priori. Emergent themes were identified by framework analysis.

Response rate: 17 of the 18 invitees attended. An additional staff member from a clinical area not represented on the invitation list was included at the commencement of the workshop.

Representativeness of sample: Participants represented all campuses, sub-specialties and health professionals (medicine, nursing, allied health, technical, quality improvement, business management, research) within the department.

Document analysis

Aim: To provide evidence for the stated positions and methods of administration of decision-making systems and processes for resource allocation at Monash Health and the state health department.

Inclusion criteria: Documents that guided decision-making or implementation of resource allocation decisions

Identification: Documents were identified by key informants and searches within the Monash Health Policy and Procedure database.

Documents included: 1) State government: Victorian Government Purchasing Guidelines, Medical Equipment Asset Management Framework, Targeted Equipment Replacement Program and Health Purchasing Victoria Product Management Guidelines. 2) Monash Health: Purchasing Policy, Purchasing Policy Guidelines, Authority Delegation Schedule, Code of Conduct, Conflict of Interest Protocol, Guidelines for management of Gifts and Benefits, Terms of Reference for committees that make resource allocation decisions, Application forms, Business case templates, Requisition forms and checklists.

Data collection: Documents were retrieved or sourced online. Data were extracted based on a theoretical framework for the process of change [3].

Collation: Findings were collated and organised in MS Word and Excel using the elements of the theoretical framework.

Consultation with purchasing and procurement staff

Aim: To clarify purchasing and procurement processes; present proposals for change and identify additional opportunities; and discuss feasibility of proposals considered, implementation and evaluation.

Participants: Managers of Procurement, Clinical Purchasing and Health Technology Services; representative of SHARE Steering Committee; project team members.

Design: Agenda including points for discussion; decisions made by consensus; documentation of discussion, decisions and actions in minutes.

2. Guideline and protocol development

Development of new Policy and Procedure Framework (PPF)

PPF project: Not part of SHARE, separate project contemporaneously undertaken by members of SHARE project team: included rapid review of the literature; search for existing PPF frameworks; communication with Australian health agencies regarding standard definitions for policies, procedures, protocols and guidelines; consultation with Monash Health staff; review of local documents, processes and structures; comparison with practice in other health services.

SHARE component: Introduction of a prompt in the instructions to document developers to consider whether any current practices could be discontinued, and a requirement that a systematic review process was followed and a checklist recording the steps undertaken in document development were also included.

3. Proactive use of published research

Development of catalogue of disinvestment opportunities

Literature searches: Searches were conducted in known sources of high quality evidence using terms to identify health technologies and clinical practices with evidence of harm, lack of effect, and lack of cost-effectiveness

- Systematic reviews and Health Technology Assessments from Cochrane Database of Systematic Reviews, UK National Institute for Health and Clinical Excellence (NICE), Australian Safety and Efficacy Register of New Interventional Procedures-Surgical (ASERNIPS)
- Alerts, recalls and bulletins from Australian Therapeutic Goods Administration, Australian National Prescribing Service and Australia New Zealand Horizon Scanning Network
- Resources that specifically identified evidence-based targets for disinvestment such as NICE Optimal Practice Reviews and South Birmingham Primary Care Trust Not Routinely Funded List

Opportunistic capture: Potential disinvestment projects were proposed by SHARE Steering Committee, Technology/Clinical Practice Committee, project team and clinicians. Sources of ideas included conferences, journals articles, email bulletins and awareness of practice elsewhere. Claims regarding suitability for disinvestment were validated from the research literature by the project team.

Development of taxonomy: Classifications were based on existing definitions from the National Library of Medicine Medical Subject Headings (MeSH) [5]; International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM) [6]; McMaster Evidence Updates [7]; and Academy Health Glossary of Terms Commonly Used in Health Care [8]. When suitable definitions were not available, additional classifications were created and defined to meet Monash Health needs [9].

Development of catalogue: Details of 184 disinvestment opportunities were stored in an MS Excel spreadsheet using classifications from the taxonomy.

4. Proactive use of local data

Consultation

Participants and Aims

- Director of Clinical Information Management to identify opportunities and methods for accessing and using data to drive disinvestment decision-making.
- Director of Quality to discuss use of data in quality initiatives.
- Representatives of the 13 committees that make organisation-wide decisions regarding allocation of resources (noted above) to identify their ongoing and intermittent needs from local data.

Design: Informal individual discussions with SHARE project team members; the discussions with the committee representatives were conducted subsequent to the data gathering interviews noted above.

Structured interviews with representatives from departments collecting, maintaining and sharing data related to TCPs

Aim: To identify current sources of data at Monash Health and the processes involved.

Inclusion criteria: Managers of departments involved in collection, storage and use of data.

Sampling: Purposive sampling was used initially: departments were identified by the Head of Clinical Information Management and a concept paper on knowledge transfer at Monash Health. Snowball sample was used subsequently by asking respondents if they were aware of others. Representatives of 10 relevant departments were invited to participate (Clinical Information Management, Health Information Systems, Pharmacy, Pathology, Diagnostic Imaging, Research Directorate, Infection Control, Infectious Diseases and the Clinical Audit and Clinical Risk groups within the Quality Unit).

Approach: Email invitations were sent to the heads of the departments identified.

Interview schedule: Questions were designed to identify the data available, methods of collection and storage, utilisation in decision-making, internal and external reporting, other forms of dissemination, strengths and weaknesses of the current system and opportunities for improvement. The interview schedule is available [10].

Data collection: Interviews approximately 1 hour long were conducted by one CCE staff member and audio taped.

Collation: Interview data were collated in MS Excel using the elements of the interview schedule.

Response rate: All 10 invitees participated

Representativeness of sample: A broad range of settings were included.

5. Economic approaches to priority setting

Literature review

Aim: To identify examples of economic approaches to priority setting relevant to resource allocation for TCPs, decision-making criteria, and challenges of priority setting for disinvestment.

Search terms: Combinations of the terms priority, prioritisation, priority setting, priority criteria and health technology.

Sources: Medical databases (Ovid Medline, Cochrane Library, Cinahl), the internet (via the Google search engine), and prospective searches of identified review articles (in the Web of Science online search engine). These methods were supplemented by snowball searching for additional relevant articles from reference lists.

Inclusion criteria: Review articles, English language publications.

Data Collection and Analysis: Results were screened by title and abstract to identify recent review articles. Information relevant to local health service decision-making was extracted.

Search results: Two documents met the inclusion criteria.

Synthesis: Information was summarised in a discussion paper for a workshop with the SHARE Steering Committee (Table E).

Consultation

Expert advice was sought from the SHARE health economist throughout this project.

6. System Redesign

Literature review

Aim: To investigate system redesign examples and their applicability to resource allocation decision-making for TCPs at Monash Health.

Search terms: Combinations of the terms system redesign, restructure, modernisation, clinical process redesign, lean, design principles, health system, healthcare reform, transformation, system change, organisational redesign, technology, clinical practice, priorities and disinvestment. The search strategy was iterative with new terms added as they were identified.

Sources: Medical databases (Ovid Medline, Embase, CINAHL, Cochrane Library), the internet (via the Google search engine) and specific websites including the UK National Health Service, the UK National Institute for Health and Clinical Excellence (NICE) and the US Institute for Healthcare Improvement (IHI). Key references, authors, organisations and reports highlighted in the literature were also investigated.

Inclusion criteria: Any study design, report or document discussing system redesign relevant to resource allocation decision-making for TCPs within a local health service, English language publications.

Data Collection and Analysis: Results were screened by title and abstract. Information relevant to local health service decision-making was extracted. The information retrieved was analysed in themes relevant to the SHARE aims is system redesign, disinvestment, TCPs and decision-making in healthcare.

Search results: 682 articles were retrieved and 42 met the inclusion criteria.

Synthesis: Information was summarised in a discussion paper for a workshop with the SHARE Steering Committee (Table E).

Structured interviews with staff experienced in system redesign

Aim: To investigate system redesign examples and their applicability to resource allocation decision-making for TCPs at Monash Health.

Participants: Experts in system redesign were initially identified by the Director of Quality; snowball sampling by asking interviewees if they were aware of others working in this area identified additional participants. Directors or senior managers in the areas of Strategic Planning; Access, Innovation and Service Improvement; Acute Ambulatory Services; Chronic Disease Management; Service Improvement, Quality and Projects, Mental Health; Diagnostic Imaging; General Medicine Model of Care Redesign; and Clinical Performance and Service Reconfiguration participated.

Interview schedule: Interviewees were asked about system redesign, their understanding of disinvestment, decision-making on new and existing services, prioritisation of services, processes for monitoring and evaluation, and communication strategies. Interview schedule in Table F below.

Data collection: Interviews lasting between 45 and 60 minutes were conducted by one CCE staff member who took notes.

Analysis: Content analysis was undertaken to identify emergent themes.

Response rate: All 8 invitees participated.

Representativeness of sample: All interviewees had expertise and experience in system redesign. This was an illustrative sample, no attempt was made to comprehensively identify all potential respondents within the organisation.

Table C. Investigation of methods for prioritisation and decision-making at Monash Health

Literature review

Aim: To identify existing frameworks and tools for prioritisation relevant to resource allocation for TCPs.

Search terms: Scoping search using the terms prioritisation, priority setting, priority criteria and health technology.

Sources: Medical databases (Ovid Medline, Cochrane Library) and the internet (via the Google search engine).

Inclusion criteria: Frameworks and tools for prioritisation relevant to the local healthcare setting or systematic reviews on this topic, English language publications.

Data Collection and Analysis: Results were screened by title and abstract to identify frameworks and tools for prioritisation. Information relevant to local health service decision-making was extracted.

Search results: 7 documents met the inclusion criteria; these included guidelines, frameworks, tools, systematic reviews and an overview of international practice in prioritisation of new technologies.

Synthesis: Information from articles which met the inclusion criteria was summarised in a discussion paper for a workshop with the SHARE Steering Committee (Table E).

Consultation

Aims: To document government and local decision-making requirements for purchase of new and replacement of existing capital equipment and identify current practice at Monash Health.

Participants: Director of Business Support Services and Manager of Health Technology Services.

Design: Informal individual discussions with members of the project team who took notes.

Table D. Investigation of methods for implementation and evaluation at Monash Health

Structured interviews with staff members who have experience in disinvestment projects

Aim: To learn from previous experiences of disinvestment at Monash Health.

Inclusion criteria: Staff who had undertaken projects to remove, reduce or restrict current practices (the term 'disinvestment' was not used in Monash Health projects).

Sampling: Purposive and snowball sampling was used. Relevant projects were initially identified by members of the SHARE Steering Committee and interviewees in the committee review process noted above. A snowballing method was employed by asking participating project representatives if they knew of any other relevant projects. Nineteen potential projects were identified, 13 met the inclusion criteria.

Approach: Personalised email invitations from the project team were sent to project managers of 13 relevant projects. Project managers or Department/Unit Heads were sought as key contacts; however a representative of the project team was accepted when a senior staff member was unavailable.

Interview schedule: Questions were designed to explore project governance, use of routinely-collected hospital data, other local data and research evidence in the development and implementation of projects; barriers and enablers to successful project implementation; what staff would do again and what they would do differently. The full interview schedule is available [4].

Data collection: Interviews were approximately 1 hour long and were conducted in the interviewee's office or suitable meeting room. Interviews were not taped or transcribed but detailed notes were taken. Two CCE staff members attended, one as interviewer and one as note taker.

Respondent validation: Drafts were sent to the interviewees for clarification, comment and/or amendment as required.

Analysis: Final interview notes were collated and organised in MS Word and Excel using the elements of the scanning taxonomy. Emergent themes were identified by framework analysis.

Response rate: Representatives of 10 projects participated based on interviewee's and interviewer's availability

Representativeness of sample: The process was designed to be illustrative and did not seek to comprehensively identify all projects. A number of project topics across a range of clinical areas were included.

Structured interviews with decision-makers

Aim: To identify and document current processes for implementing and evaluating decisions and the factors that influence them.

Participants: 27 staff members authorised to make decisions on behalf of the organisation (previously described in Table B).

Interview schedule, data collection and analysis: Questions regarding implementation and evaluation of decisions at Monash Health were a subset of the broader interviews which are reported in Table B.

Structured workshops with SHARE Steering Committee

Aims: To review and refine draft proposals, frameworks and plans and make final decisions.

Participants: SHARE Steering Committee members including Executive Directors (Medical, Nursing, Support Services), Program Directors (Medical, Nursing, Allied Health, Pharmacy, Diagnostic Services), Committee chairs (Technology/Clinical Practice, Therapeutics, Human Research and Ethics, Clinical Ethics), Managers (Information Services, Clinical Information Services, Procurement, Biomedical Engineering, Research Services), Legal counsel and two Consumer representatives.

Design

- Provision of pre-reading materials and/or workshop presentation of background, issues to consider, draft proposals, etc
- Agenda including points for discussion and decisions required
- Decisions made by consensus
- Documentation of discussion, decisions and actions in minutes

Table F. Interview schedule System Redesign

The following questions focus on system redesign specifically in relation to technologies and clinical practices (TCPs).

Our aim is to investigate system redesign examples and their applicability to TCP resource allocation decision making in Southern Health.

System redesign

- 1. What is your understanding of system redesign?
 - a) Why do system redesign? eg better use of existing resources
- 2. How do you identify the need for system redesign?
- 3. What are some examples of system redesign within Southern Health? eg hospital-wide, department/s or ward/s.
 - a) Where do you plan to implement system redesign in the future?
- 4. When do you plan and implement system redesign in the future? When is the 'right' or preferable time? May involve long-term projects organisation-wide or shorter-term individual projects within a department or ward.
 - a) How do you decide which project is the priority?
- 5. Who is involved in the planning and implementation of system redesign? eg key stakeholders, executive management, staff and/or consumer representation
 - a) How do you plan for system redesign? What resources are required? eg time, staff etc
- 6. How do you implement system redesign? What process is undertaken? eg an organisation-wide process of decision making and prioritisation or individual projects to implement change

Disinvestment

- 7. Are you familiar with the concept of disinvestment? What is your understanding of disinvestment? Our understanding of disinvestment is: the process of (partially or completely) withdrawing health resources that are no longer considered to be safe, effective or cost-effective, and thus are not efficient health resource allocations.
- 8. Is this concept actively considered in planning for system redesign in Southern Health? Specifically in relation to TCPs?

Decision making

- 9. How do you make decisions on planning for new services? Or changes in existing services?
 - a) Assessment of how well new services will work / how well existing services work?
 - b) Which new services to provide / spend money on?
 - c) Which existing services to cease providing or enforce limitations/restrictions?
- 10. How do you prioritise allocation of new services? In particular, new TCPs?
- 11. What is your process for monitoring and evaluation of changes / collection of data?
- 12. How do you plan your communication strategy?
- 13. Any further thoughts or suggestions?

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Appendix 5. Paper 8 Additional file

Sustainability in Health care by Allocating Resources Effectively (SHARE) 8: Developing, implementing and evaluating an Evidence Dissemination Service in a local healthcare setting

Additional File: Methods and Results

Contents

Section 1	Identifying the need for change: Data collection methods and sources	2
Section 2	Developing the intervention: Feedback, refinement and decision-making	4
Section 3	Evaluating the change: Evaluation Plans	5
	a. Model 1	5
	b. Model 2	6
Section 4	Survey of decision-makers: Preferred content and format of evidence product	7
Section 5	Factors that influenced organisational decision-making relevant to EDS	8
Section 6	Factors that influenced development of SHARE Program relevant to EDS	16
Section 7	Factors that influenced development, processes, outcomes and revision of EDS	18
	a. Development	18
	b. Success and sustainability	20
	c. Model 1 Pilot	22
	d. Model 1 Full implementation	23
	e. Model 2 Pilot	24
	f. Model 2 Full implementation	24
Section 8	Options considered in development of EDS	25
Section 9	Definitions of evidence products, inclusion criteria and appraisal applied to publication sources	26
Section 10	Sources of synthesised evidence	28
Section 11	Taxonomy	29
Section 12	Model 1 Examples of the EDS Website	32
Section 13	Model 1 Example of EDS Email Alert	35
Section 14	Draft tool for reporting use of evidence with completed examples	36
Section 15	Survey of staff enrolling in the EDS: Baseline data	37
Section 16	Model 1 Pilot implementation and evaluation	40
Section 17	Model 1 Evaluation of full implementation	45
Section 18	Systematic Review Appraisal	52
Section 19	Model 2 Evidence Bulletin template	54
Section 20	Model 2 Example of an Evidence Bulletin	56
Section 21	Model 2 Report to Executive Management Team	58
Section 22	Model 2 Pilot implementation and evaluation	61
Section 23	Model 2 Implementation flyer	62
Section 24	Model 2 Evaluation of full implementation	63
Section 25	Protocol to address evidence findings involving multiple decision-makers	66
Section 26	References	73

LITERATURE REVIEW

Information needs of decision-makers

Aim: To identify the information needs of decision-makers in local healthcare services to facilitate development of pilot support services.

Questions: What are the information needs of clinicians and managers to support evidence-based decision-making regarding the introduction or removal of technologies and clinical procedures?

How have assessments to determine these needs been conducted in the past?

Sources: Medline, CINAHL, EMBASE, LISA, LISTA and Google

Medline Search (adapted for other databases): (exp Needs Assessment/) AND (Information Dissemination/ or Information Services/ or Information Management/) limit to (English language and humans) Google Search: (information OR evidence) AND (need OR assessment) AND (health OR nurs OR doctor OR med). Preferences were set to English language.

Inclusion criteria: Articles describing information needs assessments in similar health service contexts examining how clinicians and managers make evidence-based decisions regarding the introduction or removal of technologies and clinical practices; articles published in English from 1996.

Exclusion criteria: Information needs of students; continuing professional education needs; point of care decision-making needs; assessments of information needs in resource poor health settings

Data Collection and Analysis: Inclusion, exclusion and appraisal criteria were established a priori. Studies to be reviewed by one reviewer in consultation with colleagues when necessary. Critical appraisal relevant to study design to be conducted using standard CCE templates.

Results: No studies were found to meet the inclusion criteria. The limitations of the very specific question and narrow selection criteria were acknowledged. Earlier broad searches resulted in unmanageable numbers of returned articles, however limiting the search returned none. Since the purpose of the review was to inform development of the support services, and not to be a systematic review providing a definitive answer for others, a decision was made to take a pragmatic, iterative approach by accessing relevant publications already known to the project team and following up with simpler searches, pursuing articles from reference lists, etc.

SURVEYS

Staff who made decisions about resource allocation

Aim: To identify the information needs of decision-makers at Monash Health to facilitate development of support services and gather baseline data for evaluation purposes.

Participants: Staff who made decisions regarding resource allocation for technologies and clinical practices.

Design and content: An electronic questionnaire was designed and delivered using SurveyMonkey [1]. Questions were developed to identify current use of evidence; confidence in searching for, accessing and appraising evidence; difficulties in using evidence and implementing evidence-based change; preferred content and format of bulletins disseminating research evidence; and preferred formats for education and training in these areas. Some questions were adapted from Taylor et al [2].

Pretesting and piloting: The survey was pre-tested with colleagues at a co-located research institute, piloted with the SHARE Steering Committee, and refined based on feedback from these groups **Distribution:** An email with an embedded link to the survey was distributed to senior staff using the Monash Health 'All Managers' and 'Senior Medical Staff' email lists. Members of these lists were asked to forward the survey to others who made decisions about resource allocation but might not be on the list.

Data collection: Data were collected over a four-week period from the time of distribution. No reminders were sent.

Analysis: Results were downloaded into Excel from the survey provider. Qualitative data from the three free text answers were copied into NVivo [3] where they were coded according to themes presented in Michie et al [4]. Data were reviewed by two investigators to ensure agreement of coding. Discrepancies were discussed with a third investigator until consensus was reached. There were insufficient categories in the Michie et al framework to address some of the organisational issues; additional themes were created as required.

Response rate: 141 staff members responded. 118 were eligible to complete the survey having answered 'yes' to the screening question asking if they made decisions about resource allocation. 103 completed the entire survey. The response rate could not be calculated in the absence of denominator information; the total number of staff on the email lists and the number of additional staff to whom the survey was forwarded were unknown.

Representativeness of sample: All programs and service sites were represented in proportions consistent with the size of the program or campus. A range of professional disciplines were represented: nursing (28%), allied health (25%), medical (24%) and other (23%) including pharmacy, diagnostic services, corporate and clinical program management, and administration.

Staff enrolling in the Evidence Dissemination Service (Baseline survey)

Aim: To ascertain how participants enrolling in an Evidence Dissemination Service (EDS) currently use evidence in decision-making.

Participants: Staff members enrolling to participate in EDS.

Design and content: An electronic questionnaire was designed and delivered using SurveyMonkey [1]. Questions were developed to identify current use of evidence; time spent searching for, accessing and appraising evidence; perceptions of EBP at Monash Health and features of respondent's decision-making practice.

Distribution and Data collection: The survey was part of the enrolment process.

Analysis: Results were downloaded into Excel from the survey provider.

Response rate: 46 staff members enrolled to participate in EDS during the survey period.

Representativeness of sample: Respondents represented all clinical groups and all health service programs and sites.

INTERVIEWS

Members of organisation-wide committees, representatives of approved purchasing units and individuals who made decisions about resource allocation

Aim: 1) To examine and document current processes for making, implementing and evaluating decisions and the factors that influence them (all interviewees) and 2) To identify relevant issues and pilot draft questions for needs analysis survey (clinical program managers only).

Participants: Invitations were extended to 1) representatives of 14 committees with a mandate to make organisation-wide decisions regarding allocation of resources, 2) managers of 5 approved purchasing units (APUs) and 3) 9 managers from one clinical program selected for its high use of health technologies.

Interview schedule: Questions were designed to identify how evidence and data were used in decision-making, implementation and evaluation and the associated barriers and enablers (all interviewees). Additional questions were designed to identify training and support needs for decision-making, implementation and evaluation and preferred formats for delivery (clinical program managers only). These were part of a schedule investigating organisational decision-making more broadly. The full interview schedule is available [5].

Data collection: Interviews were approximately 1 hour long. Two CCE staff members attended, one as facilitator, one as note taker. Drafts were sent to the interviewees for clarification, comment and/or amendment as required.

Analysis: Final interview notes were analysed thematically in MS Word and Excel using the elements of the theoretical framework.

Response rate: 13 of the 14 committees, all 5 APU managers and all 9 clinical managers participated

Representativeness of sample: All but one of the relevant committees and all APUs were represented, the clinical managers selected represented Program Directors, Medical Department Heads, Nurse Unit Managers and Quality and Risk Manager in medical and surgical sub-specialties, nursing and quality management across a range of campuses.

WORKSHOP

Structured workshop with decision-makers from a large diagnostic service

Aim: To capture the process of capital equipment purchasing in a large multi-campus diagnostic service and how an ideal process for this decision-making might differ from the current process.

Participants: The Director and Research Director of the diagnostic service generated the invitation list. Eighteen decision makers from all units, campuses and health professional groups within the service were invited by the Executive Director Medical Services and Quality.

Design: An experienced facilitator from CCE who had no involvement in the SHARE project developed and delivered the workshop. A presentation on the background of the project and its relevance to the workshop was made by a SHARE project team member. Two other project team members were present to assist with logistics and note taking. The session was run over 1½ hours in the departmental seminar room. Five domains were identified a priori: how do we get an idea; what is the process (application, approval, feedback, who, timing); is it a good idea; is it the best idea and monitoring and evaluation. Barriers and enablers were explored.

Data collection: Using a nominal group technique, participants were asked to describe the ideal process for purchasing large capital equipment. Responses were collected on sticky-notes. This method was repeated to identify gaps in the current process and included prioritisation of key areas for improvement.

Analysis: Responses on the sticky notes were collated under the domains identified a priori. They were analysed within these domains to identify key themes.

Response rate: 17 of the 18 invitees attended. An additional staff member from a clinical area not represented on the invitation list was included at the commencement of the workshop.

Representativeness of sample: A range of medical, nursing, technical, quality improvement staff and business management representing all units within the department and all campuses attended.

INDIVIDUAL AND GROUP DISCUSSIONS

Senior decision-makers

Aims: To inform senior decision-makers of proposed plans, ascertain feedback regarding feasibility and acceptability, and seek support and endorsement.

Participants: Nursing Executive Team, all Medical Program Directors and the General Manager of Allied Health.

Format: Nursing Executive Team met as a group, Program Directors and General Manager were consulted individually. A summary of the proposed EDS was presented and participants asked for their feedback.

Data collection: Discussions were approximately 30 minutes long. The CCE Director/SHARE Program Director was the presenter and facilitator. Notes were taken.

WORKSHOPS

Aims: To review and refine draft proposals and make final decisions.

Participants: Initially held with the EDS Advisory Group, including an Executive Director (Nursing), General Manager (Allied Health) and two Department Heads (Surgery and Information Technology). Subsequently held with the SHARE Steering Committee including Executive Directors (Medical, Nursing, Support Services), Program Directors (Medical, Nursing, Allied Health, Pharmacy, Diagnostic Services), Committee chairs (Technology/Clinical Practice, Therapeutics, Human Research and Ethics, Clinical Ethics), Managers (Information Services, Clinical Information Services, Procurement, Biomedical Engineering, Research Services), Legal counsel and two Consumer representatives.

Design

- Provision of pre-reading materials and/or workshop presentation of background, issues to consider, draft proposals, etc
- Agenda including points for discussion and decisions required
- Documentation of discussion, decisions and actions in minutes

Structured decision-making workshops were held at scheduled meetings of both groups. Discussion papers and background documents were provided beforehand, formal presentations introduced the workshops, and topics for discussion and decisions required were listed on the agenda.

Deliberation

The deliberative process was informal within the structure of the agenda and decisions were based on consensus. Discussion, decisions and actions were documented in minutes which were confirmed at subsequent meetings.

FACTORS FOR SUCCESS AND SUSTAINABILITY (Reproduced from Harris et al [6] with permission)

Success

A proposal is more likely to be successfully implemented if it meets the following criteria:

- It is based on sound evidence or expert consensus
- It is presented by a credible organisation
- It can be tested and adapted
- The relative advantage is evident
- It is of low complexity
- It is compatible with the status quo
- It has an attractive and accessible format

Sustainability

A proposal is more likely to be sustainable if it has appropriate and adequate provision in each of the following categories:

- Structure
- Skills
- Resources
- Commitment
- Leadership

Section 3 Evaluating the change: Evaluation Plans

a. Model 1

Domains	Key Evaluation Questions	Data Sources	Data collection methods	Outcomes		
Reach	Have Southern Health Decision-makers either personally reviewed or nominated a member to receive and report EDS alerts?	Decision-maker documentation	Document analysis	Committees, Departmental, Executive and Program heads sign up to EDS or nominate an employee to receive alerts relevant to their area of		
	What are the trends in Southern Health User enrolment for EDS alerts?	EDS Web-based statistics	Audit			
	How often are Southern Health staff accessing the EDS website?	EDS Web-based statistics	Audit	specialty.		
Usefulness	Which aspects of EDS presentation, content and format do decision-makers	Decision-makers	Interviews and surveys	Decision-makers review relevant		
	find helpful?	Users	Surveys	information from EDS alert and retrieve full text where necessary		
	Which aspects of EDS presentation, content and format do decision-makers feel	Decision-makers	Interviews and surveys	Southern Health decision-making		
	could be improved?	Users	Surveys	Committees discuss relevant		
	Do decision-makers consider information delivered by EDS as being credible,	Decision-makers	Interviews and surveys	information identified in EDS alert		
	reputable, authoritative, and trustworthy?	Users	Surveys			
Use	Have EDS Alerts been discussed in Southern Health decision-making committee meetings?	Decision-maker Committee documentation	Document analysis	Decision-making Committees, Executive, Department heads and		
	Have Committees, Executives, Program heads and Department heads used information received from EDS to guide decision-making?	Decision-makers	Interviews and surveys	Program heads respond to relevant information identified in EDS alerts		
	Do Committees, Executives, Program heads and Department heads intend on using information received from EDS in future decision-making?	Decision-makers	Interviews and surveys	adapted accordingly		
	Is there evidence that EDS has been used to inform disinvestment activities?	Decision-makers	Interviews and surveys			
	Is there evidence that TCP related decisions have been made without input from Committees? (related to wider implementation with staff)	Users	Surveys			
Implementation	To what extent has EDS been implemented as planned?	EDS team	Group interview	EDS is fully implemented		
	What do decision-makers report to be the barriers and enablers of implementing evidence received from EDS into practice?	EDS team	Group interview			
	Were there any gaps in the implementation of EDS that need addressing to meet program aims?	EDS team	Group interview			

b. Model 2

Domains	Evaluation Questions	Data Sources	Data collection methods	Outcomes	
Reach	How many evidence bulletins have been disseminated through the TCPC to decision-makers?	EDS Database	Audit	The EDS appraises the quality and	
	How many evidence bulletins had related Southern Health policies, procedures or guidelines?	EDS Database	Audit	relevance of evidence prior to	
	How many evidence bulletins were inconsistent with local policies and procedures?	EDS Database	Audit	stakeholders at Southern Health	
	How many pieces of evidence required action by the decision-maker and/or stakeholders?	EDS Database	Audit		
Usefulness	Was the TCPC satisfied with the format and presentation of the evidence?	ТСРС	Interviews	Decision-makers find the content, presentation and delivery of the new process for disseminating evidence	
	Were decision-makers satisfied with the new EDS/TCPC process?	Decision-makers	Survey		
	Were decision-makers satisfied with the format and presentation of the evidence?	Decision-makers	Survey	useful	
	Do decision-makers consider the content of the evidence bulletins to be useful?	Decision-makers	Survey		
	What aspects of the format, presentation and content could be improved?	Decision-makers	Survey		
	Was the TCPC satisfied with the format and presentation of the templates for reporting?	ТСРС	Interviews		
	Were decision-makers satisfied with the format and presentation of the templates for reporting?	Decision-makers	Survey		
	Do decision-makers consider information delivered by the new EDS to be credible, reputable, authoritative, and trustworthy?	Decision-makers	Survey	Decision-makers find the evidence delivered to them to be credible, reputable, authoritative, & trustworthy	
Use	How many evidence bulletins identified by the EDS were shown to have evidence of harm, evidence of benefit, evidence of a more cost-effective alternative, or evidence of lack of effect?	EDS Database	Audit	Decision-makers use the evidence presented to them to inform or change	
	How many evidence bulletins identified by the EDS required action by the decision-maker and/or	EDS Database	Audit	current practice	
	stakeholders due to inconsistency with Southern Health policies, procedures or guidelines?	EDS Reporting Database			
	How many decision-makers report that their practice would require a change based on the	EDS Reporting Database	Audit		
	evidence presented?	Decision-makers	Survey		
	How many decision-makers actually changed their practice based on the evidence presented?	EDS Reporting Database	Audit		
	What types of change were involved?	Decision-makers	Survey		
	Have all instances of evidence of harm been forwarded to the Executive Management Team?	EDS Database	Audit	Procedures where there is evidence of harm are not undertaken	
	How many decision-makers reported to the TCPC within the appropriate period of time?	EDS Reporting Database	Audit	Decision-makers respond to presented	
		ТСРС	Survey	evidence in the appropriate timeframe	
Implementation	To what extent has the new EDS been implemented as planned?	EDS Team & TCPC	Discussion/reflection	Southern Health practice is consistent	
	What do decision-makers report to be the barriers and enablers of implementing evidence received from the new configuration of EDS into practice?	Decision-makers	Survey	with current high-quality synthesised evidence	
	Were there any gaps in the implementation of the new EDS that need addressing to meet program aims?	EDS Team & TCPC	Discussion/reflection		

Section 4 Survey of decision-makers: Preferred content and format of evidence product

From survey of Monash Health staff who made decisions about resource allocation.

Full details of all survey questions are in Paper 7 of this series [7].

Respondents were invited to choose as many as applied	n (%)		
Critical appraisals of primary research	88 (83.0)		
Full text of secondary research (eg evidence-based guidelines, systematic reviews)	83 (78.3)		
Critical appraisals of secondary research	79 (74.9)		
Full text of primary research (eg clinical trials)	73 (68.9)		
Abstracts of primary research	50 (47.2)		
Abstracts of secondary research	44 (41.5)		
Other*	7 (6.6)		
Total	106		
*Other: consumer perspectives, case-studies of other health services, web-access to journals,			

Type of research publication to inform decisions about health technologies or clinical practices

professional guidelines and web-access for participation in group wide trials

Focus of research to inform decisions about health technologies or clinical practices

Respondents were asked to rank at least three preferences with 1	1	2	3	4	5	6
being the most preferred option	n (%)	n (%)				
Condition specific information (eg Diabetes)	25 (23.8)	26 (25.2)	18 (17.5)	7 (13.0)	8 (20.0)	3 (21.4)
Professional group information (eg Emergency Department Nursing)	23 (21.9)	25 (24.3)	17 (16.5)	8 (14.8)	6 (15.0)	0 (0.0)
Program relevant information (eg Mental Health)	21 (20.0)	20 (19.4)	26 (25.2)	16 (29.6)	2 (5.0)	0 (0.0)
Organisation wide information (eg Infection Control)	15 (14.3)	14 (13.6)	15 (14.6)	14 (25.9)	16 (40.0)	1 (7.1)
Unit relevant information (eg Monash Newborn Services)	13 (12.4)	18 (17.5)	26 (25.2)	9 (16.7)	8 (20.0)	2 (14.3)
Other*	8 (7.6)	0 (0.0)	1 (0.97)	0 (0.0)	0 (0.0)	8 (57.1)
Total	105	103	103	54	40	14
*Other: consumer initiated, focused and developed research; international relevance; focus needed depends on the task; skill or procedure specific eg bed management						

Format of research dissemination to inform decisions about health technologies or clinical practices

Respondents were asked to rank at least three preferences with 1	1	2	3	4	5	6	7
being the most preferred option	n (%)	n (%)					
Short pdf attachment to an email (eg titles and hyperlinks)	33 (32.4)	19 (18.8)	26 (25.5)	5 (11.9)	0 (0.0)	0 (0.0)	0 (0.0)
Long pdf attachment to email (eg titles, abstracts, hyperlinks)	26 (25.5)	22 (21.8)	11 (10.8)	8 (19.0)	2 (6.3)	3 (10.7)	0 (0.0)
Email with titles and embedded hyperlinks	18 (17.6)	26 (25.7)	21 (20.6)	2 (4.8)	7 (21.9)	4 (14.3)	0 (0.0)
Searchable database	18 (17.6)	13 (12.9)	19 (18.6)	12 (28.6)	6 (18.8)	7 (25.0)	1 (7.7)
Short paper-based newsletter (eg titles and web addresses)	4 (3.9)	14 (13.9)	13 (12.7)	9 (21.4)	6 (18.8)	5 (17.9)	1 (7.7)
Long paper-based newsletter (eg titles, abstracts, web addresses)	2 (1.9)	6 (5.9)	9 (8.9)	6 (14.3)	11 (34.4)	12 (42.3)	4 (30.8)
Other*	1 (1.0)	1 (1.0)	3 (2.9)	0 (0.0)	0 (0.0)	0 (0.0)	7 (53.9)
Total	102	101	102	42	32	28	13
*Other short summaries about the article and main findings and then a link to the full article, lectures and /or in services, website, full text							

Other: short summaries about the article and main findings and then a link to the full article; lectures and/or in-services; website; full text review articles by well-respected authors; workshops regarding methods eg statistics, database development

Section 5 Factors that influenced organisational decision-making relevant to EDS

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Items related to proactive use of evidence in decision-making are highlighted. The other items are retained to provide context.

Factors identified in response to a specific question about barriers and enablers are noted in italics.

STRENGTHS/ENABLERS	WEAKNESSES/BARRIERS
External environment	
General Good relationships with external agencies such as Australian Council of Healthcare Standards, Victorian Department of Human Services (DHS) Projects initiated by external organisations such as Australian Quality Council, NSW Therapeutics Advisory Group and Clinical Excellence Commission • Legislation, regulations, national and international standards, and professional standards must be followed. This provides clarity and certainty for some decisions.	 Some decision-makers are unaware of mandatory requirements.
 International International bodies and national agencies of other countries provide evidence-based recommendations for use of health technologies, clinical practices, models of care, etc. Systematic reviews and Health Technology Assessments are also available. National The Medical Services Advisory Committee and Pharmaceutical Benefits Advisory Committee provide ovidence based reviews and drugs. 	 Decision-makers are frequently unaware of these resources. Due to lack of time, knowledge and skills decision-makers do not actively seek these resources when making decisions and do not differentiate between high and low quality resources. Cost-effectiveness data is often based on modelling which is perceived not to reflect reality Not all medical and surgical procedures and drugs are covered by these processes.
 State Guidance for introduction of new health technologies and clinical practices (TCPs) is provided by DHS. This includes reporting requirements. Monash Health has developed tools to implement these processes. DHS has recommended these tools to other health services. Monash Health Decision Summaries are published on the health service website. The Victorian Policy Advisory Committee on Technology (VPACT) has an annual funding round for 	 Indusing and aned fleath practices, models of care and clinical consumables are not covered. DHS requirements and processes are cumbersome There is no sharing of information or decisions. Individual health services duplicate the process of finding and appraising relevant evidence, developing business cases, etc. DHS declined to coordinate sharing of information through a central database or website. Respondents unaware of any long-term state-wide strategic planning for equipment purchases
 introduction of new high cost TCPs Some guidance for purchasing is provided through the Victorian Government Purchasing Guidelines, Medical Equipment Asset Management Framework (MEAMF), Targeted Equipment Replacement Program (TERP) and Health Purchasing Victoria (HPV). HPV is responsible for bulk purchasing of pharmaceuticals, clinical equipment and consumables to streamline ordering and reduce costs. If the item required is in the HPV catalogue the specified brand must be purchased from the designated suppliers at the cost and conditions noted. The processes are transparent and accountability is clear. 	 Lack of coordination of equipment use and procurement at state level and no communication between health networks. HPV catalogue only covers 30% of Monash Health consumables Inclusion of items in the HPV catalogue is not always based on a rigorous evidence-based process Safer, more effective or more cost-effective alternatives may not be included in the catalogue HPV does not cover large items so MEAMF and TERP have no benefits from bulk purchasing and hospitals have to negotiate their own arrangements with suppliers Decision-makers do not know which of these multiple systems are relevant to a particular situation Terminology differs between systems and they are difficult to navigate
 The Victorian Aids and Equipment Program is administered by Monash Health on behalf of the DHS. The application process is standardised based on tight explicit criteria for transparency and accountability. The Department of Treasury is interested in supporting disinvestment initiatives but requires details of savings. If savings or reinvestments can be quantified the department may provide more funding. 	 This is a 'last resort' process after other sources of funding have been exhausted. Clinicians waste valuable time writing funding applications for multiple programs which could be integrated and allocated centrally. It is hard to measure the savings The savings are rarely realised because they are absorbed and used to treat more patients

Monash Health environment: General	
Enthusiastic and dedicated staff	High staff turnover in the organisation, particularly agency nurses and junior staff, increases
Staff commitment to quality improvement	difficulty in communication and implementation
Organisational support	High staff turnover in projects diminishes organisational knowledge and expertise and increases
Support from the Executive Management Team	training requirements
Support from Directors of Nursing	Organisational culture is difficult to change
Involvement of people who are outside of, or uninterested in the politics of the organisation	Organisational politics
	Incident reporting software (Riskman) is flawed, does not cover all requirements and does not enable valid aggregation of data related to consumer information
 Strategic planning provides an opportunity for integrating disinvestment decisions into organisational practices. Monash Health had transparent strategic and business planning processes. 	 Lack of strategic planning for large equipment purchases
 The Board. Executive Management Team (EMT) and Senior Managers have expressed 'patient- 	 Considerable pressures on the health service to reduce costs.
centred care' as a priority.	 Perceived distinction between 'what the hospital is concerned about (finances, organisational
	capacity and risk management) and what the clinician is concerned about (patients)'.
Monash Health environment: Governance	
Oversight	
 Overall accountability sat with the Monash Health Board. The Board and EMT determined the 	 No central resource for oversight, coordination or provision of information about committee
decision-making structures within the organisation.	processes
The Quality Unit maintained an organisational chart of committees related to quality and safety.	 No complete list of committees operating at an organisation-wide level No lists of committees operating within groups on sites
Ine Board Secretary also had a list of some committees Policies and precedures	 No lists of committees operating within programs or sites
Policies and procedures	
Robust policies and guidelines for partitions	
Active and scape of decisions upon the Unschedule Durchasing Deliau Durchasing Deliau Cuidelines	Configure about (who does what)
and Authority Delegation Schedule to prevent gaps, overlap and ambiguity.	 Duplication of some committee and project activities
 In addition to policies and guidelines there were supporting documents such as application forms, 	Too much paperwork and existing paperwork is confusing and ambiguous
business case templates, requisition forms and checklists governing activities related to resource	 Some documents were not well organised, not easily accessible, multiple versions were available
allocation such as purchasing and procurement and development of clinical guidance documents.	and some required considerable skills and resources to complete
	 Emphasis on 'business' aspects and less consideration of evidence of safety, effectiveness and cost-
	effectiveness in many of these documents
Transparency and accountability	Lack of transparency in all aspects
Iransparency and accountability in decision-making was highly valued by respondents	Lack of transparency and accountability in decision-making reduces confidence
• Improved transparency and accountability at Monash Health was desired by most respondents	Inadequate transparency and accountability was one of the strongest messages from respondents
 Clear documented lines of accountability and reporting requirements in some areas 	 Many individual and group decision-makers lower down the respective hierarchies admitted they
Individuals and members of committees at the top of their respective decision-making hierarchies	were unsure of the processes. Others who said they were sure gave answers that were inconsistent
reported that they had clear understanding of how the processes should work, who is accountable,	with each other. Some reported ambiguities and inconsistencies in the systems and processes.
authorisation	in accountability. Some committees saw their role as 'recommending' a course of action with the
 Many of these respondents also reported that all decision-makers have the same understanding as 	'decision' being made by a higher-level committee. In contrast, the higher-level committees saw
they do.	their role as one of guidance and support in response to robust investigation of decision options
,	which they expected to occur at the lower level 'decision-making' committees.
	 Individual decision-makers did not always know who to report a decision to and whether formal
	authorisation was required.

Conflict of interest	
 Conflict of Interest required as a standing item on the agendas of relevant committees. Ten of 13 	 Only one committee, the Technology/Clinical Practice Committee (TCPC), considered the effect of
committees interviewed had a process for conflict of interest for committee members, and two of	conflict of interest in the provision of evidence used in decision-making
the four committees with an application process had a similar procedure for applicants.	
Monitoring, evaluation and improvement of systems and processes	
 Quality improvement of systems and processes was supported by respondents 	 No formal requirements for quality improvement of decision-making at Monash Health
 Only one committee (TCPC) had an ongoing process of monitoring, evaluation and improvement of 	 At the program level, it was noted that 'since there was no formal decision-making process there
its systems and processes, however some committees had undergone a single evaluation/review	was no process of review'.
and some were developing or planning to develop quality improvement processes.	
 Committees that authorise or support decisions made by other committees expected that a rigorous 	 No system to check or regulate this
process of decision-making and prioritisation had occurred.	
Reporting	The structure and process of reporting varied with site, department/unit and health professional
Quality Unit chart of committees related to quality and safety included lines of reporting	group making the decisions across and between sites, programs, units, etc difficult
 Most committees had reporting requirements included in their Terms of Reference 	No systematic or documented process for reporting of projects
Monash Health environment: Administration	
Relationships, coordination, collaboration and communication	Lack of knowledge and awareness about
Knowing who to go to for information	 decision-making systems and processes and where to go to find out about them
Knowing who to go to for support	 information sources and tools and where to go to find them
Networks within the organisation, particularly pursing	Lack of information regarding how the system works and what processes need to be followed
Ovality and Dick Managars are good at charing information across the examination	Lack of central resource/identified role to provide information about committees
Quality and Risk Managers are good at snaring information across the organisation	Lack of erageisational processes for knowledge transfer
Good communication at site level (nursing)	Luck of organisational processes for knowledge transfer
Robust and regular communication	Lack of coordination and collaboration between decision-making individuals and groups
	Lack of communication about decisions between programs, departments and other stakeholders
	Lack of communication about impending decisions and projects to enable stakeholder input
 Quality Unit chart of committees included relationships (but only for reporting purposes). 	 Lack of awareness of other committees within Monash Health
• Some committees recognised the overlap in their work and the potential to work together. These	 Other than reporting, there were no documented relationships between committees
were in two groups, those considering introduction of new TCPs and those involved in purchasing.	• Other than the committees considering new TCPs, there were no formal processes of referral for
• People who were members of more than one committee often provided the links between them.	issues that might affect, or should be addressed by, other committees
• There were many examples of cross-unit/department consultation and collaboration for policy and	Decision-making 'in isolation' was noted to be a problem in multiple settings. 'Fragmentation' and a
protocol development and implementation.	'silo mentality' were used in relation to decisions made without consideration of the areas they will
 Four projects were linked to others with similar aims. 	impact upon or consultation with relevant stakeholders.
	 No systematic processes to link projects across the organisation
Monash Health environment: Stakeholder engagement	
Involvement of broad range of stakeholders from multiple sites and a range of health professional	Lack of consultation with clinicians in decisions made by managers
disciplines	Lack of consideration of impact of change on others when making decisions or planning projects
Reported benefits of broad stakeholder involvement in decision-making included improved decision-	Lack of consideration of downstream or lateral impacts en 'cost saving measures in one area can
making, more effective dissemination of decisions and informing and encouraging others about the	result in increased costs in another area'
need to consult with the groups represented.	limited input from the Quality and the Education Units
 Iviany respondents supported increased consumer participation and were planning to act upon this 	 Only one committee (TCPC) included consumer representation in decision-making. Consider the second sec
	 Several respondents thought that consumer representation on their committees would be
	inappropriate or that consumers had insufficient technical understanding to participate.

Monash Health environment: Resources	
Funding and staff time	Staff dissatisfaction with the expectation of their superiors that they will do more work within
Provision of extra staff	existing resources
Availability of extra funds enhanced implementation and evaluation, eg introduction of the National	Insufficient allocation of staff time impairs
Inpatients Medication Chart had external funding specifically for implementation and evaluation	• research and preparation for decisions
Some clinical pathways involve no additional costs	 implementation and evaluation of decisions
	project delivery
	• training
	Lack of/inadequate coordination of current resources
 Some committees had a Secretariat comprised of 1-2 officers from named roles within the 	• Some committees used the Personal Assistant of the committee Chair in an administrative role. If a
organisation. These positions were allocated sufficient time to complete the required tasks.	new Chair did not have a personal assistant there would be no resources to support the committee.
Some projects were provided with adequate resources for implementation and evaluation	Some respondents found it difficult to separate the role of the committee from the role of their dependence of their second their se
 Some wards had additional staffing for education support and clinical nurse support. These were involuble resources for practice change, protocol development and implementation. 	administrative matters, and it was not always clear if these duties were part of or additional to
 Some projects had external funding from DHS universities etc for staff or infrastructure costs 	their normal duties and what they could cut back in order to accommodate committee obligations
	 Many projects were to be carried out 'within existing resources'. Respondents noted that they either
	did unpaid overtime or aspects of the project were not undertaken.
Expertise and Training	Lack of/inadequate skills in
	• use of information technology
	 finding and appraising evidence from research and data
	project management
	change management
Staff in Centre for Clinical Effectiveness (CCE) and Clinical Information Management (CIM) were	CCE's funding for training was redirected due to budget cuts so it was unable to provide free in-
available to decision-makers to provide expertise in research evidence and local data respectively.	house programs (however many staff attended the fee-paying courses CCE provided)
 CCE ran training programs in finding and using evidence, implementation and evaluation 	 Lack of understanding of information systems and project management in senior decision-makers
 Six of 10 projects had training for project staff in change management, leadership or IT skills. 	was reported and training for committee members was suggested
	 Most projects used a staff member from the department involved to deliver the project, most of
	these did not have project skills or expertise
	Education and training is not well provided for part-time and night staff.
Information	Lack of computers and/or access to computers, particularly for nurses
Provision of extra computers	Difficulties using intranet to find organisational data
CCE and CIM were available to provide information to decision-makers	Lack of research evidence and local data to inform decisions
 Monash Health libraries provided access to health databases and electronic journals, as well as 	 Many decision-makers chose not to use these sources of information
advice in searching the health literature.	 Priority was given to senior decision-makers and high level decisions; sometimes decisions at lower
	levels could not be provided with information due to limited resources.
Decision-makers	
Broad committee membership	Clinical autonomy
Dedication of committee members	High workload in running a committee with lack of administrative staff
Depth and range of experience of committee members	Difficulty taking off 'clinician hat' and replacing it with 'manager or decision-maker hat'
Proactive clinicians who think about improving and moving forward	
High level of skill within medical staff acting as leaders in their specialties	
Committee membership included a range of relevant stakeholders (except consumers) invited to	Some clinicians feel that if they are experts in a particular area they should not have to justify

participate because of their role in the organisation or their knowledge and skills in relevant areas.	operational decisions
Potential adopters	
Having the appropriate profession engaging others in change process, for example nurses should be implementing projects with nurses, not pharmacists.	Resistance to change Staff cynicism about the importance of changes and relevance to them Some clinicians insist on autonomy in their areas of expertise
Decision-making process	
 Identification of need/application Decisions were instigated by 'top down' direction and 'bottom up' invitation. 	 General perceptions that financial drivers were stronger than clinical drivers impetus for change was ad hoc, there was no systematic or proactive approach internal bureaucracy and red tape stifled ideas
 Some committees had a well-documented application process. 	 Complex and time consuming nature of application processes People by-pass the system, usually not deliberate but due to lack of awareness of the process Some applications are driven by pharmaceutical or equipment manufacturers
 Decision criteria Documenting explicit criteria was generally viewed positively. The committees with application forms had some documentation of criteria. Other decision-making groups and individuals had 'mental checklists' of criteria they considered. 	 Only one committee (TCPC) and one individual used explicit, documented decision-making criteria. Some committees had no decision-making criteria. Some individual decision-makers strongly rejected documentation of explicit criteria as 'another form of paperwork that will waste clinician's time'.
 Most committees considered the Monash Health Strategic Plan, quality, safety, access and equity. All committees considered financial factors. 	 Organisational priorities dominated eg 'Sound practice is not always affordable practice' 'The operational aspects of nursing (Key performance indicators that are reported to DHS) come first and professional aspects comes second' There was a perception that there was 'too much emphasis on financial return for investment'
 Ascertainment and use of evidence Strong knowledge of the literature Attendance at conferences Using research evidence and local data in decision-making was considered to be important. All respondents reported using research evidence and data in decision-making to some extent. Most committees sought a broad membership in order to utilise expertise in the consideration of research evidence and for decision-making with limited evidence. Four out of ten projects sought research evidence from the literature to inform the project. 	 Amount of time needed to search the literature or collect data Access to evidence is not easy or coordinated Lag time between what universities teach and latest research evidence so new staff are not always aware of best practice Drug company marketing Only one committee (TCPC) required explicit inclusion of research and local data and considered the quality and applicability of this evidence. Only one of the projects appraised the evidence used. The other committees had no process to seek evidence from research. When evidence from research and data was used, it was not usually appraised for quality or applicability. Due to difficulty finding uninterrupted blocks of time, slow computers and lack of skills in finding and analysing evidence, decision-makers relied on clinical expertise and advice from colleagues. Appropriate local data was frequently reported to be lacking, unavailable and 'manipulated'.

Reminders and prompts to consider disinvestment	
 One application form (TCPC) had an explicit question about what the new technology will replace 	• "It's all very well to ask the question but it's very hard to get a clinician to say they will stop doing
and what can be disinvested.	something".
Deliberative process	Process not seen as priority for some
Robust and honest conversations	• Some committee members do not attend
Autonomous decision-makina	Meetings too short for proper deliberation
Decision-makers expressed a decire for a documented standard process	Some decisions made reactively, 'on the run', due to lack of consultation or not following process
 Many respondents noted that the main goal of discussion was to reach decisions by consensus. 	Long log time between application and decision
many respondents noted that the main goar of discussion was to reach decisions by consensus.	Long tog time between application and decision
	 Lack of standardised process Many of the current processes were perceived to be unclear (ad bec) and locking objectivity
	 Industry of the current processes were perceived to be unclear, ad noc and lacking objectivity Lobbying, both covert (babind the scopes' and overt (squaaky wheels', was perceived to result in
	- LODDying, both covert behind the scenes and overt squeaky wheels, was perceived to result in
Most committees required not only the process of a quorum to make decisions but also	 Not all committees had a defined querum. Of these that did, some made desirings in the absence of
- Most committees required not only the presence of a quotian to make decisions but also	- Not all committees had a denied quotum. Of those that did, some made decisions in the absence of
attendance of members with relevant knowledge of expertise to the decision at hand.	a quorum and some made decisions even in a meeting was cancelled due to lack of a quorum.
Documentation and discemination	Large size neture and diversity of the organization increases
One committee (TCPC) published Decision Summaries which were formally distributed to the	difficulty in diversity of the organisation increases
The committee (For C) published Decision and switch were infinitely distributed to the	• alfficulty in dissemination of information
nublicly available on the internet	• frequency and range of communication methods required
 Most committees recorded minutes: these were considered to be confidential and were not 	Not everyone uses email
nubliched, but were available to appropriate requestors by contacting the committee secretariat	Using email too often dilutes the effect
 All of the individual decision makers interviewed reported discominating decisions to people they 	The majority of committees did not publish minutes or anything similar.
considered appropriate and when deemed necessary, discominating decisions to people they	 One committee did not keep any records.
 Many respondents reported others discominating decisions to them 	 Although some related committees exchanged minutes there was a lack of formal communication
	across committees.
	 Documentation and dissemination of decisions made by individuals was informal and ad hoc.
	 Not all projects communicated decisions to other staff members or the wider organisation. Unless
	people were directly involved, some projects appeared not to make project work or associated
	decisions public knowledge.
	 Lack of processes for knowledge transfer, especially across sites.
Implementation	
Purchasing	
 Robust organisational processes that met annual audit requirements 	Use of evidence in purchasing decisions was not outlined in the Purchasing Policy Guidelines.
Electronic ordering was controlled through an approval hierarchy with delegation thresholds.	 Those making the decision of 'whether to buy' were responsible for ascertaining evidence of safety,
It was assumed that the decision to purchase was made with due process before reaching the	effectiveness and cost-effectiveness in the first stage; however there was no system to check that
purchasing unit.	this has been done before the second stage.
Health Technology Services, the Product Evaluation Committee and working parties set up to	Difficulty managing expectations eg 'once something is approved people want it immediately'
evaluate large individual capital purchases considered appropriateness of equipment to Monash	 Some were unaware of this process and went directly to the manufacturer. If this was overseas it
Health, availability of spare parts, life expectancy, servicing requirements, related consumables,	may be difficult or expensive to get parts, there may not be relevant skills for local maintenance and
availability of technical expertise and fit with the DHS Asset Management Framework. They also had	it excludes benefits that may already exist with a local manufacturer that could supply the same
expertise in contract negotiation.	product under better terms and conditions. Re-negotiating contracts, or establishing new ones.
	creates bad feeling and wastes lots of time.
 Purchasing of clinical consumables within budget allocation is done electronically. Electronic 	There is little assessment of safety, effectiveness or cost-effectiveness of clinical consumable items.
authorisation is required for items above individual limits (eg Nurse Unit Manager approval up to	
\$10,000, items above this require authorisation).	

Policy and guidance	 Lack of structure and standardisation of processes, especially between sites.
 Monash Health was developing a new Policy and Procedure Framework 	
 Broad support for increased standardisation of practice through policies and procedures 	
 Development process seen as a communication tool between professional groups and across sites. 	
Implementers	 Some project staff felt isolated and would have liked support from others who had done the same or
Finding others who have done the same work for support, advice and information	similar work
Establishing Working Parties and Steering Committees for support, endorsement, troubleshooting	It was not always clear who was responsible for project management
Project leader whose primary role is 'at the coal face'	Lack of/inadequate project management and communication resulted in multiple people
 Decisions made at program level that involve multiple wards, departments or sites are usually 	making inconsistent changes
implemented by multidisciplinary teams.	 contacting equipment vendors with requests and ideas for change
Practice change	Unrealistic project timelines
At site level, there is good 'buy-in' for change and people are keen to make things work (nursing)	Variability in current practice and lack of standardisation increases number of practices to change
Allowing wards to nominate themselves for participation in projects	Large size, nature and diversity of the organisation increases complexity of implementation across
'Bottom up' approach to develop individual implementation plan in each ward	departments with different needs
'Bottom up' training to gain staff 'buy in' combined with 'top down' supportive strategy	Lack of effective implementation pathways
Flexible and adaptable staff	Things take a long time to implement, to the point that they 'fall off the agenda'
Lots of preparation including training and communication with all stakeholders	Staffing issues, including leave, mean that a lot of projects are on hold
Use of pre-existing (and pre-tested) tools from other organisations	Project-specific barriers such as logistical challenges with product being implemented
 Some committees provide an approval process only and the applicant is responsible for implementing the decision. In most cases the applicant has control over the process (eg head of department implementing a new procedure) and is motivated to implement the change. 	 Sometimes practice change is required beyond the applicant and their department. Committees do not require applicants to have or acquire knowledge and skills in implementation.
 Training and education activities and 'champions' were reported as the two key strategies used to 	 Lack of knowledge and skills in project management, change management and use of information
effect change and encourage sustainability of the intervention.	technology were exacerbated when interventions were complex and required high levels of training
 Most projects had a champion and/or Executive sponsor. Project champions were generally the head of the relevant department; others included the Chief Executive Officer, Executive Directors who were Steering Committee Chairs and 'Ward Champions' selected to encourage and promote change. 	 Lack of known, standardised processes for implementation at Monash Health
• Those with champions unanimously considered champions important to the success of the project.	
 Training or education included passive methods using posters and memos, interactive learning on 	
new equipment and participatory approaches involving staff in design and implementation.	
Seven projects involved training for the target group, most of which was done by external providers of new equipment.	
 Most considered their project sustainable and believed the change was embedded in the system. 	 Only two considered sustainability in the design of the project.
This was reportedly achieved by involving a variety of staff and 'bottom-up' approaches to change.	, , , , , , , , , , , , , , , , , , ,
Half of the projects tailored the implementation plan to anticipated barriers and enablers sourced	One project had no implementation plan
from other health services, literature searches and personal experiences of project staff.	 Half of the projects did not consider barriers and enablers
Half reported that implementation was conducted as planned. Some noted that it mostly went to	
plan but 'amendments were made continually to improve the process'.	
The benefit of the proposed practice change is clear and observable	 Lack of baseline data meant that potential adopters were unable to see the benefit or relevance to their situation resulting in less 'buy in' and poor uptake.

Evaluation of outcomes of decisions	
 General Use of pre-existing (and pre-tested) tools from other organisations eg audit tools Evaluation and monitoring were considered important and had broad support Monitoring of projects after implementation was thought to increase sustainability. 	 Quality and Risk Managers are not included at the beginning to help with collection of baseline data and evaluation design Lack of baseline data A lack of data was seen to contribute to the current state of 'little or no process of evaluation'. Limited funds, knowledge and/or skills inhibited both the planning and conduct of evaluation.
 Evaluators CCE was establishing an in-house Evaluation Service at the time of these interviews. 	 No specified evaluators with appropriate training or expertise had been utilised by the respondents.
 Requirements for evaluation Monitoring, evaluation and reporting of outcomes was required by DHS sponsored projects and TCPC. The Therapeutics Committee requested reports for some decisions. Routine clinical audits and monitoring of adverse events undertaken for hospital accreditation purposes provided indirect evaluation of decisions in some situations. Half of the completed projects had been evaluated; all but one project reported achieving its planned objectives. 	 Monash Health had no requirements for evaluation of outcomes of decisions or projects. Most committees had no planned evaluation of outcomes of decisions or implementation projects. The purpose of reports for TCPC and Therapeutics was questioned by some respondents who noted that it may be inconsistent with the knowledge needed for program staff. Only 2 projects planned evaluation as a project component. Some were evaluated post hoc.
Reinvestment	
 Reinvestment or reallocation of resources would be an incentive to disinvestment SHARE Steering Committee keen to establish and support methods for reinvestment/reallocation Flexibility and thinking laterally to include novel methods/indicators such as reducing waiting lists, getting patients out of Emergency Department faster, freeing up time in procedural/operating suites, freeing up bed days that are used to treat another patient group faster (eg X procedure saved Y\$/bed days which was used by Z patients). 	 Lack of planning for resource reallocation Lack of transparency and consultation in reallocation of savings creates disillusionment Staff dissatisfaction that savings generated are not reallocated A health economist is required to do this properly, Monash Health had no resources for this 'We don't look far enough for downstream effects; we're too simplistic in assessment of savings'. It was noted that savings made in a project in one area sometimes increased costs in other areas; hence reallocation of the savings to the project department would be unfair. Savings of bed days or time in procedural/operating suites were used immediately to treat another patient group so were never realised Accounting practices did not enable measurement and/or reallocation of savings in some areas, for example changes to one TCP may affect multiple cost centres eg department, ward, ICU, pharmacy.

Factors that influenced development of SHARE Program relevant to EDS

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Items related to proactive use of evidence in decision-making are highlighted. The other items are retained to provide context.

Finding	Source	Decision	Program element
Potential benefits of disinvestment identified	Literature		
External environment supportive of disinvestment program	Literature & DHS documents	Establish a program ovaloring disinvestment at Monach Health	SHARE
Internal environment supportive of disinvestment program	Monash Health Staff	Establish a program exploring disinvestment at Monash Health.	program
Capacity for leadership in this area demonstrated	Success of new TCP program		
The word 'disinvestment' is associated with negative connotations, high risk of engendering suspicion and distrust and getting stakeholders offside.	Literature Monash Health Staff	Proceed carefully, avoid the term 'disinvestment' and use positive language.	Principles
'Top down' approach seen as negative. Needs to be balanced with 'bottom up' strategies and involvement of stakeholders.	Literature Monash Health Staff	Implement 'top down' and 'bottom up' strategies, make stakeholder engagement a priority, and integrate methods for staff to drive change into the new systems and processes.	Principles Preconditions
A systematic integrated approach would be better than ad hoc decisions, individuals 'championing' causes or projects undertaken in isolation.	SHARE leaders International experts	Focus on organisation-wide approach to decision-making that integrates new and current systems and processes.	Principles
Perceived lack of transparency and accountability and suboptimal use of evidence in current decision-making processes. Power struggles and hidden agendas perceived to influence outcomes. Lack of transparency and accountability in reallocation of funding released through disinvestment would be significant barrier to effective program.	Monash Health Staff Project team	Ensure the new systems and processes are transparent, accountable and evidence-based. Introduce explicit criteria for disinvestment decisions.	Principles
Lack of consistent terminology, absence of decision-making criteria and no guidance to inform an organisational approach.	Literature International experts	Develop our own frameworks and methods.	Principles
Disinvestment should not be considered in isolation but alongside other decisions. Investment and disinvestment decisions are often linked, disinvestment occurs when something new is introduced.	Monash Health Staff SHARE leaders Project team	Do not focus on 'disinvestment' or 'investment' alone. Consider 'resource allocation'. Establish processes along decision-making continuum from introduction to removal.	Principles
Health service staff perceive management priorities to be focused on saving money. The concepts around 'disinvestment' accentuate this.	Literature Monash Health Staff	Focus on 'effective application of health resources' to facilitate a positive approach.	Principles
The program needs a strong positive image that reflects the new focus on 'effective application of health resources'. Being compatible with 'iCARE', the familiar acronym for Monash Health values would be beneficial.	Monash Health Staff SHARE leaders Project team	Change the name from 'Disinvestment Project' to 'SHARE' (Sustainability in Health care by Allocating Resources Effectively)	Name
Six potential opportunities to integrate disinvestment decisions into organisational infrastructure, systems and processes were identified.	Literature SHARE leaders	Investigate methods to implement disinvestment decisions in the six settings identified.	Systems and Processes
Undertaking disinvestment projects was a key element of the original proposal. Waiting for investigation of the six settings is too long to delay pilot projects. Some 'quick wins' would be valuable.	SHARE leaders Monash Health Staff	Develop methods to identify and prioritise potential target TCPs in parallel with the investigation of the six settings. Undertake pilot projects to disinvest them.	Disinvestment projects
Current decisions are made 'routinely' or 'reactively'. Introduction of TCPs is based on applications from clinicians or managers and removal of TCPs is based on emerging problems or product alerts and recalls. Research literature and local data could be used 'proactively' to drive health service practice.	Monash Health Staff SHARE leaders Project team	Build on current 'routine/reactive' processes that are done well. Develop new processes to use evidence 'proactively' to drive decisions and/or priority setting. Make these explicit elements of the new program.	Principles
Using evidence 'proactively' requires time and attention from decision-makers. The information provided must be trustworthy, applicable and sufficiently important to	Monash Health Staff SHARE leaders	Develop methods to identify appropriate high-quality information, process and package it for ease of use and deliver it to the	Systems and Processes

Finding	Source	Decision	Program element
warrant adding to their workload.		relevant decision-makers.	
Decisions for resource allocation are delegated to committees and individuals. There are opportunities for improvement in the governance of these processes and to introduce routine consideration of 'disinvestment'.	Monash Health Staff SHARE leaders Project team	Review processes and governance of decision-making by committees and the authority delegation schedule	Systems and Processes
There is no guidance on consumer participation in disinvestment activities.	Literature		
With a few exceptions, committees and project teams do not routinely involve consumers in making or implementing decisions and the organisation does not have a framework for engaging consumers.	Monash Health Staff Project team	Develop methods to capture and utilise consumer perspectives and integrate them into the new program.	Systems and Processes
The systems and processes for evidence-based decision-making cannot be delivered without appropriate and adequate skills and support	<mark>Literature</mark> Monash Health Staff	Develop support services that enable capacity-building and provide expertise and practical assistance	Support Services
With a few exceptions, staff do not routinely seek evidence for decisions, are unaware of best practice in implementation and do not evaluate outcomes.	Monash Health Staff Project team	Provide expertise, training and support in accessing and utilising evidence in decisions.	<mark>Support</mark>
The main barriers to use of evidence and effective implementation are lack of time, knowledge, skills and resources.	Literature Monash Health Staff	Provide expertise, training and support in implementing and evaluating evidence-based change.	<mark>Services</mark>
Health service projects are not usually well supported. It is common for funding to be insufficient, timelines inadequate and staff lacking in knowledge and skills in project management, data collection and analysis.	Monash Health Staff Project team	Influence planning of disinvestment projects to ensure adequate resources and appropriate timelines. Provide expertise, training and support in project methods and administration	Support Services
Disinvestment projects are generally based on health economic principles	Literature		
Monash Health does not have expertise in health economics and does not intend to fund this in the foreseeable future	Monash Health Leaders	Utilise in-house expertise and take an 'evidence-driven', rather	
Safety, effectiveness, local health service utilisation and benchmarking parameters are possible alternative considerations for disinvestment.	SHARE leaders Monash Health Staff	than 'economics-driven', approach to investigation of disinvestment in the health service context.	<mark>Principles</mark>
Monash Health has high-level expertise in accessing and using research evidence and health service data to inform decisions.	Project team		
Monash Health does not have the level of expertise in health program evaluation required for SHARE and has no expertise in health economics.	Project team	Engage consultants in health program evaluation and health economics to assist in development and evaluation	Preconditions
There is no guidance to inform a systematic organisational approach.	Literature	Undertake action research to investigate the process of change in	
In addition to detailed program and economic evaluation, understanding what happened in the process of investigation, what worked, what didn't work and why is required.	SHARE leaders Project team	addition to program and economic evaluations. Run a national workshop to learn and share information. Disseminate all findings.	Evaluation and Research
This large program will need funds. It is consistent with the disinvestment agenda of the Victorian DHS who are sympathetic to a funding application.	DHS documents DHS staff	Seek funding from the state health department.	Preconditions
To be successful this ambitious proposal will need endorsement, support and strategic direction from the highest level and links to those with power and influence in the organisation.	Literature SHARE leaders Project team reflection	Increase membership of the Steering Committee to reflect those best able to provide the appropriate influence, direction and support.	Preconditions
All projects should be aligned to the Monash Health Strategic Goals. Program activities will be facilitated if integrated into the organisation Business Plan.	SHARE leaders Project team reflection	Align SHARE with the Monash Health Strategic Goals and include program activities in the annual Business Plans	Principles

Section 7 Factors that influenced development, processes, outcomes and revision of EDS

a. Development

Influencing factors are presented in the matrix below. Decisions are summarised in the table following.

Development, implementation and evaluation of the pilot Data, Capacity Building and Project Support Services are reported in Paper 7 [7]. Matrix reproduced with permission.

The findings of the initial review [8-22] are consistent with current literature on evidence-based decision-making [23-29], disinvestment and resource allocation [30-40], and information needs of health service decision-makers [16, 41-49]. Recent studies have also demonstrated that dissemination of summaries of synthesised evidence [23, 27, 50-52] and evidence products with targeted messages [23, 27, 53-55] are effective knowledge translation mechanisms. References regarding the evidence of effective strategies have been added to the matrix for completeness.

Influencing factors	E\ S	VIDEN	CE E	DATA SERVICE			C/ BI S	APACII JILDIN ERVIC	ΓΥ IG E	PROJECT SUPPORT SERVICE		
	Identify, capture and process svnthesised evidence	Translate into user friendly formats	Disseminate to decision-makers	Identify high risks and variations in practice	Translate into user friendly formats	Disseminate to decision-makers	Provide training in accessing and using evidence and data	Provide training in implementation & evaluation	Mentor and support	Provide advice regarding methodologies and methods	Assist with project development & administration	Assist with data capture, data entry and analysis
BARRIERS												
Lack of time and opportunity [10, 23, 25, 26, 29, 41, 44, 46- 48, 56-59]			~			~					~	✓
Lack of skills [10, 23, 26, 29, 33, 41, 43, 44, 46-48, 59-63]	~	~	~	~	~	~	~	~	~	~	~	~
Lack of confidence [29, 42]	~	~	~	~	~	~	<	<	~	~	~	~
Lack of interest or competing priorities [27, 42, 45, 46, 59]			~			~	<		~			
Lack of awareness of research and data [10, 23, 27, 29, 60, 62]	~		~	~		~	~					
Lack of use of available research and data [27, 34, 60-62]		~	~		~	✓	~	~	✓	~	~	
Lack of relevant research and data [26, 43, 46-48, 56-58, 60, 64] particularly for disinvestment [30, 33, 39, 48, 59]	~			~			~					
Poor quality of health data [28, 48, 56, 60, 61, 64, 65]				~	~	✓						
Unfamiliar or difficult to use formats of research and data [10, 29, 48, 59-61, 64]		~			~		~					
Lack of policies and interventions for data-informed decision- making [56, 60, 66]				~	~	~						
Difficulty accessing or using online resources [10, 26, 27, 29, 41, 43, 44, 46-48, 58, 60, 64]	~			~			~		~			
Lack of infrastructure and technical support [21, 25, 29, 56, 58, 59, 61, 62, 65]	~	~	~	~	~	~	~	~	~	~	~	~
Inadequate resources [21, 25, 26, 46, 56, 58, 66]	~		~	~		~					~	~
Negative attitudes or resistance to change [23, 25, 29, 59]		~			~		~	~				
Professional groups with different perspectives of evidence, knowledge base and skill set [30]								~	~			
Lack of triggers to initiate disinvestment discussions [31, 34, 36, 38]			~			~						

	Identify, capture and process svnthesised evidence	Translate into user friendly formats	Disseminate to decision-makers	Identify high risks and variations in practice	Translate into user friendly formats	Disseminate to decision-makers	Provide training in accessing and using evidence and data	Provide training in implementation & evaluation	Mentor and support	Provide advice regarding methodologies and methods	Assist with project development & administration	Assist with data capture, data entry and analysis
Lack of standardised processes for project delivery, responsibilities and accountability [32, 33, 67]								~	~	~	~	~
Unrealistic project timelines [32]								~	✓	~	~	~
ENABLERS												
Training in use of evidence and data [10, 29, 41, 61, 65, 66]							~	✓	✓	~	~	~
Dissemination of research and data [10, 26, 66, 68]			~			~						
Clarity, relevance, credibility and reliability of research findings [10, 16, 24, 26, 48]	~	✓					~					
Quality and timely data from health information systems [48, 60, 61]				~	~		~					
Organisational willingness to invest in a knowledge translation culture [25, 66, 69]	~	~	~	~	~	~	~	~	~	~	~	~
Infrastructure or policy for accountability in knowledge use [25, 66]			~			~						
Links to researchers or knowledge brokers [25, 26, 48, 69, 70]			~			✓	✓	✓	✓	~	~	~
Initiatives to integrate data into routine decision-making processes [68]				~	~	~						
ADDITIONAL NEEDS												
Capacity-building and provision of expertise and practical assistance [10, 28, 35, 37, 40, 60, 62]	~	✓	~	~	~	~	~	~	✓	~	~	~
New processes to use research and data 'proactively' to drive decisions [28, 37, 60, 65]	~	✓	~	~	~	~						
Analysis, synthesis, interpretation and review of data in decision-making [60, 61, 65]				~	~	~	~	~	✓	~		~
Incentives to change [34, 66, 67]										~	~	~
Support to be tailored to units and professional needs [16, 60, 69]		✓			~		~	~	✓	~	~	~
Provision of a range of expertise in evaluation methods [65, 71]										~	~	~
Support from others who had done the same or similar work to address feelings of isolation							~	~	✓	>	>	~
EVIDENCE-BASED INTERVENTIONS												
Dissemination of summaries of systematic review evidence [27, 50, 51]		✓	~									
Tailored targeted messages [27, 53-55]		~	~		~	~						
Training in critical appraisal [51, 54, 72]							~		~			
Interactive workshops [27, 72]							~	~	\checkmark			
Multifaceted educational intervention [27, 72]							~	~	✓	~	✓	~

b. Success and sustainability

Model 1

SUCCESS: A proposal is more likely to be successful if it meets the following criteria

Based on sound evidence or expert consensus

There is evidence of desirable characteristics of evidence products, but no clear evidence of effectiveness for the overall model.

Presented by credible organisation

Sources of evidence, such as The Cochrane Library, are considered credible. CCE is considered credible as a knowledge broker.

Able to be tested and adapted

A formal pilot will be undertaken, ongoing feedback will be sought, and systems and processes will be refined based on stakeholder feedback.

Relative advantage is evident

All stakeholders consulted have responded that they would welcome up-to-date evidence being delivered directly to them.

Low complexity

Users only have to register to receive evidence, however they will have to appraise it. Reporting template is as simple as possible.

Compatible with status quo

There is no current system for receiving disseminated evidence. Reporting is integrated into the existing monthly reporting schedule.

Attractive and accessible format

The email and website formats are attractive and easy to use. The evidence is categorised and readily accessible.

SUSTAINABILITY: A proposal is more likely to be sustainable if it has appropriate and adequate provision in each category

Structure

CCE is an appropriate vehicle to deliver EDS within the organisation. Line management is the appropriate way to report use of evidence, change in practice, etc.

Skills

CCE team includes systematic reviewers, knowledge brokers and a health librarian. The Monash Health Medical Administration Registrar (trainee) with up-to-date clinical knowledge was seconded to ensure correct classification within clinical categories. The decision-makers may not have the skills to appraise the evidence appropriately.

Resources

Adequate funding was provided from the SHARE Program and by Monash Health allowing secondment of staff to the EDS.

Commitment

The organisation has demonstrated commitment through endorsement by the Executive Management Team and the Board and representation on the SHARE Steering Committee (3 executive directors, 10 clinical program directors, 4 committee chairs, 5 senior managers, legal counsel and 2 consumer representatives). All senior decision-makers consulted expressed their support.

Leadership

The Executive Director of Medical Services and Quality, Chair of the Technology/Clinical Practice Committee and Director of CCE are leaders of the process. All have credibility within the organisation.

Model 2

SUCCESS: A proposal is more likely to be successful if it meets the following criteria

Based on sound evidence or expert consensus

This model addressed the desirable characteristics of evidence products better than Model 1.

No evidence of effectiveness for the overall model, no evidence that it has been done before.

Presented by credible organisation

Sources of evidence, such as The Cochrane Library, are considered credible. CCE is considered credible as a knowledge broker.

Able to be tested and adapted

A formal pilot will be undertaken, ongoing feedback will be sought, and systems and processes will be refined based on stakeholder feedback.

Relative advantage is evident

Changes between Models 1 and 2 are based on stakeholder feedback and the benefits of the changes are clear.

Low complexity

Recipients of Evidence Bulletins only have to check applicability of the evidence and make changes if required. The response form is even simpler and has been reduced from seven responses to two.

Compatible with status quo

There is no current system for receiving disseminated evidence. Designated decision-makers are responsible for making sure practice in their area of authority is up-to-date.

Attractive and accessible format

The Evidence Bulletins are attractive, able to be read at a glance, with key information extracted from the publication and summarised.

SUSTAINABILITY: A proposal is more likely to be sustainable if it has appropriate and adequate provision in each category

Structure

Designated decision-makers for the topic under consideration are the appropriate recipients of Evidence Bulletins.

Program Directors are the appropriate individuals to disseminate the evidence and request a response from the decision-makers who report to them.

The Technology/Clinical Practice Committee (TCPC) is the appropriately authorised group to govern the EDS process.

CCE is an appropriate vehicle to develop the evidence products.

Skills

CCE team have the relevant skills to produce the Evidence Bulletins.

The TCPC and Program Directors have the relevant knowledge to assess applicability of the evidence and need for change within the organisation.

Resources

Funding has been provided by Monash Health for the piloting phase, but ongoing funding to enable continuous delivery of the EDS will be needed.

The current level of funding does not enable dissemination of all available evidence; limitation of selected publications to areas of priority within the organisation will be required.

Commitment

The Chief Executive has made EDS an organisational priority and requires notification of all responses related to evidence of harm.

Leadership

The Executive Director of Medical Services and Quality, Chair of the Technology/Clinical Practice Committee and Director of CCE are leaders of the process. All have credibility within the organisation.

c. Model 1 Pilot

Domain	Influencing factors	Decisions/Action
Evidence products	 The quality, currency, content, format and methods of delivery of the EDS were all viewed positively 	These features were retained
Target audience	 Users were not certain about the purpose of EDS and why specific publications were not being disseminated. They were also not using the website search function. 	 The EDS explanatory pages were revised and a 'Frequently asked questions' page was introduced.
Knowledge brokering	 The EDS process was complex and only one staff member was familiar with all the requirements, creating problems when they were on leave. 	 An administrator's manual was developed and additional staff were trained to improve sustainability of the service.
	 The pilot website had no branding, which did not comply with internal standards for Monash Health publications. 	 The Public Affairs and Communications Department assisted the EDS team to include Monash Health branding
Processes and infrastructure	 Executives, Senior Managers and Program Directors required information about policy and management decisions which was not addressed in the predominantly clinical evidence provided from the sources previously identified. 	 The category of 'Evidence based policy and management advice' was added and criteria to identify high quality sources of this information were developed (<u>Section 9</u>).
	 The need for users to identify publications that recommended ceasing or restricting a TCP for evidence of harm or lack of effect wa noted. 	The category of Disinvestment was added s
	 The initial taxonomy used first level ICD10 headings. This did not provide enough detail and half way through the pilot period this was changed to the second level. The change to second level headings within the limitations of the free software made the process of entering data very time intensive and created messy search results for users. 	 ICD10 classifications were replaced with MeSH.
	 The category of 'Professional Group' was thought to be too broad to be of real use, for example 'Medicine' was attached to almost every piece of evidence, and had considerable overlap with the 'Specialty' category. 	 'Professional Group' was removed and 'Specialty' was modified slightly to accommodate this change
	 The Medical Administration trainee was unable to undertake the classification due to other commitments which were given greater priority. This was a limitation of the Medical Administration portfolio where crises requiring immediate attention occurred frequently. 	 The EDS paid a medical graduate for one hour per week to ensure categorisation was correct and completed on time.
	 Users reported a preference for shorter emails with fewer entries. 	 Distribution was changed from fortnightly to weekly with fewer entries.
	 Citations in bulletins from EUROSCAN did not point to full text. 	 EUROSCAN was removed from the list of sources of evidence.
Evaluation plan	 The free email software had significant limitations related to analysi of available statistics. (Separate email software was needed at the start of the pilot as the website software did not have an email subscription function but introduced it later so the separate email software was no longer needed) 	 The email service with the original provider was discontinued and re-established with the website provider
d. Model 1 Full implementation

Domain	Influencing factors	Decisions/Action
Evidence	• Although they were recent publications, they may not contain any new evidence eg	To repackage the evidence to
products	update of SRs or HTAs with no changes	highlight key messages,
	• Although the sources of evidence were appraised for their requirements of rigorous	demonstrate local relevance and
	methods, this does not guarantee that the publication is valid or has low risk of bias	implications, and provide
	 There was a large volume of information, including a large number of publications 	actionable recommendations.
	that did not require action	
	 The email Alerts did not contain many of the features known to increase use and 	
	application of disseminated evidence ie no targeted message, no specific request for	
	action	
Target audience	 Lack of time to appraise for quality and applicability, check for consistency with 	To reduce the burden on busy
	current documented practice or complete the proposed reporting template	decision-makers by filtering
	Findings were often irrelevant to recipient's areas of practice, already known to	publications before dissemination
	them	to assess quality, applicability, lack
	 Wasted their time and increased the potential for them to miss findings that mattered 	of or inconsistency with policies
	mattered	and procedures, local importance
	Cuidenes Alextenest alumne reaching the right desiring malage and elected	To deliver the receivered evidence.
	 Evidence Alerts not always reaching the right decision-makers – self selected 	To deliver the repackaged evidence
		to a specified authorised decision-
		the areas addressed in the
		nublication
Knowledge	The EDS team had difficulty processing the large number of eligible publications	To limit coloction critoria for
brokoring	- The EDS team had difficulty processing the large number of eligible publications	nublications to areas of high
DIOKETINg	to reduce the volume	priority within Monach Health
Processes and	Lack of governance, particularly a lack of transparency and accountability. EDS	To introduce a governance
infrastructure	 Lack of governance, particularly a lack of transparency and accountability. LDS broadcasts were developed and disseminated rigorously and systematically, but 	framework for transparency and
innastructure	were not accessed or used rigorously or systematically. Those responsible for	accountability and to ensure that
	decisions within the organisation were required to self-select and take action but	the appropriate decision-makers
	there was no process to ensure that the appropriate person with authority in the	are engaged they address the
	area affected by the evidence had considered the information or made a decision	evidence and take action as
	Recipients could choose whether to access use or report use of evidence: or not	required and the process is
		documented and reported.
Local	 Although most publications were relevant to Monash Health because it covered such 	To introduce steps that address
considerations	a wide range of clinical areas they may not be applicable if Monash Health does not	these local considerations
	service a particular population, have expertise in a particular procedure, etc	
	 Although there may be high quality strong evidence. practice change may not be 	
	important or worth the effort of change processes in preference to other needs, or	
	action may not be required if Monash Health policies and procedures are already	
	consistent with the evidence	

e. Model 2 Pilot

Domain	Influencing factors	Decisions/Action
Evidence products	 The critical appraisal findings could be expressed more succinctly to increase ease of use by decision-makers 	 The quality appraisal summary table was removed and replaced with statements regarding the findings and their implications
Target audience	 The authorised decision-makers for the areas addressed by the evidence were readily identified 	 This was an enabler
Knowledge brokering	 The Evidence Bulletin could be improved to make completion easier for the EDS administrator 	 Drop-down boxes were introduced into the template
	 It was often difficult to interpret authors' conclusions even after reading the whole article 	 Publications were only disseminated when EDS team were confident that the findings were valid.
Processes and infrastructure	 Evidence of benefit could not always be classified as clinical or cost effectiveness; for example effective methods to develop or implement guidelines. 	 A new category of methodological effectiveness was added.
	 There was not enough time to discuss the potential items for dissemination at the TCPC meeting 	 A standing item for EDS was introduced to the TCPC agenda
	 EDS was promoted as an organisation-wide priority Responses were mandatory, would be audited and reported to Chief Executive every month TCPC had the authority to require action All senior managers were supportive 	 These were enablers

f. Model 2 Full implementation

Domain	Potential influencing factors	Potential Decisions/Action			
Evidence	 No negative comments were received regarding the Evidence 	• The format could be replicated in subsequent			
products	Bulletins	models			
Target audience	 The volume of information to each decision-maker was significantly 	 These were enablers 			
	reduced				
	 Most bulletins were provided for information only, on average 				
	responses were required only once every few months.				
	 All the bulletins decision-makers received were relevant to their 				
	clinical area				
	 Their workloads were reduced to confirming whether change was 				
	needed, taking action if required, and reporting the outcomes				
	 Many decision-makers in the target audience were researchers 	 Difficult to know how to address this when 			
	familiar with the literature and often contributors to systematic	EDS staff do not know which areas of research			
	reviews or evidence-based guidelines. They were annoyed when	staff members are active in, and should not			
	receiving material they were familiar with.	assume even if they are active that they are			
	 Several respondents appeared to be unclear about the purpose of 	A flowchart or toxt summary of the EDS			
Knowledge	the EDS in particular it was perceived that CCE had undertaken the	nrocess within each bulletin may address this			
brokering	reviews, rather than canturing synthesised evidence as it was	process within each buildin may address this			
	published by others				
	 Evidence regarding drugs that were not available locally was 	 Confirmation that drugs or other technologies 			
	disceminated	are available would require an extra sten in the			
	usseninuteu	process			
	Many publications had more than one conclusion, eg harm plus	 New methods are needed to address these 			
	effect or effect plus lack of evidence.	issues.			
	 Some complex issues were relevant to multiple decision-makers 				
Processes and	The governance elements worked smoothly and enabled	 These were enablers 			
infrastructure	transparency and accountability of the processes				
linitastructure	 The methodological issues were addressed successfully; only valid 				
	evidence was disseminated in bulletins that highlighted key				
	messages, demonstrated potential inconsistency with local practice,				
	and clearly stated required actions				

Capturing	Processing	Storage	Dissemination	Utilisation		
E newsletters: daily	Format	Options available to us now	CCE current practices	CCE current practices		
	 How will information be 	 Endnote (problems with record 	 Emails to interested individuals 	 Evidence requests 		
RSS feeds: fortnightly	presented to various	limits and slowness due to stored	 Classes and workshops 	 Journal clubs 		
	groups?	documents)	 Conference presentations 	 Participation on SH 		
Websites	 Will we develop 	 Individual drive and personal hard 	 Journal articles 	committees		
 Cochrane Library: quarterly 	standardised forms?	disks	 Commissioned reports to internal 			
for new and updated		 Access database (need IT to create 	and external client groups			
reviews	Classification	and training to use)	 Reports on the old CCE website 	New practices		
 Other web accessible 	Multiple systems available	 Shared drive (public) 		 Training programs 		
databases (e.g. TRIP, NGC,	 ICD 10 	 SH intranet 	New practices	 Support systems 		
Q&A services etc): monthly	 MeSH 	Options we could invest in	 SH Intranet 	 Reporting systems 		
 Annual reports (online or 	SNOMED	 Blogging software on SH intranet 	 Newsletters (CE, SH News, Purple 	 Project support processes 		
print) annually or twice	 Data dictionaries 	(enable anonymous discussion)	Peril, Nursing & Midwifery			
yearly		 RSS Aggregators (newsreaders) 	(including guidelines)	External activities		
	Holding	 BookCat (based on Access, 	 Education (medical and nursing 	 Journal articles 		
Human interaction	Will information we capture	modifiable, able to create reports)	learning portals)	 Conference presentations 		
 Note-taking 	be extracted into a temporary	 A document repository system on 	 Health Information Services 	 Lectures / Seminars 		
 Memory 	holding place (e.g. Endnote)	the intranet (could store finished	 Protocols and Guideline site 	 Promotional activities 		
Communication	until ready for processing?	reports here, as well as use it as an	 CCE webpage 			
 Conference and workshop 		email archive)	 Targeted emails (Heads of Depts, 			
attendance		Time in storage	Committee members, senior			
		 Permanent (change in practice, 	staff) who can then impart to			
Clinical Information		evidence reports, etc)	junior staff			
Management		 Temporary (alerts/recalls) 	 Internal newsletters 			
 As needed. CIM will extract 		 Immediate deletion (weekly email 	 Hospital-wide and group emails 			
information from their		roundups eg eCAB, Medscape etc)	 Print and distribute entire 			
database and send to		Legalities	documents at committee			
requestor in a		 Copyright restrictions (documents 	meetings, pass onto interested			
report/spreadsheet		obtained under interlibrary loan	individuals etc			
		need to be destroyed after	 Google group discussion list 			
		intended use etc.)	(available via email and RSS,			
		 Need to find out SH's legal record- 	enables anonymous discussion)			
		keeping responsibilities	 Emails to individuals asking what 			
			emerging trends are happening in			
			their field			
	Capturing inewsletters: daily ISS feeds: fortnightly Vebsites Cochrane Library: quarterly for new and updated reviews Other web accessible databases (e.g. TRIP, NGC, Q&A services etc): monthly Annual reports (online or print) annually or twice yearly Human interaction Note-taking Memory Communication Conference and workshop attendance Clinical Information Management As needed. CIM will extract information from their database and send to requestor in a report/spreadsheet	CapturingProcessinginewsletters: dailyFormatitsS feeds: fortnightlyFormatitsS feeds: fortnightly- How will information be presented to various groups?Vebsites- Occhrane Library: quarterly for new and updated reviews- Will we develop standardised forms?Other web accessible databases (e.g. TRIP, NGC, Q&A services etc): monthly- ICD 10 • MeSHAnnual reports (online or print) annually or twice yearly- ICD 10 • MeSHHuman interaction • Note-taking • Memory- Data dictionariesWill information we capture be extracted into a temporary holding place (e.g. Endnote) until ready for processing?Clinical Information Management • As needed. CIM will extract information from their database and send to requestor in a report/spreadsheettitute of Health and Welfare: CCE Centre for Clinical Effectivene	CapturingProcessingStorageInewsletters: dailyFormatOptions available to us nowISS feeds: fortnightlyHow will information be presented to various groups?Definition and slowness due to stored documents)VebsitesWill we develop standardised forms?Individual drive and personal hard disksOptions wailable to us nowEndnote (problems with record limits and slowness due to stored documents)Other web accessible databases (e.g. TRIP, NGC, Q&A services etc): monthlyWill we develop 	CapturingProcessingStorageDisseminationinewsletters: daily isseminationFormatOptions available to us nowCCE current practicesISS feeds: fortnightly- How will information be presented to various groups?- Endnose (problems with record limits and slowness due to stored documents)- Emails to interested individuals - Casses and workshopsVebsites • Cochrane Library: quarterly for new and updated reviews- Will we develop standardised forms?- Individual drive and personal hard disks- Commissioned reports to internal and external client groupsOther web accessible databases (e.g. TRIP, NGC, Q&A services etc): monthly- KDS 10- Shared drive (public)- Reports on the old CCE website• Mesh vearly- Data dictionaries- Blogging software on SH intranet (nolding place (e.g. Endnote) until ready for processing?- Blogging software on SH intranet reports here, as well as use it as an email archive)- Newsletters (CC, SH News, Purple Peril, Nursing & Midwifery (Including guidelines)• Memory Communication commication Communication to As needed. ClM will extract information from their database and send to requestor in a report/spreadsheet- Medical and nursing email archive)- Record and current reports, spreior staff who can then impart to junior staffIlinical Information database and send to requestor in a report/spreadsheet- Kere for Clinical Effectiveness: CE Chief Executive: CHA Children's Hoosital, Australia: ClM Clinical Information commication during intersited individuals etc- Foreta and commication evidence reports, etc.)		

Ontions considered in development of EDS

Section 8

Abbreviations: AIHW Australian Institute of Health and Welfare; CCE Centre for Clinical Effectiveness; CE Chief Executive; CHA Children's Hospitals Australia; CIM Clinical Information Management; FDA Food and Drug Authority; HTA Health Technology Assessment; ICD 10 International Statistical Classification of Diseases and Related Health Problems Tenth Revision; IT Information Technology; MeSH Medical Subject Heading; MHRA Medicines and Healthcare products Regulatory Agency; NGC National Guideline Clearinghouse; NICE National Institute for Health and Care Excellence; RSS Really Simple Syndication, SH Southern Health; SIGN Scottish Intercollegiate Guideline Network; SNOMED Systematized Nomenclature of Medicine; TGA Therapeutic Goods Authority; TRIP Turning Research into Practice, WHA Women's Hospitals Australia; WHO World Health Organisation,

Storage decision: WordPress (wordpress.com) blogging software was chosen because it was easy to set up and maintain; had a professional appearance; included in-built categories, the choice to turn off comments, a variety of widgets such as search boxes and category drop-down lists, and the ability to store documents within the blog.

Section 9 Definitions of evidence products, inclusion criteria and appraisal of publication sources

Inclusion and appraisal criteria were applied to methods published on the websites of potential sources of high quality synthesised evidence.

Generic criteria

- Publications are in English or have English summaries of foreign language evidence
- Evidence must be freely accessible and require no cost to subscribe or register
- The evidence must be electronically accessible for a period of time (ie stable links)
- Declarations of conflicts of interest and attributions of authorship must be clear and immediately identifiable
- Funding sources must be explicit. If funded by commercial entities, editorial independence must be demonstrated

Systematic Reviews and Health Technology Assessments (HTAs)

A **systematic review** synthesises the results from all available studies in a particular area and provides a thorough analysis of the results, strengths and weaknesses of the collected studies. A systematic review addresses a focused, clearly formulated question. It uses systematic and explicit methods to identify, select and critically appraise relevant research and to collect and analyse data from the studies that are included in the review. It may or may not include a meta-analysis which summarises the statistical results of included studies.¹

A **health technology assessment** is an evaluation of the clinical effectiveness, cost effectiveness, and broader impact of drugs, medical technologies, and health systems, both on patient health and the health care system. During the assessment, data from research studies and other scientific sources are systematically gathered, analysed and interpreted. The findings from this process are then summarised in reports that translate scientific data into information that is relevant to decision-making.²

Quality criteria

- Focused research question(s)
- Comprehensive search strategy
- Specified inclusion and exclusion criteria
- Quality assessment of included information/studies
- Summary of results of individual studies

Evidence-Based Guidelines

Evidence-based guidelines are systematically developed statements that aim to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances. Developed after the systematic retrieval and appraisal of information from the literature, evidence-based guidelines usually include strategies for describing the strength of the evidence, and clearly separate expert opinion from the best available evidence.³ Evidence-based guidelines have been sourced from sites or organisations that have appropriate methods of development.

Quality criteria

Sources were assessed against a subset of criteria from the AGREE II instrument.⁴

- Systematic methods were used to search for evidence criterion 7
- The criteria for selecting the evidence are clearly described criterion 8
- The methods used for formulating the recommendations are clearly described criterion 10
- There is an explicit link between the recommendations and the supporting evidence criterion 12

^{1.} Centre for Clinical Effectiveness. 2009. Evidence-Based Answers to Clinical Questions for Busy Clinicians. The Centre for Clinical Effectiveness, Southern Health, Melbourne, Australia. <u>http://www.southernhealth.org.au/icms_docs/2145_EBP_workbook.pdf</u>

^{2.} The Canadian Agency for Drugs and Technologies in Health (CADTH). <u>http://www.cadth.ca/index.php/en/hta/faq</u>

McKinlay E, McLeod D, Dowell T & Howden-Chapman P. 2001. Clinical Practice Guidelines: A selective literature Review, Report prepared by the Wellington School of Medicine for the New Zealand Guidelines Group Inc. http://www.nzgg.org.nz/download/files/wsm_literature_review.pdf

^{4.} AGREE. 2009. Appraisal of Guidelines for Research and Evaluation II. The AGREE Next Steps Consortium. http://www.agreetrust.org/?o=1397

Horizon scanning documents

Horizon scanning provides short, rapidly completed, 'state of play' documents. These provide current information on technologies to alert planners and policy makers of the advent and potential impact in terms of safety and cost, before they are introduced into the health system. In addition to new and emerging technologies, horizon scanning can also provide timely information about changes in the delivery and use of existing technologies.⁵

Quality criteria

Sources were assessed against the eight principles of the HONcode (Health on the Net Foundation).⁶

- Authoritative
- Complementarity
- Privacy
- Attribution
- Justifiability
- Transparency
- Financial Disclosure
- Advertising policy

Alerts and recalls

An alert is advice regarding a specific situation in which a therapeutic good which, whilst performing to meet all specifications and therapeutic indications, might present an unreasonable risk of substantial harm if certain specified precautions in regard to its use are not observed.⁷

A recall advises the permanent removal of therapeutic goods from supply or use for reasons relating to deficiencies in the quality, safety or efficacy of the goods.⁷

Alerts and recalls were not appraised but were limited to Australian government publications.

Evidence-based policy and management advice

Evidence-based policy and management advice is represented as synthesised research evidence related to governance, financial and delivery arrangements in health systems⁸ as well as policies, programs and interventions at public health decision-making levels.⁹

Quality criteria

- Aim of the source is to enable Evidence-Based Decision-Making
- Original full text article freely available online
- Classified as 'strong evidence' by source of publication

- 6. HONcode (Health On the Net Foundation) http://www.hon.ch/cgi-bin/HONcode/Inscription/site_evaluation.pl?language=en&userCategory=individuals
- 7. Therapeutic Goods Administration. Uniform Recall Procedure for Therapeutic Goods. 2004 edition ©. Commonwealth of Australia. http://www.tga.gov.au/docs/pdf/urptg.pdf
- Health Systems Evidence. 2011. Health Systems Evidence Evidence to support decision-making An online repository of synthesized research evidence for health system policymakers, managers and stakeholders
 <u>http://www.healthsystemsevidence.org/images/stories/documents/mhf-tool 3 healthsystemsevidence 2010-04-21.pdf</u>

9. Health Evidence Canada. 2011. http://www.health-evidence.ca/html/AboutUs

^{5.} Australian and New Zealand Horizon Scanning Network (ANZHSN). http://www.horizonscanning.gov.au/internet/horizon/publishing.nsf/Content/process-2#what

Section 10 Sources of synthesised evidence

Systematic reviews, HTAs and Evidence-based Guidelines

- Cochrane Library
- Scottish Intercollegiate Guidelines Network
- New Zealand Guidelines Group
- National Institute for Health and Clinical Excellence (NICE)
- National Institute for Health and Clinical Excellence (NICE) "Do not Do Database"
- Australian National Health and Medical Research Council
- Washington State Health Care Authority HTA Program
- Australian Medical Services Advisory Committee
- Institute of Work and Health
- Health Information and Quality Authority
- Effective Public Health Practice Project
- Centre for Clinical Effectiveness
- Centre for Reviews and Dissemination
- California Technology Assessment Forum
- California Health Benefits Review Program

Horizon Scanning

- Australia New Zealand Horizon Scanning Network
- Canadian Agency for Drugs and Technologies in Health Horizon Scanning Service
- International Network on New and Emerging Health Technologies (EuroScan)

Alerts and recalls

- Australian Therapeutics Goods Administration
- National Prescribing Service
- Any alerts or recalls distributed through Monash Health internal systems

Evidence-based policy and management advice

- Health Systems Evidence (McMaster Health Forum) (Canada)
- Health Evidence Canada

Coding

The titles were coded so the reader could identify the type of publication

- Systematic reviews and health technology assessments (HTAs) were identified by the prefix SR.
- Evidence-based guidelines were identified by the prefix GL.
- Horizon scanning can be identified by the prefix HS.
- Alerts and recalls can be identified by the prefix AR.
- Evidence-based policy advice can be identified by the prefix PL.

Categories

Bibliographic Source, Healthcare setting, Type of technology/practice, Professional group, Specialty, Disease group, Age, Gender, Outcomes, Author's Recommendations and Links to original documents.

Definitions

Healthcare settings

'Settings' refers to the places where healthcare is undertaken. Sources of individual definitions are cited.

- Inpatient (Monash Health Acute Care): where the patient requires admission to the hospital; "persons admitted to health facilities which provide board and room, for the purpose of observation, care, diagnosis or treatment" (Mondofacto Medical Dictionary 2008).
- Outpatient (Monash Health Continuing Care): where treatment occurs without admission, often on a continuing basis; "a patient who is receiving ambulatory care at a hospital or other facility without being admitted to the facility. Usually, it does not mean people receiving services from a physician's office of other program that also does not provide inpatient care" (Academy Health 2004).
- Emergency Department: "a hospital room or area staffed and equipped for the reception and treatment of persons with conditions (as illness or trauma) requiring immediate medical care" (Meriam-Webster's Medical Dictionary, 2010)
- **Organisation-wide**: Information catalogued with this subject heading (e.g. hand-washing, staff wellbeing, patient information) needs to be addressed by multiple departments.
- General Practice: A service which provides primary care, generally privately operated; "a term for physicians who care for all types of medical problems. Has since been replaced by more extensively trained family practitioners" (Mondofacto Medical Dictionary 2008).
- Community Health Service: provides mixed preventive and primary care; "Community health... has [a] focus on health
 promotion and disease prevention and management is designed to improve the health and wellbeing of local
 residents, as well as take pressure off the acute care health system." Services are provided locally, to everyone,
 irrespective of income. http://www.betterhealth.vic.gov.au/bhcv2/bhcarticles.nsf/pages/Community_health_centres?open

Types of technology /practice

This list was determined by the Technology/Clinical Practice Committee which has the role of approving the commissioning and decommissioning of health technologies and clinical practices at Monash Health. Definitions are based on National Library of Medicine Medical Subject Headings (MeSH).

- Pharmaceuticals: Drugs intended for human or veterinary use, presented in their finished dosage form. Included here
 are materials used in the preparation and/or formulation of the finished dosage form.
- Implantable Devices: Devices which are inserted into an organism, typically beneath the epithelium tissue layer, for prosthetic, diagnostic, therapeutic, or experimental purposes.
- Prostheses: Artificial substitutes for body parts, and materials inserted into tissue for functional, cosmetic, or therapeutic purposes.
- Surgical Procedure: Procedure that either uses open invasive surgery, closed or local surgery, corrects deformities and defects, repairs injuries, diagnoses and cures certain diseases, is elective surgery, or is a procedure to reconstruct, restore, or improve defective, damaged, or missing structures.
- **Surgical Devices:** Nonexpendable and expendable apparatus used during surgical procedures, including surgical instruments (devices that are usually hand-held and used in the immediate operative field).
- Diagnostic Procedures: Methods, procedures, and tests performed to diagnose disease, disordered function, or disability.
- Diagnostic Devices: Instruments or tests used in medical diagnosis / Nonexpendable items used in examination.
- Medical Procedure: A course of action intended to achieve a result in the care of admitted patients, used by medical personnel.
- Medical Device: Expendable and nonexpendable equipment, supplies, apparatus, and instruments that are used in diagnostic, therapeutic, scientific, and experimental procedures.
- Clinical Procedure: All other procedures or clinical activities

Professional Specialties

This is a modified version of MeSH Health Occupations [H02], originally developed by the National Library of Medicine (<u>http://www.nlm.nih.gov/mesh/2010/mesh_browser/MBrowser.html</u>).

A Acupuncture Adolescent Medicine Adolescent Psychiatry Aerospace Medicine Allergy and Immunology Anaesthesiology Andrology Animal Nutrition Science Audiology	B Bariatric Medicine Behavioural Medicine Biological Psychiatry Biomedical Engineering	C Cardiology Child Nutrition Sciences Child Psychiatry Chiropractic Clinical Medicine Colorectal Surgery Community Dentistry Community Health Nursing Community Medicine Community Psychiatry Critical Care Medicine	D Dietetics Dental General Practice Dental Research Dental Technology Dermatology Disaster Medicine	E Emergency Medicine Emergency Nursing Endocrinology Endodontics Epidemiology Environmental Health Environmental Medicine Epidemiology Ethnopharmacology
F Family Nursing Family Practice Forensic Dentistry Forensic Medicine Forensic Nursing Forensic Psychiatry	G Gastroenterology Geriatric Dentistry Geriatric Nursing Geriatric Psychiatry Geriatrics Gynaecology	H Haematology Health Physics Health Promotion Health Services Administration Health Services Research Herbal Medicine Holistic Nursing Hospitalists Hospital Administration	l Immunology Infection Control Infectious Disease Medicine Integrative Medicine	J, K, L
M Medical Genetics Medical Illustration Medical Oncology Medical Sociology Midwifery Military Dentistry Military Medicine Military Nursing Military Psychiatry Mortuary Practice	N Naval Medicine Nephrology Neonatal Nursing Neonatology Neuropharmacology Neurosurgery Nuclear Medicine Nursing Nursing Research Nutritional Sciences	O Obstetrical Nursing Obstetrics Occupational Dentistry Occupational Dentistry Occupational Medicine Occupational Medicine Occupational Therapy Oncologic Nursing Oral Medicine Oral Pathology Oral Surgery Orthodontics Orthopaedic Nursing Operative Dentistry Ophthalmology Optometry Oral Medicine Oral pathology Oral surgery Organization and Administration Orthodontics Orthopaedics Orthopaedics Osteopathic Medicine Otolaryngology	P Paediatrics Paediatric Dentistry Paediatric Dentistry Paediatric Nursing Palliative Care Paramedicine Perinatology Perioperative Nursing Pathology Periodontics Pharmaceoepidemiology Pharmaceutical Technology Pharmacogenetics Pharmacology Pharmacy Pharmacy Pharmacy Phastic Surgery Podiatry Preventive Medicine Prosthodontics Psychiatric Nursing Psychology Psychopharmacology Public Health Public Health Dentistry Public Health Nursing Pulmonary Medicine	Q Quality of Health Care
R Radiation Oncology Radiologic Technology Radiology Regenerative Medicine Rehabilitation Rehabilitation Nursing Reproductive Medicine Rheumatology	S School Dentistry School Nursing Serology Sleep Medicine Speech Language Pathology Sports Medicine Social Medicine Surgery	T Telemedicine Thoracic Surgery Toxicology Transcultural Nursing Traumatology Tropical Medicine	U Urology	V Venereology Vaccination Vascular Surgery

Acupuncture Allied Health **Biomedical Engineering** Chiropractic Dentistry **Environmental Health** Health Services Administration **Hospital Administration** Medical Illustration Medical Sociology Medicine **Mortuary Practice** Nursing **Nutritional Sciences** Optometry Orthoptics Pharmaceutical Technology Pharmacology Pharmacy Podiatry Serology

Special Interest Groups

These categories are RSS feeds that have been set up for special interest groups.

Clinical Risk: Medical Procedure, Clinical Procedure, Organisation-wide, Infection Control, Nursing, Falls.

Medication Safety: Pharmaceuticals, Pharmaceutical Technology, Pharmacy, Potassium, Insulin, Narcotics (opioid analgesics), Chemotherapy, Heparins, Administration errors, Prescribing errors, Dispensing errors, Electronic prescribing. *Emergency*: Emergency Department, Emergency Medicine, Emergency Nursing, Toxicology *Disinvestment*: Not recommended, evidence of harm

Section 12 Model 1 Examples of the EDS Website

PILOT VERSION









Evidence Disser	Home About EDS How to use the EDS website Manage your Subscription Latest	Evidence FAQs Resources
Southern Health	SR: Bone morphogenetic protein: the state of the evidence of on-label and off-label use October 13, 2010 – EDS Team Edit	2
Disinvestment Alert Sorafenib	Ratko TA, Belinson SE, Samson, DJ et al (2010). Bone morphogenetic protein: the state of the evidence of on-label and off-label use. Technology Assessment Report. Agency for Research and Quality, Maryland USA. Click here for full text	Clincians, Corsumers, Evidence
Latest Evidence October 2010 M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 « Sep Resources	Author summary The Centers for Medicare and Medicaid Services (CMS) has called this meeting to consider the currently available evidence regarding the clinical benefits and harms of on-label and off -label use of BMPs. More than 20 BMPs have been identified, but only BMPs -2, -4, -6 and -7 have been shown to have significant osteogenic properties. The main physiologic role of BMP is to promote differentiation of mesenchymal cells into chrondrocytes and osteoblasts, to promote differentiation of osteoprogenitors into osteoblasts, and to influence skeletal pattern formation. Human BMPs are now produced using recombinant DNA technology. Currently, two recombinant BMPs have some form of FDA approval and are commercially available in the United States: rhBMP-2 and rhBMP-7. The on-label and off -label use of BMPs has rapidly grown since becoming clinically available in 2001. There are reports stating that up to 85% of BMP use is for off-label indications, mostly in the spine. There have also been a number of reports of adverse events associated with the use of BMPs.	Centre for Clinical Effectiveness Search the EDS Search Email Subscription You are subscribed to this blog (manage). Categories
Visit the EDS Resources page	Keywords: Bone Fractures, Musculoskeletal Abnormalities	Popular RSS Feeds
Visit the CCE website New to EDS?	Posted in Inpatient, Medical Devices, Orthopaedics, Prostheses, Surgery. Tags: Bone Fractures, Musculoskeletal Abnormalities. Comments Off	Clinical Risk
Have you signed up for the EDS email? Please complete this survey. Contact Us	SR: Genetic testing for predisposition to inherited hypertrophic cardiomyopathy October 13, 2010 – EDS Team Edit BlueCross BlueShield Association (2010). Genetic testing for predisposition to inherited hypertrophic cardiomyopathy. TEC Assessment 24(11). BlueCross BlueShield Association (BCBS), Chicago IL. URL accessed	use by junior medical staff in acute hospital settings Emergency SR: Radiofrequency
Click the link below to email us	06/10/10	ablation for the treatment

Section 13 Model 1 Example of EDS Email Alert _ 8 × 🤹 Evidence Dissemination Service - Thunderbird <u>File Edit View Go Message Tools Help</u> Q ٤ () s . G - O -1 X R Ç. **N**-Get Mail Write Address Book Reply Reply All Forward Tag Delete Junk Print Subject: Evidence Dissemination Service From: Evidence Dissemination Service Sender: noreply+feedproxy@google.com Date: 17/03/2010 7:19 PM To: cara.waller@med.monash.edu.au . Evidence Dissemination Service 🕂 Google • SR: Gamma-hydroxybutyrate (GHB) for treatment of alcohol withdrawal and prevention of relapses • SR: Heliox for croup in children • SR: Infraclavicular brachial plexus block for regional anaesthesia of the lower arm • SR: Interventions for increasing ankle range of motion in patients with neuromuscular disease • SR: Laparoscopic versus open surgery in small bowel obstruction • SR: Momordica charantia for type 2 diabetes mellitus • GL: Acute Pain Management SR: Gamma-hydroxybutyrate (GHB) for treatment of alcohol withdrawal and prevention of relapses Posted: 16 Mar 2010 06:39 PM PDT Leone MA, Vigna-Taglianti F, Avanzi G et al (2010). Gamma-hydroxybutyrate (GHB) for treatment of alcohol withdrawal and prevention of relapses. Cochrane Database of Systematic Reviews, Issue 2. Art. No.: CD006266. DOI: 10.1002/14651858.CD006266.pub2. URL accessed 16.03.10. Click here for full text Author summary GHB 50mg is effective compared to placebo in the treatment of AWS, and in preventing relapses in previously detoxified alcoholiss at 3 months follow-up, but the results of this review do not provide sufficient evidence in favour of GHB compared to benzodiazepines and Chlormethiazole for AWS prevention. GHB is better than NTX and Disulfiram in maintaining abstinence and it has a better effect on craving than placebo and Disulfiram. Side effects of GHB are not statistically different from those with BZD, NTX or Disulfiram. However, concern has been raised regarding the risk of developing addiction, misuse or abuse, especially in polydrug abusers. SR: Heliox for croup in children Posted: 16 Mar 2010 06:20 PM PDT Vorwerk C, Coats T (2010). Heliox for croup in children. Cochrane Database of Systematic Reviews, Issue 2. Art. No.: CD006822. DOI: 10.1002/14651858. CD006822. pub2. URL accessed 16.03.10. Click **here** for full text Author summary At present there is a lack of evidence to establish the effect of heliox inhalation in the treatment of croup in children. A methodologically well-designed and adequately powered RCT is needed to assess whether there is a role for heliox therapy in the

management of children with croup.

Section 14 Draft tool for reporting use of evidence with completed examples								nples			
Clinical Area	Reference	Source	Evidence of benefit	Evidence of harm or no benefit	Lack of evidence	Applicability	Policy or procedure on this topic?	Policy or procedure consistent with evidence?	Quality	Change in practice needed?	 If policy, procedure or local practice is not consistent with the evidence: What are the plans to implement change? What are the reasons for not implementing change?
Respiratory medicine	Ward et al	Cochrane	×			☑ Good □ Limited □ Poor	☑ Yes □ No □ N/A	☑ Yes □ No □ N/A	☑ Good □ Limited □ Poor □ N/A	□ Yes ☑ No □ N/A	N/A
	Kimber et al	UK HTA		×		□ Good ☑ Limited □ Poor	☑ Yes □ No □ N/A	□ Yes ☑ No □ N/A	☑ Good □ Limited □ Poor □ N/A	☑ Yes □ No □ N/A	The new drug will be implemented following an education program and introduction of revised local guidelines
	Georgiou et al	ASERNIPS			V	☑ Good □ Limited □ Poor	□ Yes ☑ No □ N/A	□ Yes □ No □ N/A	☑ Good □ Limited □ Poor □ N/A	□ Yes ☑ No □ N/A	<i>In the absence of good evidence to retain or discontinue current practice, no changes will be made.</i>
						□ Good □ Limited □ Poor	□ Yes □ No □ N/A	□ Yes □ No □ N/A	□ Good □ Limited □ Poor □ N/A	□ Yes □ No □ N/A	
						□ Good □ Limited □ Poor	□ Yes □ No □ N/A	□ Yes □ No □ N/A	□ Good □ Limited □ Poor □ N/A	□ Yes □ No □ N/A	
						□ Good □ Limited □ Poor	□ Yes □ No □ N/A	□ Yes □ No □ N/A	□ Good □ Limited □ Poor □ N/A	□ Yes □ No □ N/A	
						□ Good □ Limited □ Poor	□ Yes □ No □ N/A	□ Yes □ No □ N/A	□ Good □ Limited □ Poor □ N/A	□ Yes □ No □ N/A	
						□ Good □ Limited □ Poor	□ Yes □ No □ N/A	□ Yes □ No □ N/A	□ Good □ Limited □ Poor	□ Yes □ No □ N/A	

Section 15 Survey of staff enrolling in the EDS: Baseline data

All subscribers had been invited to complete a baseline survey regarding their use of evidence when they registered with the EDS. The findings were very similar to other surveys in this area [23, 24, 29, 41-43, 45-48, 57, 73-78], including others at Monash Health [7]. Users consulted a range of sources to inform their decision-making and believed that EBDM resulted in the best clinical care.

Almost half (18/41) of the respondents found out about the EDS through the advertisement on the Monash Health Intranet, the others found out through the Chief Executive's Newsletter (8), referrals from colleagues (8), posters in the hospital (4), or other means (3). Most (33/45) reported that their role involved decision-making about introducing or changing use of TCPs.

All respondents 'sometimes', 'often' or 'always' included research evidence in their decision making. The internet, The Cochrane Library, and electronic databases were the most commonly used resources. Most respondents spent more than two hours searching for, assessing and appraising evidence for their decisions.

The majority of respondents agreed that Monash Health promoted the use of EBP (35/41) and facilitated employee's use of evidence in making decisions for TCPs (27/40); that EBP results in the best clinical care for their patients (37/40) and new medical technology requires rigorous evidence before introduction into clinical practice (37/42); that they have access to research findings in the workplace (32/41) and know where to get local Monash Health data for their decisions (23/41). Most (25/42) did not believe that EBP is difficult or that EBP takes too much time.

Q1. How did you hear about the Evidence Dissemination Service				
I saw it in the CEs newsletter	8			
I saw it advertised in the front intranet page	18			
I saw a poster in the hospital	4			
I was referred by a colleague	8			
I work at another health service and a Southern Health employee referred me	0			
Other	3			
Missing Answers	5			
Total	46			
Other, please specify: direct email notification, was a part of the pilot phase, electronic newsletter	r, Received MMC email			

Q2. What is your role at Southern Health?		
13		
16		
7		
10		
46		

If Allied Health or Other, please specify: Physiotherapy 6, Occupational therapy 3, Strategic Planner/Manager SMICS 1, Pharmacy 2, Quality 1, Social work 1, Clinical psychologist 1, Speech pathology 1, Project Manager 2, Administrative 1, CCE 1

Q3. In which Program do you work?		
Continuing Care	8	
Corporate Office	1	
Medicine Program	7	
Mental Health Program	2	
Support Services	2	
Specialty Program	4	
Strategy, Performance and Planning	1	
Surgery Program	2	
Women's and Children's	5	
Other	13	
Missing Answers	1	
Total	46	

If Support Services or Other, please specify: Nursing & Midwifery Education & Strategy, Research/Theatre, SMICS, Critical Care, Imaging guided therapy, Care in Context - HARP Program, SACS, General medicine, Capital Projects, Pharmacy, Anaesthesia, Ambulatory and Community Care, CCE

Q4. At which Southern Health site do you work?		
Kingston	5	
Moorabbin	6	
Clayton	24	
Dandenong	8	
Casey	5	
Cranbourne Integrated Care	2	
Other	5	
Total	46	

Other, please specify: All sites, Pakenham, Yarraman, Middle South CCU, Berwick

Q5. Does your role involve decision-making about introducing or changing use of TCPs?		
Yes	33	
No	12	
Missing Answers	1	
Total	46	

26. In your decision-making around TCPs, approximately how often do you include evidence from research?					
Never	0				
Rarely	0				
Sometimes	10				
Often	10				
Always	12				
Missing Answers	14				
Total	46				

Q7. How often do you use the following resources to find information about technologies?							
	Never	Rarely	Sometimes	Often	Always	Total	
Personal subscription to journals	6	1	9	10	4	30	
Personal Subscriptions to email list services	9	4	8	3	3	27	
Library hard copy journals	3	7	15	2	1	28	
The Cochrane Library	2	2	13	8	3	28	
Other electronic databases of research	0	5	5	10	9	29	
Guideline websites	1	8	12	4	6	31	
Internet	0	1	12	11	7	31	
Other	3	0	4	1	1	9	
Missing Answers Total						14	

Other, please specify: senior clinical staff, trade displays / meetings, conferences, in-service, other hospital guidelines, conferences

Q8. During the last 6 months, what is the average time you spent including information from research in your decision-making? Please indicate how long, on average, you spent searching for, accessing and appraising this information?

	<30 minutes	30-60 minutes	60-90 minutes	90-120 minutes	>120 minutes	Total
Searching	4	6	6	1	15	32
Accessing	5	6	5	2	12	30
Appraising	3	6	8	1	12	30
Missing Answers						14

29. Please rate your agreement with the following statements about evidence-based practice (EBP).							
	Strongly Disagree	Disagree	Agree	Strongly Agree	Don't know	Total	
Southern Health promotes the use of EBP	0	4	15	20	2	41	
I believe EBP takes too much time	5	20	8	5	3	41	
I know where to get Southern Health data for my decisions	3	14	19	4	1	41	
I believe new medical technology does not require rigorous evidence to be introduced into clinical practice	19	18	1	4	0	42	
I have access to research findings in my workplace	2	7	24	8	0	41	
I believe EBP results in the best clinical care for patients	0	1	17	20	2	40	
Southern Health facilitates employee's use of evidence in decision-making for TCP change	1	8	24	3	4	40	
I believe EBP is difficult	3	22	12	2	3	42	
I believe that in the absence of research evidence EBP can still be applied to decision-making about TCPs	3	14	14	3	7	41	
Missing Answers						4	
Q10. Please indicate how frequently you do the following							
	Never Rarely	Somet	imes	Often	Always	Total	

	Never	Rarely	Sometimes	Often	Always	Total
I consult a range of information sources	4	0	10	18	8	40
I include the views of consumers in my decision-making	5	7	9	16	4	41
I use EBP guidelines or systematic reviews to change clinical practice where I work	4	1	15	20	2	42
I evaluate outcomes of practice change	2	7	13	15	4	41
I use evidence (research, clinical expertise, consumer preference) to change my clinical practice	2	0	15	18	7	42
Missing Answers						4

Section 16 Model 1 Pilot implementation and evaluation

Objective

To test and refine the features of Model 1 for use by individual decision-makers.

Characteristics of the pilot intervention

The scope, components and methods developed initially formed the pilot intervention.

Pilot activities were undertaken with a pragmatic sample of a range of individual decision-makers including executives, clinical program directors and senior managers from the SHARE Steering Committee and Technology/Clinical Practice Committee and clinical managers from one large multi-campus department.

Implementation strategies

EDS staff met with committee and department representatives to seek agreement in principle and then attended meetings to explain the service and obtain agreement from individuals. Personalised emails explaining the project and requirements of participants were sent to those who were not present at the meetings. The project team enrolled each of the designated staff members, but individuals were required to register to establish their account. An email invitation with information about the EDS, an embedded link for registration, and instructions on how to activate the link was sent to each participant.

Evaluation

Evaluation was conducted six months after implementation and included audit of website statistics, electronic survey of individual users, interview with EDS administrator, and reflections of the SHARE Steering Committee and project team. An additional survey was sent two months later to explore reasons for non-use of the EDS in the pilot sample. Details of the survey and interview questions, responses and project team observations are provided below and key messages are summarised.

Reach

Of the 73 individual decision-makers enrolled by the EDS team, 26 activated their email subscription and one created an RSS subscription. Due to problems determining the validity of email addresses it was difficult to define a denominator for this response. Medical staff frequently used personal email addresses and lists of committee members were not kept up-to-date; some may not have received the invitation and others may have left the organisation.

Users preferred the email to the website with email 'views' growing significantly over the pilot period while the website remained steady with relatively fewer 'views'.

While not officially in the evaluation period, in the eight months between the formal pilot and implementation of the revised EDS, subscription more than doubled to 64 participants with an average number of 100 visits to the site per month. The 'Home' page was the most frequently visited page of the site with the most recent systematic review being the most common destination for users.

Usefulness: User satisfaction

There were only eight responses to an online survey sent to individual participants. While this small number limits generalisability, the themes were very consistent and most respondents replied positively. Users were 'mostly' or 'completely' satisfied with the service. The website was viewed as 'easy' or 'very easy to use' and the amount of information on the website met user's needs. Email alerts were read and respondents reported accessing full text at least 'sometimes' and one person 'always'. One respondent questioned why there were not more publications in their area of expertise, suggesting that they misunderstood the nature of the service ie that it captured publications as they were published rather than selecting them by topic.

Usefulness: Service quality

All respondents rated the information as 'trustworthy', 'current' and 'coming from an authoritative source'. One respondent was unaware of the classification system, but the others reported that entries had been classified correctly. Two respondents suggested improvements, both related to identifying information relevant to users' specialty areas.

Use

Two individuals had used the information in making decisions about clinical practice. No one had used it for purchasing clinical consumables or capital equipment; although half thought that they would in the future.

The executives and senior managers reported that the information in the EDS alerts did not influence their decisionmaking because it was predominantly about clinical practice and their decisions were not. They observed that the different levels of management within the organisation required different types of information and proposed three levels: 1) Department heads and unit managers needed evidence for local policies and protocols related to clinical practice. 2) Program directors required evidence that informed their one to two year planning processes and was relevant to procedural aspects of the health service such as programs and service delivery as well as individual practitioners. 3) Executives and senior managers required information to inform three to five year forward planning that aligned with the organisation's strategic objectives. This resulted in addition of a category for 'Evidence-based policy and management advice' and development of criteria to identify high quality sources of this information; details in section on Definitions of evidence products above.

Implementation fidelity

The only modifications to the planned intervention were that some of the sources were not accessed during the pilot period. The intervention was implemented as planned. Barriers and enablers were identified and action taken. Almost all were related to technical issues in delivering the service.

•		
Evaluation Question	Method/Source	Results
Reach		
What percentage of decision-making	Audit of web	Of the 73 SH staff signed-up by SHARE, 26 (35%) activated their email
staff have subscribed to the EDS?	statistics	subscription.
What percentage of 'unsubscribed'	Audit of web	Of the 47 staff who did not activate their email subscription, 1 person has an
users accessed the information	statistics	RSS subscription.
through different means?	Survey of users	Of the 8 respondents, 5 had activated email subscriptions, 1 did not use the
		service and 2 have subscribed to RSS updates.
Are there any patterns across sites,	Audit of web	4/6 TCPC, 10/20 Therapeutics, 11/47 Diagnostic imaging (DI)
professions or programs, and what	statistics	Gaps: Subscription rates in Therapeutics committee and DI low.
are the gaps?	Survey of users	5/8 Medical, 1 Allied Health, 1 Nursing and 1 Research
		2 TCPC, 2 Therapeutics, 4 DI
		All sites but Cranbourne Integrated Care were represented. All respondents
		spent time working at Clayton campus.
		Gaps: No survey responses from Pharmacy
Usefulness: Satisfaction	Survey of users	
What percentage of users is satisfied		6/7 reported being 'mostly' or 'completely' satisfied with the service. One
with the service?		person was not at all satisfied with the service.
What percentage of users read the	Survey of users	6/7 browsed the email, 4 'always', 2 'often'.
email, accessed and read the		4/5 read the email in detail, 1 'always', 2 'often', 1 'sometimes'
website?		
What percentage of users followed	Survey of users	5/5 followed links from emails to full-text, 4 'sometimes', 1 'always'
links and read full-text articles		2/4 'sometimes' followed links from the website to full text.
What percentage of users found the	Survey of users	2/7 had used the information in decision-making.
information received useful for		
decision-making?		
What percentage of users rate the	Survey of users	Amount of information on the website: 5/7 said this met their needs, 1
amount of information as useful in		commented this question was not applicable, 1 responded 'very few SRs on
decision-making.		diagnostic imaging and no categorisation makes perusal inefficient
		Amount of information in the email: 6/6 reported this met their needs.
What percentage of users are	Survey of users	5/6 respondents wanted shorter emails more frequently (<30 updates in a
satisfied with the frequency of email		weekly email)
Preference for classification of	Survey of users	5/7 respondents preferred more specific levels of ICD 10 headings
	Curries of usons	7/7 under die farumentieren ein (dur entre ein der
	Survey of users	// rated information as 'trustwortny'
To what extent do users consider the		/// rated information as 'current
trustworthy? Information sources as		7/7 rated sources as 'coming from an authoritative source'
authoritative?		
Trend of 'hits' to the website over	Audit of web	'Views' of emails grew by 600% (this could be affected by referral or by one or
time, as compared to subscription	statistics	two people looking at the same thing).
rates		The average number of 'views' to email 641 (range 21-1004)
		Average number of 'clicks' on the website is 147/month. however. excluding

July (set-up bias), the average is 51 'clicks'/month

Electronic survey of users

Number of entries classified under correct headings	Survey of users	5/6 reported that classifications were correct, 1 was unaware that entries were classified.
Ease of use	Survey of users	4/6 rated website as 'easy' or 'very easy to use', 2 did not access website.
Suggestions/comments	Survey of users	'Little of relevance to diagnostic imaging. Most of the links did not work for me by opening the article when I clicked on it so could not read' 'Needs to be tailored to the user's specialty and links need to work so that the information can actually be accessed. I was aware of SRs to do with diagnostic imaging (including one that I wrote!) which never came up in the emailed list. I am not sure how the selection process worked.' 'The topics often seem esoteric'
Implementation To what extent has the service been implemented as planned and what are the gaps?	Audit of implementation plan Interview with administrator	 There are a number of small things that have not been implemented due to the nature of the pilot (eg using the full list of original resources), however, the service is fully operational and implemented without any major changes to the implementation plan. Unplanned modifications Applying narrower ICD 10 headings as a result of user feedback Excluding EUROSCAN from the list of resources Minor changes to taxonomy Changing broadcasts from fortnightly to weekly Gaps in implementation Using the whole list of original resources Move the blog to a new domain name
What are the barriers and enablers to implementation?	Interview with administrator	 Barriers Length of time to find, classify, upload and check evidence (approx. 3hrs) Slow computer Lack of clarity of Feedburner stats EDS staff use of website skewing data Enablers Routine and streamlining process with templates etc Software is easy to learn and use Feedburner allows for timed email updates – means you can upload early and publish later
Use What percentage of users have used information in decision-making?	Survey of users	3/7 had used the information in making decisions about 'clinical practice'. No one had used the information for purchasing clinical consumables or capital equipment.
What percentage of users intend to use information in decision-making?	Survey of users	 3/6 thought they would not use it in purchasing clinical consumables or capital equipment, 3/6 thought possibly 4/6 thought they would use it for clinical practice decisions, 2/6 thought possibly 4/6 thought they might possibly use it for other decision-making

Interview with EDS Administrator

To what extent has the EDS been implemented as planned?

There are a number of small things that have not been implemented due to the nature of the pilot, however, the service is fully operational and implemented without any major changes to the implementation plan.

The full list of resources to be checked has not been implemented yet as only a few of the resources were chosen for the pilot. These were those that met the quality criteria. This list needs to be revisited. New resources have emerged and will be added to the resource manual.

Have there been any unplanned modifications along the way and why or why not?

Second level ICD10 headings introduced half way into pilot. Depending on evaluation results, this will be retained and all entries under the top level headings removed.

Excluded EUROSCAN from the list of resources as it did not meet the quality criteria (sends out notifications without data – duplication of effort)

The taxonomy will always be in development. This is due to the nature of starting with existing classification systems not designed for this purpose. For example, the category for medicine from MeSH is too broad and lacks some specialisations. There is also duplication within the taxonomy which must be addressed.

The last month of the pilot was changed to a weekly email due to the amount of new evidence uploaded to the resources we are using over our holiday break

Is there anything yet to be done that was in the plan?

The full resource list has yet to be searched.

Move to a new blog with new domain name. The current EDS is on a personal account. Moving will allow any EDS team member to update it. Reviewing original resources for quality. We have got it listed in the EDS as 'at least annually'. Maybe once every two/three years? Did consider how long to keep the posts on the blog. It's not meant to be a repository – the email is main feature. Could remove after 6 months. Need to ask users or steering committee.

What have been the main barriers and enablers to establishing and continuing the EDS?

Barriers

Slowness of work computer necessitating work from home one day a week. This has been resolved with a new computer at work. Incorporating this new task into work load has taken some time. Establishing a routine and developing a more streamlined process of gathering and updating the blog – once a barrier and now an enabler – hopefully. This has been facilitated by creating a template for broadcasts ie, keeping the headings in table format, learning that updates need to be entered in a certain order for SRs to go 1st on the blog. Average load time is 3-4 hours.

Lack of definition from Feedburner re indicators and user statistics has meant that getting easy access to data to report back to the steering committee has been confusing and time consuming.

Enablers

Feedburner lets you decide what time the emails go out.

Can publish broadcasts without needing to do anything.

Setting up the blog was easy – the software is straightforward and easy to learn.

What can be done to improve the service in the future?

Creating a smooth workflow, eg. refining templates and routines, making the handbook.

Creating documents that aid others in updating the EDS when I am away. Training some staff in how to check resources, create and post broadcast. Also, training on how to use statistics on Wordpress and Feedburner. This can be done through using the practice blog. Moving the existing EDS to a shared CCE Wordpress account (I've already set one up and that is where the practice blog is). This will enable any staff member to update it.

What is needed for this to be a sustainable service in the future?

Staff need to know how to take over if the administrator goes on leave. Because of the nature of the post, human editing is always needed. This won't be a completely automated process.

Instead of moving it to a new account, SHARE staff could create their own Wordpress account and I can add them to the administrator list for the EDS. We would then keep the current URL.

I think it might be a good idea to use the Wordpress email subscriber function instead of Feedburner. That way, all the statistics are in one place. The downside is that the Wordpress statistics for email subscribers don't show what email posts were most popular - Feedburner does. On the other hand, users subscribing through Wordpress can choose how often they want to get emails.

Setting aside a particular day and time to get evidence and loading it the next day really works.

If this was to become a state or national project there would need to be increased leadership and budget from another body. The software would need to be upgraded and the use of IT technician might be needed.

There might need to be some review process for quality assurance of the taxonomy with a clinical review every so often that checked a few posts to ensure categorisation was correct. This would be necessary for new people administrating the service.

Project team and Steering Committee observations

- Executives, Senior Managers and Program Directors required information about policy and management decisions which was not
 addressed in the predominantly clinical evidence provided from the sources previously identified.
- The need for users to identify publications that recommended ceasing or restricting a TCP for evidence of harm or lack of effect was noted.
- The Medical Admin trainee was unable to undertake the classification due to other commitments given greater priority. This was a limitation of the Medical Admin portfolio where crises requiring immediate attention occurred frequently.
- The EDS process was complex and only one staff member was familiar with all the requirements, creating problems when they were on leave.
- The pilot website had no branding which did not meet internal standards for Monash Health publications.
- Users reported a preference for shorter emails with fewer entries.
- Users were not certain about the purpose of EDS and why specific publications were not being disseminated. They were also not using the website search function.
- The free email software had significant limitations related to analysis of available statistics. The website software did not have an email subscription function at the start of the pilot but introduced it later.
- The initial taxonomy used first level ICD10 headings. This did not provide enough detail and half way through the pilot period this was changed to the second level. The change to second level headings within the limitations of the free software made the process of entering data very time intensive and created messy search results for users.
- The category of 'Professional Group' was thought to be too broad to be of real use, for example 'Medicine' was attached to almost every
 piece of evidence, and had considerable overlap with the 'Specialty' category.
- Citations in bulletins from EUROSCAN did not point to full text.

Follow-up electronic survey to explore non-use of EDS

	No 4
2. If you have heard of the EDS, do you receive email updates or browse the website?	Yes 5 No 0
3. If you ticked No above, please outline your reasons for not subscribing to email update	es or browsing the website No responses
4. Please make suggestions for tailoring the service to better meet your needs in the futu	ire
Users	
 Have no issues. Would love more renal/transplant issues but do find the other issues u 	iseful.
• When email is sent, it is very clear at a glance which units may be interested in article e	g. Infectious Disease: Article A Article B
 Very good format. Maybe a wider range of topics; more on clinical drug trial reports 	
 Define source of information eg HS on email alert 	
 Unable to do this – I am not a staff member (Consumer representative). Some staff mighighted to enable quick access. I did not explore the possibilities here. 	ght like particular areas to be categorised or
Non-users	
 I imagine the EDS would provide links to new sources of evidence, references and summ EDS would set up a permanent link on the Clinicians Health Channel or directly on the in 	maries of noteworthy publications etc. Perhaps the ntranet or send out a regular e-newsletter.
5 Although you may not have heard of the EDS or may not use it please comment on ho	w you imagine the EDS could be used to aid
decision-making within the organisation more broadly.	
decision-making within the organisation more broadly. Users	
 decision-making within the organisation more broadly. Users Have already used information to pass on to head of unit which has been useful in decision. 	sion-making for a trial we want to do
 decision-making within the organisation more broadly. Users Have already used information to pass on to head of unit which has been useful in decis First point of call prior to development of new clinical policy/procedure 	sion-making for a trial we want to do
 decision-making within the organisation more broadly. Users Have already used information to pass on to head of unit which has been useful in decision. First point of call prior to development of new clinical policy/procedure EDS has enormous potential. Sorry I can't be more helpful. 	sion-making for a trial we want to do
 decision-making within the organisation more broadly. Users Have already used information to pass on to head of unit which has been useful in decis First point of call prior to development of new clinical policy/procedure EDS has enormous potential. Sorry I can't be more helpful. Non-users	sion-making for a trial we want to do
 decision-making within the organisation more broadly. Users Have already used information to pass on to head of unit which has been useful in decision-making within the organisation more broadly. First point of call prior to development of new clinical policy/procedure EDS has enormous potential. Sorry I can't be more helpful. Non-users Good idea. Needs to be widely known about. Email updates are more likely to be effect updates on a regular basis may be helpful. 	sion-making for a trial we want to do tive than promoting web address. Specific topic

• Would be very interested to receive the suggested ?monthly emails

Section 17 Model 1 Evaluation of full implementation

Evaluation was conducted ten months after implementation of Stage 1 and included audit of website statistics, survey of individual users, interviews and consultations with stakeholders, and reflections of the SHARE Steering Committee and project team.

The project team identified 46 of the 70 subscribers by their Monash Health email addresses (the others used anonymous personal emails) and surveys were sent by internal mail including an addressed return envelope and a chocolate incentive. A two week response time was stipulated.

The user survey had a 52% (24/46) response rate; all health professional groups and all campuses were represented. All three committee liaison representatives and two senior individual decision-makers participated in interviews.

Reach

Seventy subscribers enrolled during the evaluation period.

Most (20/24) survey respondents received email broadcasts and the others established personal RSS feeds. Although the EDS was set up for users to access information via email or RSS feed, it was encouraging to see the EDS accessed via the Monash Health intranet 182 times and 134 full text articles downloaded this way. It was difficult to interpret other available data as limitations with the free website software meant that 'user' and 'administrator' (EDS staff) traffic to the site could not be separated.

The Therapeutics Committee representative was a member of the SHARE team and received the full EDS email broadcasts; customised RSS feeds were developed to address the specific needs of the Medication Safety and Clinical Risk Committees.

Usefulness

Most (21/24) respondents were satisfied with the EDS and found the website, email broadcast or RSS feed met their needs 'fully' or 'partially'. The majority (17/19) of respondents found the categories useful and those that did not were not aware that this feature was available. Categories were used to quickly identify if the information was relevant to them and prevented them from looking at irrelevant information.

Committee representatives found that the format was "...clear and relevant", "layout of the bulletins was easy to read", "summary of the findings was very good" and "volume of material is fine".

The majority (22/24) of respondents found the content was 'current' and 'trustworthy', and 'useful' or 'partially useful'. Participants responded 'partially' or 'no' to any of the options because the information provided was not relevant to their area of clinical practice. The large volume of material was noted as a barrier to accessing the information contained in each broadcast. Six survey respondents provided suggestions for how the service could be improved; all related to making the categories more specific to avoid wasting time looking at irrelevant information.

Responses of committee representatives were mixed. Negative comments reflected the survey responses; "A lot of information that wasn't particularly relevant", "too clinical" and was "rarely helpful or useful". Positive findings included "...providing the correct kind of information" and "hitting the mark of what you would expect from an Evidence Dissemination Service".

Use

Less than half (9/24) of the survey respondents had used information from EDS in decision-making; examples of use included confirming current knowledge, ensuring knowledge is up-to-date, informing formulary decisions, passing information on to colleagues and using information in research. Only one respondent had used it for purchasing clinical consumables, none for purchasing clinical equipment, and nine for clinical practice change. However they were optimistic about the possibility of future use for purchasing clinical consumables or equipment, clinical practice change and other resource allocation decisions. The main reasons for not using the EDS information in decision-making were lack of time to read full articles and lack of relevance to the clinical setting.

Committee representatives reported that no information provided by the EDS was discussed at meetings held during the evaluation period. Further tailoring of customised RSS feeds was suggested by committees as a way to increase use, for example the Medication Safety Committee requested publications that demonstrated evidence of harm, evidence of reduction in risk of harm, and evidence regarding use of an effective alternative to a medication in current use. They were not interested in publications reporting lack of effect or insufficient evidence.

Two senior decision-makers responsible for organisation-wide portfolios were consulted regarding the draft reporting tool prior to implementation of stage 2. They were in agreement that the volume of work required to access the publication to identify whether it was relevant; then appraise it for quality, local applicability and consistency with existing policies and

procedures; take appropriate action and report using the proposed tool was too onerous and it was unlikely that model would be achievable.

Implementation fidelity

There was one major modification to the planned intervention. Following evaluation of stage 1, it was clear that this model would not meet the objectives and stage 2 was not undertaken.

All the proposed implementation activities for the participating committees were completed as planned and there were only minor changes to the plan for organisation-wide roll-out. Time constraints prevented the project team delivering demonstrations of the EDS in Monash Health public places and icons were not placed on all computers.

The barriers and enablers identified in the evaluation are discussed as factors influencing the processes and outcomes below and in <u>Section 7d</u>.

Participants

Individuals (survey): Forty-six paper based surveys were sent and 24 were returned.

Survey participant's role

	Total
Medical	4
Nursing	5
Allied Health	9
Pharmacy	2
Other	4
Total Participants	24
Survey participant's site	

	Total
Kingston	2
Moorabbin	4
Clayton	15
Dandenong	6
Casey	2
Cranbourne Integrated Care	1
Other	1
Total Participants	24
Survey participant's method of receipt of information from EDS	
	Total
As an email (full bulletin)	20
As an RSS feed (selected topics delivered to inbox or browser)	4

The four participants that selected 'Other' came from the Quality Unit, Corporate Office and Research Nursing, and one described their role as a project officer.

A large proportion of respondents were Allied Health staff. Due to the small numbers of overall respondents this may not be representative of the EDS user population.

The majority of survey participants were located at Clayton. Six participants listed multiple Southern Health sites

The majority (83%) of participants received information from EDS as a full email bulletin.

Groups (interviews): The EDS engaged with three decision-making committees (Medication Safety, Clinical Risk and Therapeutics Committees). One committee representatives participated in a face to face interview, one an email interview, and one provided feedback directly as they were also a member of the EDS team.

24

Reach

Total Participants

The EDS attracted 70 active subscribers during the evaluation period.

The statistics generated by Wordpress.com suggested that users accessed EDS via the Intranet 182 times. The most clicked links included the resource page (19 clicks), the CCE internet homepage (18 clicks) and the CCE email query link (11 clicks). A total of 134 full text articles were accessed via the EDS website.

Access to the EDS website was variable over the 10 months of activity. Although the EDS was set up for users to access information via an email or RSS feed it is encouraging to see that users were still visiting the site. The reasons for the peaks and troughs in access are unclear. A potential explanation for the high peak in the first month may be due to access by the project team to sort through initial teething problems, or extra interest by new users which was not sustained. Limitations with the software meant that we could not separate 'users' from 'the administrator' (CCE staff).

All three committees participated.

Usefulness

Satisfaction

Survey participants were asked to rate their overall satisfaction with the EDS. The majority (21/24) of participants were either 'partially' or 'very satisfied' with the EDS overall

Content

Survey participants were asked whether the amount of information provided by the EDS met their needs; 8/24 found the website content useful, 12/24 found the email alert useful and 2/24 found the RSS feed content useful. The main message from the participant's feedback reflects that there was a significant amount of non-specific information being sent to users. This results in a time-consuming activity for participants who trawl through each piece of evidence.

Survey participant's responses to amount of information provided by EDS meeting their needs

	Yes	Partially	No	N/A	Missing	Total
Website	8	3	0	6	7	24
Email (full bulletin)	12	5	2	0	5	24
RSS feed (delivered to inbox or browser)	2	3	0	12	7	24

Participants who answered 'partial' or 'no' provided the following feedback:

- "Probably too much irrelevant stuff (I am not sure whether I selected the correct options when I subscribed)"
- "The amount of emails I receive is quite large and trawling through them is time consuming. I don't have much time to attend to articles"
- "Would be good to group into medical, nursing, allied health specific info if relevant"
- "A lot of irrelevant information not much specific topical info"
- "Very little information provided for medication safety that was relevant, however this may be a reflection of the lack of evidence for medication safety related topics"
- "It isn't specific like the BMJ Evidence email service. I do not want to know about articles that are not relevant to my practice"
- "So much unfiltered and irrelevant"

Committee representatives were asked about usefulness of the content of EDS alerts. The responses were:

- "A lot of information that wasn't particularly relevant...I just don't need RCTs but other published articles are also helpful".
- "Too clinical" and was "rarely helpful or useful"
- "Providing the correct kind of information" and was "hitting the mark of what you would expect from an evidence dissemination service".

Format

The EDS categorises information by healthcare setting, type of technology, professional specialty and special interest groups. 17/19 respondents found the EDS categories useful. Participants found that the categories helped them to quickly realise if the information was relevant to them and prevented them from looking at irrelevant information. The reason they did not find the categorisation of evidence useful is because they did not notice the feature.

Survey participant's responses to usefulness of EDS categories

	Yes	No	Missing	Total
Usefulness of EDS categories	17	2	5	24

The following explanations were provided for participants finding the categories useful:

- "Although would prefer more specific ones"
- "It helps me quickly realise what info is useful to me"
- "Allows quick browsing"
- "Generic covered most areas"
- "Useful so you don't have to sort through irrelevant information"
- "I focus more on the topic presented, not the category"
- "But would like more around current policy environment such as food and nutrition interventions, medicare locals"

The following explanations were provided for participants not finding the categories useful:

- "Probably would be useful wasn't aware of this feature"
- "I have never noticed the grouping before"
- "Need to be more specific"

Committee representatives were also asked to respond to the format of the EDS alerts. The responses were:

- "The layout of the alerts was easy to read and OK" but "the abbreviations were a bit confusing eg SR".
- "The summary of findings was very good" and the "volume of material...fine".
- "The format is clear and relevant".

Quality

The majority (22/24) of respondents found the information provided by EDS to be current, trustworthy and useful or partially useful. Participants who responded 'partially' or 'no' to any one of the options agreed that the information provided was not relevant to their practice.

- "Too much irrelevant information"
- "A lot of the information I receive is of little or no use to my practice. Although some items are quite interesting"
- "It isn't specific like the BMJ Evidence email service. I do not want to know about articles that are not relevant to my practice."

Survey participant's responses to consideration of current, trustworthy and useful

	Yes	Partially	No	Missing Data	Total
Current	22	1	0	1	24
Trustworthy	22	1	0	1	24
Useful	11	11	1	1	24

Recommended improvements

Six of the 24 survey respondents provided the following suggestions for how the service could be improved:

- "As discussed, further alerts about current health policy environment or health interventions"
- "More categories to be able to focus in on relevant information"
- "Provision of services related to a specific area eg can you please provide relevant research/evidence related to...would be most helpful"
- "Make it clearer with regards to allied health related content"
- "Categories more specific although realised I should check the website which I will do"
- "It might just be me need to refine the subscription to make things more relevant"

Program Use

Accessing EDS content

The majority of survey respondents 'always', 'often' or 'sometimes' browsed email alerts or RSS feeds for interesting items (22/23) and followed links to full-text for items of interest (17/20). A considerable proportion of survey participants did not know they could browse the EDS website for interesting items (11/24), follow links to full-text for items of interest from the website (9/24) or search the website by categories (11/24).

Survey participant's use of the email alerts and RSS feeds

	Alway	ys Often	Sometimes	Never	Missing	Total
I browse email alerts or RSS feeds for interesting items	6	9	7	1	1	24
I follow links to full-text for items of interest	1	4	12	3	4	24
Survey participant's use of the website						
	Yes	No, I didn't wa	int to No, I dia	່າກ't know I coເ	uld Missing	Total
I browse the website for interesting items	5	5		11	3	24
I follow links to full-text for items of interest	10	2		9	3	24
I search the website by categories	2	7		11	4	24

The three committee representatives looked at the EDS alerts they received and screened them for relevance to their respective committees.

Use of EDS in decision-making

Less than half (9/24) of the participants had used EDS to guide decision-making; these included formulary decisions, to confirm ideas about certain interventions or to update clinical knowledge.

The main reasons participants had not used EDS to guide decision-making (15/24) was because they had not had time to read the full articles or there had not yet been any relevant information to their clinical setting.

Survey participant's use of information received from EDS in decision-making

	Yes	No	Missing Data	Total
Use in decision-making	9	15	0	24

The following comments were provided by participants regarding how they used EDS in decision-making:

- "Confirm ideas/interventions"
- "Formulary decisions"
- "Only by passing info to medical staff"
- "I ensure my clinical knowledge is up to date and look for further or stronger evidence in key areas"
- "Have used info to add to other research"

The following comments were provided by participants regarding why they did not use EDS in decision-making:

- "Often don't have time to explore further"
- "I often don't have time to read the full articles but if I did it would affect decision-making"
- "Not as yet, I have only been a recent subscriber"
- "I haven't been able to obtain any relevant information to assist decision-making yet"
- "Nothing has been appropriate for me in decision-making but I have seen info which would be useful to others"

Committee representatives reported that no information from the EDS had been discussed and acted upon at meetings.

The Medication Safety Committee representative noticed that the evidence in the alerts was rarely helpful or useful for their committee. They found the evidence was too clinical for their area of interest and did not match their committee's areas of concern. For this reason no information was presented to the committee.

The Clinical Risk Committee representative noticed that there was a lot of information that was not particularly relevant however they were happy to screen and choose areas that were of interest to the committee. This representative had had problems receiving customised alerts and therefore found it difficult to find any relevant information to pass on.

The Therapeutics Committee did not discuss any material at their meeting because the representative and chair of the committee decided that no information was relevant.

Use in decision-making for resource allocation

Only one respondent had used EDS to inform decision-making for purchasing clinical consumables, no one reported using it for purchasing clinical equipment, however 9 had done so for clinical practice change. One participant commented that their non-use was related to the fact that their area of practice was not represented often and that there was a lot of medical and drug information that did not apply to them.

Survey participant's use of EDS in decision-making for resource allocation

	Yes	No	Missing Data	Total
Purchasing clinical consumables	1	22	1	24
Purchasing clinical equipment	0	23	1	24
Clinical practice change	9	15	0	24
Other	0	12	12	24

Half (12/24) of respondents felt they would possibly or definitely use EDS to inform decision-making for purchasing clinical consumables and for purchasing clinical equipment. The majority (22/24) said they would use EDS to guide decision-making for clinical practice change in the future. Reasons given for future use or non-use included the following:

- "I am not involved in clinical practice"
- "Not for me but maybe for others"
- "Would always pass on relevant info to relevant medical staff"
- "Possibly clinical practice change if I have time to read and evaluate the evidence"
- "I don't have control over any budget/purchasing"
- "Depends on the information available"

Survey participant's future use of EDS in decision-making for resource allocation in the future

	Yes	Possibly	No	Missing Data	Total
Purchasing clinical consumables	2	10	11	1	24
Purchasing clinical equipment	0	12	11	1	24
Clinical practice change	5	17	2	0	24
Other	1	5	3	15	24

It was interesting to note that, of the participants who had answered 'no' (22/24) to using the EDS in decision-making for 'purchasing clinical consumables', 11/22 said they would, or possibly would, use it in the future. Participants who answered 'no' (23/24) to using the EDS in decision-making for 'purchasing clinical equipment', 12/23 said they would possibly use it in the future. Participants who answered 'no' (15/24) to using the EDS in decision-making for 'clinical practice change', 13/15 said they would, or possibly would, use it in the future.

Implementation

Implementation activities were undertaken for two separate target audiences, all Monash Health staff and the targeted committees. The EDS Manager was responsible for coordinating implementation activities and other EDS project members were responsible for providing technical support to users.

The majority (4/6) of the activities for implementation across the organisation were undertaken as planned. Advertisements were included online and in print and were promoted on the Monash Health Intranet and specific staff portals. Due to time restraints the project team were unable to undertake demonstrations of the EDS for specific groups or in Southern Health public places.

Proposal	Achieved	Outcome
Place ad in CE's newsletter	\checkmark	One ad was placed when the EDS disseminated its first alert.
Adverts disseminated in the form of flyers via Email, eBoards, Notice boards	✓	Flyers were placed across all campuses in public areas as well as within departments.
Demonstrations of EDS (public place or for specific groups registrar meetings)	eg x	Time restrictions meant that this activity was not undertaken.
Launch newly modified and updated website across the SH intranet site (also include message about brief survey)	✓	A logo and brief description was posted on the front page of the Southern Health intranet as well as permanently placed in the side bar.
Investigate the possibility of putting an icon on all SH computers	х	More appropriate locations were identified compared to all Southern Health computers, therefore this activity was not undertaken.
Investigate the possibility of adding 'hotlinks to specific use sites, such as Pharmacy website, Medical Staff Portal, Allied Health Staff Portal, Library website, CCE website	er ✓ d	Links to the EDS were included on the Emergency, Pharmacy and Allied Health portals. Because the EDS was only for internal dissemination it was not included on the CCE website.

All activities for implementation with the target committees were undertaken. The EDS Manager met with the three committee representatives and discussed all elements of the EDS with them. Further work could have been undertaken to identify potential barriers and enablers to using the EDS with the committee representatives.

Methods and success achieved for committee implementation

Proposal	Achieved	Outcome
Liaise with committee contacts and identify barriers and enablers to using EDS	\checkmark	Undertaken
Establish best communication processes for committee representatives	\checkmark	Undertaken
Discuss the details about EDS with committee representatives	\checkmark	Undertaken
Discuss possible strategies for using EDS in committee meetings	\checkmark	The EDS became a standing item on all agendas of committee's engaged to use EDS.
Establish most appropriate time to introduce EDS to committees	\checkmark	Undertaken

Project team and Steering Committee observations

Relevance of material

- Main message from participant's feedback was that a significant amount of irrelevant information was being sent to users.
- The time to develop and disseminate this service should be considered especially if the information is not relevant to recipients.
- One user has suggested they like the information delivered by BMJ Evidence Updates because the information is relevant to their specialty. Although this is a different resource to EDS, we should consider relevance of information as a priority.

Use of EDS

- Users were not always clear about use of EDS
- Almost all chose email and received everything then complained about the volume they received. They could have RSS feeds on their areas of interest
- Demonstrations for how to use the EDS should be considered in the next phase of development.
- Particular attention should be made to demonstrate to users how to receive RSS feeds.
- The EDS team should investigate other platforms to run the EDS. At the moment only one specialty area or the full alert can be selected for users to receive information. Users would like to be able to select more than one specialty to ensure emails are specific to their areas of interest and Wordpress.com does not allow this function.

Resource use – time and skills

- Participants: Too much, too busy, not all relevant, things they knew already, not new evidence or SR finding lack of evidence, not important, etc
- KB team: too many publications, can't process all available
- If we had followed our plan of getting department heads to do all the follow up re local policies and protocols etc this would have been very time consuming, particularly for evidence that was not very important, and which may already be documented practice for the organisation.
- We proposed that decision-makers appraise the information, check for policies and protocols, and report. Decision-makers
 don't want any additional work, we know they don't have the time and skills to appraise we could do that for them

Not achieving aims

- Systematically disseminated but not systematically used
- Not integrated into other decision-making processes we tried with monthly reporting but too onerous
- Not accountable or transparent
- Those who did receive it were not always the appropriate decision-makers
- Can't be sure practice is evidence-based
- Individuals may or may not have changed practice or their own practice may have been consistent so they didn't need to change. SHARE was about a systemic approach, integrating new decision-making systems and processes into existing infrastructure for organisational impact. We needed a process that addressed organisational practice not individual practice. Needed to integrate it into existing processes for determining organisational practice.
- We had determined designated groups and individuals who made decisions regarding resource allocation for TCPs in previous project, targeting to them would be better use of resources and more likely to achieve aims
- We are not following the evidence regarding desirable characteristics of evidence products, we don't have targeted messages

Section 18	Systematic Revie	w Appraisal
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Assessment criteria (for CCE use only)

Quality assessment category*	Study Validity Criteria	Outcome	Assessment criteria
(A) Conflicts of interest	Is it clear that there were no conflicts of interest in the writing or funding of this review?	Yes; No; Not reported	<pre>✓✓ = yes ✓ = no ? = not reported</pre>
(B) Appropriate study	Does the review have a clearly focused question?	Yes; Partial; No	✓ ✓ = 2 'yes';
design	Is a systematic review the appropriate method to answer the question?	Yes; Partial; No	\$\scrime{1} \sqrime{2} = 1 'yes' or 2 'partials' \$\scrime{k} = 2 'no' or 1 partial + 1 'no'
(C) Study selection	Does the review have specified inclusion/exclusion criteria?	Yes; Partial; No	✓ ✓ = 3 'yes'
	If there were specified inclusion/ exclusion criteria, were these appropriate?	Yes; Partial; No; N/A	 ✓ = 'yes' for search strategy + any other answer
	Does the review document a comprehensive search strategy?	Yes; Partial; No; Not reported	<pre>* = 3 'no' or 'no' for search strategy + any other answer</pre>
(D) Allocation and	Were reviewers blind to authors, institutions and affiliation?	Yes; Partial; No; Not reported	✓ ✓ = yes
blinding			✓ = partial
			$\star = nO$
(E) Data collection	Were 2 or more independent reviewers used for: application of inclusion	Ves: Partial: No: Not reported	f = 100 reported
	criteria?		\checkmark = any 1 or 2 'yes' + any other answer
	Were 2 or more independent reviewers used for: extraction of data?	Yes: Partial: No: Not reported	≠ = all 'no'
	Were 2 or more independent reviewers used for: apprecial of study quality?	Very Dartial: Ney Net reported	? = 3 'not reported'
	Were the strengths and limitations of included studies and natential impact	Yes: Dartial: No: Not reported	
(F) Attributable to	on the results discussed?	res, Partial, No, Not reported	v = 2 yes v = 2 'nartial' or 1 'yes + any other answer
	Was the validity of included trials appraised using appropriate criteria?	Yes; Partial; No; Not reported	* = 2 'no'
			? = 2 'not reported'
(G) Appropriate analysis	Is there a summary of the results of individual studies?	Yes; Partial; No	\checkmark = 3 'yes' or 1 'yes' for summary + 2
	If meta-analysis were conducted, was it reasonable to do so?	Yes; Partial; No; N/A	'N/A'
	If meta-analysis were conducted, was it done appropriately?	Yes; Partial; No; Not reported;	\checkmark = 1 'no' for any criteria + any other
		N/A	answer
	Othor		
	What is the overall risk of bias?	Low: Moderate: High: Incufficient	information
	what is the overall LISK OF DIAS!	Low, would ale, mgn, insumilient	

Model 2 (Pilot)

Tick boxes were used in pilot. The details below are an example of information contained in an Evidence Bulletin

Quality of evidence

Study	Disease area		Quality assessment*						
		Conflicts of interest	Appropriate study design	Participant selection	Allocation and blinding	Data collection	Attributable to intervention	Appropriate analysis	
Smith et al 2009	Diabetes	?	$\checkmark\checkmark$	$\checkmark\checkmark$	✓	~	\checkmark	$\checkmark\checkmark$	

*Quality assessment: 🗸 criterion met, 🖌 criterion partially met, 🗶 criterion not met,? unclear from the information provided

Application of evidence

- Use with confidence: Low Risk of Bias (All of the quality criteria have been fulfilled or where criteria have not been fulfilled it is very unlikely the conclusions of the study would be affected)
- Use with consideration of limitations: Moderate Risk of Bias (Some of the criteria have been fulfilled and those criteria that have not been fulfilled may affect the conclusions of the study)
- **Use with caution: High Risk of Bias** (Few or no criteria fulfilled or the conclusions of the study are likely or very likely to be affected) or Insufficient information (not enough information provided to be able to determine risk of bias)

Consistency with Southern Health documented practice

- Southern Health policies or procedures appear to be consistent with the evidence
- Southern Health policies or procedures do not appear to be consistent with the evidence
- No Southern Health policies or procedures on this topic were identified

Model 2 (Full implementation)

Drop-down boxes were added to the template so that only findings applicable to this publication are reported. The text incorporates the implications of bias in application of the evidence.

Quality of evidence

Quality of this Systematic Review or Health Technology Assessment

CCE staff have appraised the methods used in this publication and found the risk of bias to be **LOW**. This means that you can use the findings of the review with confidence as all of the quality criteria have been fulfilled or where criteria have not been fulfilled it is very unlikely the conclusions of the study would be affected.

Quality of the evidence contained in this Systematic Review or Health Technology Assessment

The review authors have appraised the available evidence and found it to be Level I Evidence (a systematic review of Level II studies) of high quality.

Consistency with Southern Health documented practice

Southern Health policies or procedures appear to be consistent with the evidence

Southern Health

Technology/Clinical Practice Committee Evidence Bulletin

This bulletin is part of a process to ensure that Southern Health practice is consistent with current evidence. Your response is required by the date below. You can find more information about this process on the <u>TCPC website</u>.

The publication below indicates evidence of Choose an item.¹⁰ related to

Responses related to evidence of Choose an item.¹¹ are required within Choose an item.¹²

Please complete and return this bulletin to the second second by Click here to enter a date.

Bibliographic Source

<LINK>

Author's Conclusion

Applicability to Southern Health

Patient / Population	
N	
Setting	
Intervention	
Comparison	
Outcomes	
Inclusion Criteria	
Exclusion Criteria	

Quality of Evidence

Quality of this Systematic Review or Health Technology Assessment

CCE staff have appraised the methods used in this publication and found the risk of bias to be Choose an item.¹³ This means that you can use the findings of the review with Choose an item.¹⁴

Quality of the evidence contained in this Systematic Review or Health Technology Assessment

The review authors have appraised the available evidence and found it to consist of Choose an item.¹⁵ The available evidence included in the review is of Choose an item.¹⁶

¹⁰ Harm, Clinical Effectiveness, Cost Effectiveness, Technical Effectiveness, Lack of Effect

¹¹ Harm, Clinical Effectiveness, Cost Effectiveness, Technical Effectiveness, Lack of Effect

... consideration of limitations as some of the criteria have been fulfilled and those criteria that have not been fulfilled may affect the conclusions of the study.

... caution as few or no criteria fulfilled or the conclusions of the study are likely or very likely to be affected.

¹⁵ Level I Evidence (a systematic review of level II studies)

^{12 1} month, 3 months, 6 months

¹³ Low, Moderate, High

¹⁴ ...confidence as all of the quality criteria have been fulfilled or where criteria have not been fulfilled it is very unlikely the conclusions of the study would be affected.

Level II Evidence (a randomised controlled trial)

Level III-1 Evidence (a pseudo-randomised controlled trial)

Level III-2 Evidence (a comparative study with concurrent controls; non-randomised experimental trial, cohort study, case-control study, interrupted time series with a control group)

Level III-3 Evidence (a comparative study without concurrent controls; historical control study, two or more single arm studies, interrupted time series without a parallel control group)

Level IV Evidence (a case series with either post-test or pre-test/post-test outcomes)

Consistency with Southern Health documented practice

Choose an item. 17

Response

- Click once on the shaded box to select the appropriate response
- Click once on the shaded rectangle to provide a typed comment

Practice at Southern Health (please select one response only, tick the box and provide relevant details)

Not applicable at Southern Health eg the patient group is not treated at Southern Health (please explain)
Practice is consistent with the evidence (please add comments if relevant)
Practice is not consistent with the evidence for a good reason (please explain)
Practice was not consistent with the evidence, remedial action has been undertaken and completed (please explain)
Practice is not consistent with the evidence and remedial action has been commenced/planned (please explain)

Communication

Should this information be disseminated more widely? If so, to whom?

Other comments

Feedback

This is a pilot of new processes being implemented by the Technology Clinical Practice Committee and the Centre for Clinical Effectiveness Evidence Dissemination Service.

We would appreciate any comments regarding what works, what doesn't work and how we can improve the process.

Name:		
Position:	Date:	

Thank you

 $^{\rm 16}$ Low quality, Moderate quality, High quality, Variable quality

¹⁷ Southern Health policies or procedures appear to be consistent with the evidence

Southern Health policies or procedures do not appear to be consistent with the evidence

No Southern Health policies or procedures on this topic were identified

Southern Health

Technology/Clinical Practice Committee Evidence Bulletin_164

This bulletin is part of a process to ensure that Southern Health practice is consistent with current evidence. Your response is required by the date below. You can find more information about this process on the <u>TCPC website</u>.

The publication below indicates evidence of **Potential HARM (due to significant adverse events/side effects but lack of evidence of effectiveness)** related to Tricyclic antidepressants for autism spectrum disorders (ASD) in children and adolescents. Responses related to evidence of **Potential HARM** are required within **ONE month.**

Please complete and return this bulletin to the second second by **11 June 2012**

Bibliographic Source

Hurwitz R, Blackmore R, Hazell P, Williams K, Woolfenden S. Tricyclic antidepressants for autism spectrum disorders (ASD) in children and adolescents. Cochrane Database of Systematic Reviews 2012, Issue 3. Art. No.: CD008372. DOI:10.1002/14651858.CD008372.pub2. <u>http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD008372.pub2/pdf</u>

Author's Conclusion

Clinicians considering the use of TCAs need to be aware of the limited and conflicting evidence of effect and the side effect profile when discussing this treatment option with people who have ASD and their carers. Further research is required before TCAs can be recommended for treatment of individuals with ASD.

Applicability to Southern Health

Patient / Population	Inclusion was limited to children and adolescents (birth to 18 years of age) with a diagnosis of an autism spectrum disorder (ASD), using a standardised diagnostic instrument (for example, ADOS, ADI-R, DISCO, CARS) or using established diagnostic criteria as defined by DSM-IV or ICD-10, that is Pervasive Developmental Disorder, excluding Rett Syndrome and Childhood Disintegrative Disorder.
Ν	3 studies – number of participants unclear
Setting	Outpatient setting
Intervention	Any oral tricyclic antidepressants, regardless of dosage used, duration of use or frequency of administration. Tricyclic antidepressants include amitriptyline (amitriptyline hydrochloride), amoxapine, clomipramine (clomipramine hydrochloride), dothiepin (dosulepin hydrochloride or dothiepin hydrochloride), doxepin, imipramine (imipramine hydrochloride), iofepramine, nortriptyline, trimipramine, desipramine, florpiramine, dibenzepin, iprindole, protriptyline and modified tricyclic antidepressants such as tianeptine.
Comparison	Placebo
Outcomes	 Primary outcomes Core symptoms of autism, for example, impairments in communication, reciprocal social interaction and behavioural problems, such as repetitive behaviours and rituals, obsessional behaviour and stereotypy. Non-core symptoms, including challenging behaviours, sleep disturbance and aggression. Comorbidities, including depression and anxiety. Adverse effects. Secondary outcomes Parental, child or family quality of life. Parental or family stress. We planned to examine short-term (up to three months), medium term (three to 12months) and long-term (greater than 12 months) outcomes if the data were available. We used the primary and secondary outcomes to populate the 'Summary of findings' tables. Types of measures: Standardised diagnostic assessment instruments (Childhood Autism Rating Scale, Autism Diagnostic Interview- Revised, Autism Diagnostic Observation Schedule, Diagnostic Interview for Social and Communication Disorders). Standardised of life questionnaires. Quality of life questionnaires. Rating scales of emotions and behaviour, including depression, anxiety, aggression, obsessive-compulsive behaviour and social reciprocity. Global Clinical Impression Rating Scales. Other Health Outcome Rating Scale.
Inclusion Criteria	6. Other Health Outcome Rating Scale. Randomised controlled trials (RCTs).
Exclusion Criteria	-

Quality of Evidence

Quality of this Systematic Review or Health Technology Assessment

CCE staff appraised the methods used in this publication and found the **risk of bias** to be **LOW**. This means that you can use the findings of the review with confidence as all of the quality criteria have been fulfilled or where criteria have not been fulfilled it is very unlikely the conclusions of the study would be affected.

Quality of the evidence contained in this Systematic Review or Health Technology Assessment

The review authors appraised the available evidence and found it to consist of **Level II Evidence (one or more randomised controlled trials)**. The available evidence included in the review is of **variable quality**.

Consistency with Southern Health documented practice

No Southern Health policies or procedures on this topic were identified.

Response

- Click once on the shaded box to select the appropriate response
- Click once on the shaded rectangle to provide a typed comment

Practice at Southern Health (please select one response only, tick the box and provide relevant details)

Not applicable at Southern Health eg the patient group is not treated at Southern Health (please explain)
Practice is consistent with the evidence (please add comments if relevant)
Practice is not consistent with the evidence for a good reason (please explain)
Practice was not consistent with the evidence, remedial action has been undertaken and completed (please explain)
Practice is not consistent with the evidence and remedial action has been commenced/planned (please explain)

Communication

Should this information be disseminated more widely? If so, to whom?

Other comments

Feedback

This is a pilot of new processes being implemented by the Technology Clinical Practice Committee and the Centre for Clinical Effectiveness Evidence Dissemination Service.

We would appreciate any comments regarding what works, what doesn't work and how we can improve the process.

Name:		
Position:	Date:	

Thank you

Southern Health

Technology/Clinical Practice Committee Evidence Dissemination Service Report for EMT July 2012

Bulletins SENT from December 2011 to June 2012																			
				RESPONSE REQUIRED															
							Medicine						FOR INFORMATION ONLY						
	Number of Bulletins	Number of Program rec	Allied Health	Med Services & Quality	Nursing & Midwifery	Other	Critical Care	Emergency & Amb Care	Gen Med, AAU, HITH	Medicine	Mental Health	Specialty	Surgery	Women's & Children's	Diagnostic Imaging	Pathology	Pharmacy	Procurement	Other
Evidence of potential HARM	17	18					2			8	1	2	1	4			6		2
Evidence of CLINICAL EFFECTIVENESS	31	33						1		8	2	8	4	10			18		8
Evidence of COST EFFECTIVENESS [^]	1	1				1													
Evidence of LACK OF EFFECT^	3	3										1		2		1			
Total publications requiring a response	52	55				1	2	1		16	3	11	5	16		1	24		10
Evidence of CLINICAL EFFECTIVENESS – for information only*	15	19																	19
Evidence of OTHER EFFECTIVENESS – for information only*	1																		1
Lack of evidence – for information only	107	163						-							4	1	32		126
Total publications	175	237				1	2	1		16	3	11	5	16	4	2	56		156

*For the April 2012 EDS bulletins the TCPC decided only to request responses for evidence of harm, cost effectiveness and evidence of lack of effect. Clinical effectiveness, other effectiveness and lack of evidence were provided for information only.

^Responses for these bulletins are due by the end of August 2012.
All responses RECEIVED (December 2011 to June 2012)

	ŝS						Medical Programs			Comments				
	Total number of response	Allied Health	Med Services & Quality	Nursing & Midwifery	Other	Critical Care	Emergency & Amb Care	Gen Med, AAU, HITH	Medicine	Mental Health	Specialty	Surgery	Women's and Children's	
Responses due by the end of June 2012 from 48 Bulletins	52					2	1		16	4	10	5	14	
Responses received	43					2	1		14	2	10	0	14	
Responses overdue	9					0	0		2	2	0	5	0	
Consistent with the evidence	32					1	1		11	2	8		9	
 Not applicable at Southern Health 	7													
Neuromodulators for pain management in rheumatoid arthritis (Potential Harm).									1					The options mentioned in the conclusion are not available on our PBS, so useless for our patients
 Botulinum toxin for the treatment of strabismus (Potential Harm). 											1			Botulinum toxin injection is not practised at Southern Health Ophthalmology Department
Eslicarbazepine acetate add-on for drug-resistant partial epilepsy (Clinical Effectiveness).											1			The drug is not in use in Australia and it does not appear in the TGA database. It is not helpful to examine data relating to drugs/devices not available in this country.
 Gonadotropin-releasing hormone agonist versus HCG for oocyte triggering in antagonist assisted reproductive technology cycles (Potential Harm). 													1	IVF not undertaken at Southern Health.
 Interventions for pregnant women with hyperglycaemia not meeting gestational diabetes and type 2 diabetes diagnostic criteria (Clinical Effectiveness). Respondent reported this as 'Not applicable', however CCE 													1	The diagnosis and management of GDM and hyperglycaemia not meeting GDM guidelines is currently under national and local review. The Pregnancy Diabetes service at Southern Health has already initiated changes to current practice to conform to (new) ADIPS recommendations. The service is also completing on-going research to
would categorise this response as 'Not consistent with the evidence, remedial action commenced'.														guide future practice.
 Cabergoline for preventing ovarian hyperstimulation syndrome (Clinical Effectiveness). 													1	Southern Health does not do IVF.
Milnacipran for neuropathic pain and fibromyalgia in adults (Potential Harm).						1								Not applicable to Pain Medicine Unit - agent not used at all

	S						Medical Programs							Comments
	Total number of response	Allied Health	Med Services & Quality	Nursing & Midwifery	Other	Critical Care	Emergency & Amb Care	Gen Med, AAU, HITH	Medicine	Mental Health	Specialty	Surgery	Women's and Children's	
 Not consistent with the evidence for a good reason 	3													
Naftidrofuryl for dementia (Clinical Effectiveness).									1					Drug not available in Australia
 Cognitive stimulation to improve cognitive functioning in people with dementia (Clinical Effectiveness). 									1					To my knowledge, specific interventions for patients with dementia while ideal and what we aspire to is very limited in the subacute inpatient setting (e.g. GEM) due to lack of resources and time.
Short and long term effects of tibolone in postmenopausal women (Potential Harm).													1	Most menopausal women use combined HRT. Select groups need tibolone due to low libido or abnormal bleeding on HRT.
 Not consistent with the evidence, remedial action has been undertaken and completed 														
 Not consistent with the evidence and remedial action has been commenced/planned 	1													
 Perineal techniques during the second stage of labour for reducing perineal trauma. (Clinical Effectiveness). 													1	This Cochrane Review will be looked at by the Maternity Guideline Development Group and existing practices reviewed

Section 22 Model 2 Pilot implementation and evaluation

Pilot objective

To test and refine the features of Model 2.

Characteristics of the pilot intervention

The scope, components and methods described formed the pilot intervention. Pilot activities were undertaken with a pragmatic sample of publications containing evidence of harm. A catalogue of disinvestment opportunities had been compiled to identify pilot disinvestment projects for investigation in the SHARE Program [79]. Publications with high quality evidence indicating harm published in the previous two years were selected.

Pilot implementation

The implementation strategies focused on integrating the new processes into existing Monash Health infrastructure and communicating with stakeholders.

The procedure for the new EDS processes was documented and a routine item for discussion of EDS matters was included in the TCPC agenda.

The Director of CCE/SHARE Director made presentations to the Executive Management Team, Medical and Nursing Executive groups, and met with clinical directors of all medical programs, allied health, pharmacy, pathology, diagnostic imaging and procurement. The Chair of the TCPC delivered a presentation to the Monash Health Board. All senior managers expressed their support for the proposed governance structure. A letter outlining the new process was sent to stakeholders by the Executive Director of Medical Services and Quality and a flyer was circulated to the 'All Staff' email list by the Chair of the TCPC.

Pilot evaluation

The stakeholders listed above were asked to provide feedback regarding the new processes, and templates for feedback were included at the end of the Evidence Bulletins.

An audit of responses was undertaken two months after dissemination of the pilot bulletins.

Reach

Six evidence bulletins indicating harm were forwarded by Program Directors to the relevant decision-makers (Medicine Program 3, Women's and Children's Program 1, Specialty Program 1, Critical Care Program 1).

Four out of six responses from decision-makers were received by the due date (one month after receipt). The others were received after reminders were sent. The average time to respond was 28 days.

Bulletins were received and returned by the appropriate decision-makers.

Usefulness

No feedback was received regarding 'what worked, what didn't work and how we can improve the new process'; one person said "*Thanks*" on the feedback sheet.

Use

Five responses indicated that practice was consistent with the evidence, the sixth reported that the practice was not undertaken at Monash Health. No action was required in these cases.

One respondent indicated that the evidence should be communicated to other programs and it was forwarded accordingly.

Implementation fidelity

There were no modifications to the planned intervention and it was implemented as planned.

Section 23 Model 2 Implementation flyer



Technology/Clinical Practice Committee

Ensuring Southern Health practice is up-to-date

The Technology/Clinical Practice Committee (TCPC) is introducing a new process to ensure that practice at Southern Health is consistent with current evidence.



The Centre for Clinical Effectiveness (CCE) had developed an Evidence Dissemination Service to capture high quality evidence as it is published. The TCPC will disseminate this to the relevant decision-makers who will be asked to consult with colleagues and report back on any action required to align current Southern Health practice with the most up-to-date evidence.

The process has been developed to minimise your time and effort.

- Only synthesised information such as systematic reviews, health technology assessments and evidence based guidelines will be provided. You will not receive trials or other primary studies, editorials or opinion pieces.
- The synthesised evidence is retrieved from high quality sources and will be appraised by CCE staff so that you can be confident the information is trustworthy.
- CCE staff will compare the evidence with current policies and procedures. If Southern Health documentation is consistent with the evidence, you will be informed but no response is required.
- A response will only be required if there are no policies and procedures on this topic or if the current policies and procedures are inconsistent with the latest evidence.
- Action will only be required if current practice is inconsistent with up-to-date high quality evidence that is relevant and applicable to Southern Health.
- Responses will be required within an appropriate time frame. These have been determined to prioritise action to areas of greatest risk to patients, staff or the organisation. Where there is
 - evidence of harm, a response will be required in 1 month
 - evidence of benefit, a response will be required in 3 months
 - evidence of a more cost-effective alternative, a response will be required in 3 months
 - evidence of lack of effect, a response will be required in 6 months
 - lack of evidence, the publication will be provided for information only, no response required

The new process will be implemented as a pilot. Your input and suggestions to improve the methods and materials is welcome and encouraged. Please direct your feedback and any questions to:

A/Prof Claire Harris, Centre for Clinical Effectiveness

Yours sincerely A/Prof Richard King Chair, Southern Health Technology/Clinical Practice Committee

Section 24 Model 2 Evaluation of full implementation

The EDS was discontinued prior to implementation of the planned evaluation activities, however data were collected for the first seven-month period and audited to meet reporting requirements.

Reach

During this period, 175 publications were collected and all categories were represented. The majority (n=107, 61%) found a lack of evidence or insufficient evidence to draw conclusions, followed by clinical effectiveness (n=46, 26%), harm (n=17, 1%), lack of effect (n=3), cost-effectiveness and methodological effectiveness (n=1 each).

Fifty-two bulletins required a response, however three contained information pertaining to two executive or program portfolios, making the total number of responses required 55. The remaining 123 publications were disseminated to 182 recipients for information only.

Of the 55 requiring responses, the Medicine Program and Women's and Children's Program received the most (n=16, 29% each), followed by Specialty (n=11, 20%), Surgery (n=5, 9%), Mental Health (n=3), Critical Care (n=2) and Emergency and Ambulatory Care and Other (n=1 each). A collation of 56 relevant bulletins was provided to Pharmacy, four to Diagnostic Imaging, two to Pathology and 156 to other programs and departments for their information.

Fifty-one of the 55 responses were due at the time of data collection, 4 were due in the following month. Forty-three had been received, 9 were overdue and 3 were pending.

Dissemination to the correct recipients was not formally assessed, however responses indicated that bulletins were received by the appropriate decision-makers.

Six of the 43 respondents recommended that the bulletin be forwarded to others including five internal departments, the Divisions of General Practice, health professionals across the organisation, and one did not specify the distribution.

Usefulness

Respondents reported that local practice was consistent with the evidence (n=32, 74%), the evidence was not applicable at Monash Health (n=6), local practice was not consistent with the evidence for a good reason (n=3), and changes to make practice consistent with the evidence had been commenced or was planned (n=2).

Evidence was not applicable to the Monash Health setting because the practices were not undertaken (n=4) or the specified drugs were unavailable in Australia (n=2). The three reasons for local practice being inconsistent with the evidence for a good reason also included a drug which was unavailable in Australia, plus a lack of resources and time to implement the proposed interventions, and undertaking the practice but restricting it to a specific patient group who were unable to receive the alternative treatment.

Many respondents included comments and feedback in the free text sections of the bulletins. Five offered positive comments, welcoming future bulletins. Although respondents were not specifically asked to comment on usefulness, many suggested it was not "useful", "helpful" or "valuable" to consider evidence that they were already aware of, that was consistent with current practice, or that addressed drugs that were not locally available.

Use

The 43 respondents had clearly read and understood the bulletins, and had used the bulletins to assess whether current practice was consistent with the evidence.

Given that the aim of the EDS was to use evidence proactively to drive decisions, 'use' in this context could be interpreted as leading to practice change. Two decision-makers noted that local practice was not consistent with the evidence. One department had already *"initiated changes to current practice to conform to the recommendations"*, and the other had tasked their guideline development group to address the inconsistency.

Bulletins could also be 'used' to confirm that current practice does not need to be changed, but the 'usefulness', costeffectiveness and impact of resource use in achieving this was questioned in respondent's feedback and project team and committee reflections.

Resources

Delivery of the EDS was undertaken by the EDS Administration Officer (approximately two days per week to capture and process publications and develop bulletins, three days per month to prepare reports and documents for TCPC meetings and attend the meetings), the CCE Director (approximately one half day per week to review processes and bulletins, one day per month to prepare for and attend the TCPC meetings), the TCPC Chair (approximately half day per month to consult with EDS staff and review publications for local applicability), and the TCPC members (approximately 30 minutes per month discussing EDS issues).

Implementation fidelity

There were two major modifications to the planned intervention, both were due to resource limitations. Three months after implementation, the scope was revised to focus only on evidence in areas of high priority to the organisation. Including evidence of harm was essential for patient safety, and adding evidence of cost-effectiveness and lack of effect would complement current Monash Health initiatives ascertaining examples of more cost-effective alternatives and identifying organisational waste in clinical and corporate practices. Only publications with evidence in these three areas would be appraised prior to dissemination and would require a response. Evidence of clinical effectiveness, methodological effectiveness and lack of evidence were provided for information only. Three months later, the EDS was suspended altogether due to limited capacity within CCE.

There were no changes to the implementation plan and barriers and enablers are discussed with factors influencing processes and outcomes below.

Project team and committee reflections

Pro	95	Cons				
• • • • •	Systematic Transparent, Accountable, Evidence-based Not just for 'disinvestment', applies to all practices Focuses on important changes Does not burden clinicians and managers with process Does not require clinicians and managers to have skills Does not require health economist Eirst couple of rounds just sending things out, minimal effe	 Sustainability – resources a problem How much activity can the organisation sustain? 'Top down' Buy in/ownership When should stakeholders be involved 				
	Fourth round – aware of additional things					
	 More than one conclusion – sometimes harm plus effect, sometimes effect plus lack of evidence, etc. Need to develop new way of capturing this and need more than one response – how to collect this? 					
	— More complex issues arising eg three reviews on wound management. Review of policies and procedures shows us we don't have enough information to know whether evidence is consistent. Could initiate a project rather than just asking for a response eg we look at other reviews on wound care, look at our local data re relevant patient groups/care/types of dressings/costs/etc. In these cases more than one person is responsible for decision – perhaps need a project rather than response to a single Evidence Bulletin to sort these out					
	While our policies and procedures might not be absent or inconsistent with current evidence, they may not have enough information. Eg blood transfusion in oncology patients at end of life. We have appropriate guidance re blood transfusions generically and in oncology patients, but nothing specifically about end of life. How do we use the EDS process to address this?					
	 These complex considerations require high level methodological and clinical knowledge beyond the skills of EDS project officer. Need more senior evidence staff and clinical involvement. 					
	 The authors' conclusions are not good enough. Conclusions in systematic reviews often not straightforward, often can't work out what the outcomes were or what type of evidence eg harm etc. Only sent bulletins when we were confident that we understood the authors' conclusions or recommendations. 					
	 We have only included level and quality of evidence in o by clinicians requires information regarding statistical ar qualify our evidence classification eg evidence of effectiv 	our summaries, but now it is clear that use of the information nd clinical significance, therefore need to add this. Should also veness but of uncertain clinical significance				

This is academic hospital, respondents correctly point out that they are involved in writing national guidelines and don't want EDS to waste their time reviewing said guidelines. But how does EDS know who knows/doesn't know?

Decision-maker's responses

Positive comments

- Thanks
- Good idea (n=2)
- This department would welcome receiving any future results of related CCE literature searches.
- This Cochrane Review will be looked at by the Guideline Development Group and existing practices reviewed

Drug not available in Australia

- The options mentioned in the conclusion are not available on our PBS, so useless for our patients.
- Why are you reviewing a drug that is not available in Australia?
- The drug is not in use in Australia and it does not appear in the TGA database. It is not helpful to examine data relating to drugs/devices not available in this country

Confusion over aim and/or impression that CCE undertook the review being disseminated

- This department would welcome receiving any future results of related CCE literature searches.
- It is unclear what this process is trying to achieve. At present it is increasing my workload but has not changed the
 practices of the unit.
- It would be worthwhile discussing the scope of proposed clinical effectiveness projects prior to undertaking the review so
 that this work can be better tailored to meet the needs of clinicians and others working in the field.
- Would be interested to see the rate of dependence related to this practice, as this is the issue seen by the time patients on this drug get to our unit.
- The conclusions are well known amongst specialists in this area. The exercise has not been helpful. There is no value in broad dissemination of results / guidelines etc.
- This type of review process needs to target populations more relevant to the hospital setting.
- What is the process to determine topics and priorities?

Academic health service, respondents familiar with evidence and/or involved in reviews and guideline development

- This has been the practice here for over 15 years. I'm not sure this process is an effective use of people's time. Most disciplines would be well aware of developments within their own discipline, even if the rest of the hospital is not. Especially in academically focussed units like my own, members of the team are involved in writing systematic reviews and national guidelines on topics like this.
- I was involved in Australian section of this literature review project small part of a bigger review.
- Clinicians will usually have already seen the papers upon which the recommendations are based, or may even be undertaking primary research in the field themselves - and may be able to make valuable contributions to the planning of these projects.
- The diagnosis and management of this condition not meeting guidelines is currently under national and local review. Our department has already initiated changes to current practice to conform to (new) recommendations. The service is also completing on-going research to guide future practice.
- The conclusions are well known amongst specialists in this area. The exercise has not been helpful.
- Prophylactic antibiotic should not be used. That is why it is not in our protocol.

Evidence not applicable or not of high quality

- The 'evidence' was obtained from two very small trials that showed some treated patients had relatively minor adverse events. More importantly, in regard to potential adverse events that are subject to investigator interpretation, the authors state "Lack of blinding in one trial out of the two in total that reported on adverse events may result in biased results". Furthermore, in regard to biochemical results, that in theory should be less subject to bias, they state "Accordingly, the result of our meta-analysis for this outcome is not a robust result". I conclude that this review does not help to decide whether this treatment is useful or harmful in these patients. Don't send low quality reviews for comment
- Good idea but this issue has little clinical relevance.
- The Cochrane review should not be used as a source of information. The report on this review is not quite correct. For a
 meta-analysis based on a small number of subjects and trials and with some trials being open labelled, the findings can be
 unreliable.
- This is a primary care issue and few children presenting here have this as a sole problem. For the few patients especially young we use guidelines that recommend not using these therapies. This type of review process needs to target populations more relevant to the hospital setting.

Need for additional information in bulletin

This report to the clinicians should provide details such as the number of subjects with placebo control or open label trials.
 Further the person writing the report should look at the setting of the trials, provide details on the type of antibiotic, the change in the frequency of antibiotic resistance and the cost to the hospitals.

Section 25 Protocol to address evidence findings involving multiple decision-makers

This protocol was a work in progress at the time the EDS was suspended.

Southern Health

Technology/Clinical Practice Committee Evidence Bulletin_100

This bulletin is part of a process to ensure that Southern Health practice is consistent with current evidence. Your response is required by the date below. You can find more information about this process on the <u>TCPC website</u>.

The publication below indicates evidence of CLINICAL EFFECTIVENESS related to Blunt versus sharp suture needles for preventing percutaneous exposure incidents in surgical staff.

Responses related to evidence of **CLINICAL EFFECTIVENESS** are required within **THREE months.**

Please complete and return this bulletin to the second second by 1 June 2012

Bibliographic Source

Parantainen A, Verbeek JH, Lavoie MC, Pahwa M. Blunt versus sharp suture needles for preventing percutaneous exposure incidents in surgical staff. *Cochrane Database of Systematic Reviews* 2011, Issue 11. Art. No.: CD009170. DOI: 10.1002/14651858.CD009170.pub2. http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD009170.pub2/pdf

Author's Conclusion

There is high quality evidence that the use of blunt needles appreciably reduces the risk of exposure to blood and bodily fluids for surgeons and their assistants over a range of operations. It is unlikely that future research will change this conclusion.

Patient / Population	Persons working in the operation theatre that are exposed to the risk of percutaneous injuries with suture needles.
Ν	2961 participating surgeons
Setting	UK, US, Germany, Italy, Ireland, Netherlands. Four studies focused on abdominal closure, two on vaginal repair and two on hip replacement.
Intervention	Blunted suture needles (we defined blunt needles as suture needles that have a rounded blunt point and that are circular in diameter and that can be either curved or straight)
Comparison	Sharp needles (sharp needles are suture needles that have a tapered point and that can be either circular in diameter or square with cutting edges and that can be either curved or straight).
Outcomes	Primary Exposure of healthcare workers to contaminated blood or bodily fluids was our primary outcome measure. Exposure can be observed either as self-reported needle stick injury or glove perforations. Secondary We included satisfaction with, or ease of use of, the needles.
Inclusion Criteria	Randomised clinical trials (RCTs) and cluster-randomised trials (c-RCTs). "Persons working in the operation theatre" "Blunt suture needles (rounded blunt point that are circular in diameter and that can be either curved or straight) compared to sharp suture needles (tapered point, can be circular in diameter or square with cutting edges and can be curved or straight)"
Exclusion Criteria	Intervention was a needle handling device and not a blunt needle, study not randomised or controlled.

Applicability to Southern Health

Quality of Evidence

Quality of this Systematic Review or Health Technology Assessment

CCE staff appraised the methods used in this publication and found the **risk of bias** to be **LOW**. This means that you can use the findings of the review with confidence as all of the quality criteria have been fulfilled or where criteria have not been fulfilled it is very unlikely the conclusions of the study would be affected.

Quality of the evidence contained in this Systematic Review or Health Technology Assessment

The review authors appraised the available evidence and found it to consist of **Level II Evidence (one or more randomised controlled trials)**. The available evidence included in the review is of **high quality**.

Consistency with Southern Health documented practice

No Southern Health policies or procedures on this topic were identified.

Additional analysis prior to dissemination

Priority setting

1. Is this a priority for Southern Health?

Scope

2. Who needs to be consulted (patients, clinicians, others) and where are they?

Directors (medical and nursing) of Operating Suite, Surgery, Specialty, Women's & Children's, and Procurement, and Chair of Operating Suite Product Evaluation Committee.

3. Are there other parameters that need to be considered (setting, condition, professional groups, others)?

Problem

4. What is the problem?

The systematic review recommends the use of blunt needles to reduce the rate of exposure to blood and bodily fluids for surgeons and their assistants over a range of operations. Southern Health use both blunt and sharp suture needles.

5. Is it a real problem or perceived problem?

6. Is there a gap (not being done at all) or mismatch (need to change current practice)?

Size/extent

- 7. How can it be measured (routinely collected data or collect our own data)?
- 8. How big is the problem at Southern Health?

Ethical considerations

9. Do any ethical issues arise regarding the dissemination of this bulletin?

Solutions

10. What does the literature identified in EDS say?

11. What are the options available? Pros? Cons?

Additional Questions

What is the rate of stick injuries at Southern Health?

Are they comparable to the Systematic Review?

Is there a cost difference between using blunt compared with sharp suture needles?

Do some procedures require a sharp versus blunt needle?

What is the proportion of Southern Health surgeons using blunt versus sharp needles?

Study: Parantainen, A., Verbeek, J.H., Lavoie, M.C., Pahwa, M. (2011). Blunt versus sharp suture needles for preventing percutaneous exposure incidents in surgical staff. Cochrane Database of Systematic Reviews. 11, Art. No.: CD009170.

Description of study: Systematic	tic review of RCTs							
Patient/population	Persons working in the operation theatre that are exp	Persons working in the operation theatre that are exposed to the risk of percutaneous injuries.						
N	10 studies, n= Surgeons 2961 (total gloves unclear)							
Setting	UK, US, Netherlands, Italy and Germany. Four studies	s focused on abdominal closure, two on vaginal repair a	and two on hip replacement					
Intervention/indication	Reference	Intervention	Comparison					
& Comparison/control	Ablett 1998 (195 pairs of gloves)	Suturing with blunt tipped needles	Suturing with sharp needles					
	Hartley 1996 (85 pairs of gloves)	Suture needles with blunted end	Conventional sharp pointed needles					
		46 surgeon-operations	39 surgeon-operations					
	Meyer 1996 (400 gloves)	Blunt needles	Sharp needles					
		98 surgeon-operations	102 surgeon-operations					
	Mingoli 1996 (1560 gloves)	Blunt Needles	Sharp needles					
		300 surgeon-operations	300 surgeon-operations					
	Nordkam 2005 (406 pairs of gloves)	Blunt-tapered needles	Sharp needles					
		200 surgeon-operations	100 surgeon-operations					
	Rice 1996	Taper pointed suture needles	Standard pointed needles					
		34 surgeon-operations (# of gloves not reported)	34 surgeon-operations (128 gloves)					
	Sullivan 2009	Blunt needles	Sharp needles					
		204 surgeon-operations	204 surgeon-operations					
	Thomas 1995	Blunt tipped needles	Sharp tipped needles					
		Assumed 40 surgeon-operations	Assumed 40 surgeon-operations					
	Wilson 2008	Blunt Needles	Sharp needles					
		217 surgeon-operations (All gloves collected)	221 surgeon-operations (All gloves collected)					
	Wright 1993	Blunt taper point suture needles	Standard cutting needles					
		38 surgeon-operations	31 surgeon-operations					
Outcomes	Primary:							
	Exposure of healthcare workers to contaminated bloc	od or bodily fluids. Exposure could be self reported nee	dle stick injury or glove perforations.					
	Secondary:							
	Satisfaction with or ease of use of the needles							
Inclusion Criteria	"RCTs and Cluster-RCTs"							
	"Persons working in the operation theatre"							
	"Blunt suture needles (rounded blunt point that are c point, can be circular in diameter or square with cutti	ircular in diameter and that can be either curved or str ng edges and can be curved or straight)"	aight) compared to sharp suture needles (tapered					
Exclusion Criteria	Intervention was a needle handling device and not a blunt needle, study not randomised or controlled.							

SR/HTA Objective

To determine the effectiveness of blunt needles compared to sharp needles for preventing percutaneous incidents among surgical staff.

Study Validity Is it clear that there were no conflicts of interest in the writing or Yes The authors report that there were no conflicts of interest associated with this review. funding of this review? Does the review have a clearly- focused question? Yes Is a systematic review the appropriate method to answer the Yes question? Does the review have specified inclusion/exclusion criteria? Yes See above If there were specified inclusion/ exclusion criteria, were these Yes appropriate? Does the review document a comprehensive search strategy? See appendix 1. Yes Were reviewers blind to authors, institutions and affiliations? Not reported Were 2 or more independent reviewers used for: "two authors working independently screened the identified titles and abstracts of the references that Yes resulted from the search strategy for potential studies." 1. application of inclusion criteria to assess eligibility of studies? 2. extraction of data from study reports? Yes As above 3. appraisal of study quality? Yes See potential biases in the review process pg15 Were the strengths and limitations of included studies and See page 10 'Risk of bias in included studies' Yes potential impact on the results discussed? Was the validity of included trials appraised using appropriate It is unclear if more than one assessor appraised the validity of the included trials. Yes criteria? Studies were appraised based on random sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective reporting and other bias. Is there a summary of the results of individual studies? Summary of main results provided but not for individual studies. Partial If meta-analyses were conducted, was it reasonable to do so? Yes If meta-analyses were conducted, was it done appropriately? Yes Other What is the overall risk of bias? Low - All of the criteria have been fulfilled or where criteria have not been fulfilled it is very unlikely the Low conclusions of the study would be affected.

Results

Cochrane Summary of Findings Table

Blunt needles compared to sharp needles for preventing percutaneous exposure injuries								
Patient or population: surgical staff Intervention: blunt needles Comparison: sharp needles								
Outcomes	Illustrative comparative	risks* (95% CI)	Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments		
	Assumed risk	Corresponding risk						
	sharp needles	blunt needles						
glove perforations per	Study population		RR 0.46	2961 (10 studies)	⊕⊕⊕⊕ biab			
surgeon per operation	293 per 1000 135 per 1000 (111 to 158)		(0.50 10 0.54)	(10 statics)	ngn			
	Low risk population							
	20 per 1000	9 per 1000 (8 to 11)						
	High risk population							
	750 per 1000	345 per 1000 (285 to 405)						

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% Cl). **Cl:** confidence interval; **RR**: risk ratio;

GRADE Working Group grades of evidence

High quality: Further research is very unlikely to change our confidence in the estimate of effect.

Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Very low quality: We are very uncertain about the estimate.

Figure 4. Forest plot of comparison: I Blunt versus sharp suture needles, outcome: I.I Glove perforation

rate.

				Risk Ratio		Risk Ratio
Study or Subgroup	log[Risk Ratio]	SE	Weight	IV, Fixed, 95% Cl	Year	IV, Fixed, 95% Cl
Wright 1993	-0.7472144	0.296334	8.6%	0.47 [0.27, 0.85]	1993	
Thomas 1995	-0.35667494	0.348466	6.2%	0.70 [0.35, 1.39]	1995	-++
Meyer 1996	-0.85131877	0.138984	39.2%	0.43 [0.33, 0.56]	1996	•
Rice 1996	-3.11351531	1.449138	0.4%	0.04 [0.00, 0.76]	1996	<
Mingoli 1996	-0.73315252	0.173816	25.1%	0.48 [0.34, 0.68]	1996	+
Hartley 1996	-1.70552479	0.636209	1.9%	0.18 [0.05, 0.63]	1996	
Ablett 1998	-0.64435702	0.421637	4.3%	0.52 [0.23, 1.20]	1998	
Nordkam 2005	-0.8303483	0.290628	9.0%	0.44 [0.25, 0.77]	2005	
Wilson 2008	-0.2048782	0.67082	1.7%	0.81 [0.22, 3.03]	2008	
Sullivan 2009	-0.8873032	0.449089	3.8%	0.41 [0.17, 0.99]	2009	
Total (95% CI)			100.0%	0.46 [0.38, 0.54]		•
Heterogeneity: Chi ^z =	7.45, df = 9 (P = 0	l.59); l² = 09	6			
Test for overall effect:	Z = 9.03 (P < 0.00	001)				Favours Blunt Favours Sharp

Outcome: number of glove perforations

"Ten trials including 2961 surgeon-operations compared the effect of blunt versus sharp needles on glove perforations and found a significant reduction of glove perforations, with a relative risk of glove perforations of 0.46 (95% confidence interval 0.38 to 0.54)."

Outcome: percutaneous injuries

"Five studies reported the number of percutaneous injuries but in one study there were no injuries in the intervention and control groups. We could combine four studies in a meta-analysis. The use of blunt needles decreased the risk of a needle stick injury by 69% (RR 0.31, 95% CI 0.14 to 0.68)."

Outcome: surgeon satisfaction and needle performance

"Data on needle performance could only be extracted from Nordkam (2005) and Meyer (1996). Nordkam (2005) showed that surgeons found the sharp needles 20% easier to use, on a VAS scale from 0 to 100, but Meyer (1996) reported that the blunt needles were easier to use even though, clearly more force was needed."

"Rice (1996) reported that surgeons had no difficulties with the use of the blunt needles. In Sullivan (2009), 92% of the surgeons reported that the blunt needles were acceptable but they were less satisfied with their use. Wilson (2008) reported that surgeons found the blunt needles significantly more difficult to use. In Wright (1993) the surgeons found the blunt needles slightly more difficult to use but they had minimal effect on their technique."

Author's Conclusions

"Implications for practice: There is high quality evidence that the use of blunt suture needles appreciably reduces the risk of exposure to blood and bodily fluids for surgeons and their assistants over a range of operations."

"Implications for research: There is high quality evidence that the use of blunt needles is beneficial and it is unlikely that future research will change this conclusion."

Out Comments/Summary

The overall risk of bias in this systematic review is low.

The authors suggest that the use of blunt suture needles appreciably reduces the risk of exposure to blood and bodily fluids for surgeons and their assistants over a range of operations. This is a justified conclusion based on the statistical significance of the reduction of 54% of the risk of glove perforations and 69% reduction in the risk of needle stick injuries when using blunt needles. The Systematic review was well carried out with no conflicts of interest reported.

Response

- Click once on the shaded box to select the appropriate response
- Click once on the shaded rectangle to provide a typed comment

Practice at Southern Health (please select one response only, tick the box and provide relevant details)



Communication

Should this information be disseminated more widely? If so, to whom?

Other comments

Feedback

This is a pilot of new processes being implemented by the Technology Clinical Practice Committee and the Centre for Clinical Effectiveness Evidence Dissemination Service.

We would appreciate any comments regarding what works, what doesn't work and how we can improve the process.

Name:		
Position:	Date:	

Thank you

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Appendix 6. Paper 9 Additional file

Sustainability in Health care by Allocating Resources Effectively (SHARE) 9: Conceptualising disinvestment in the local healthcare setting

Additional File: Methods

Papers 9 and 10 of the SHARE series present the findings of a review of the disinvestment literature, combined with findings from the SHARE Program, discussed from the perspective of the local healthcare setting.

The papers are presented as Debate rather than Research papers but, since the arguments are based on the findings of a literature review, readers need to have confidence that the process was rigorous and as comprehensive as possible.

Although undertaken systematically, this was not a systematic review. It is impossible to be absolutely comprehensive in ascertaining all the relevant literature on disinvestment for two main reasons.

- There is no general agreement about use of the term 'disinvestment', it is used to convey multiple concepts and there are many other terms used to convey the same range of concepts.
- The aims, activities and outcomes of disinvestment initiatives are replicated in research and practice in other healthcare paradigms and published in various bodies of literature.

Extensive searches were undertaken to ensure as much as possible that the discussion correctly reflects the literature.

Search strategy

General search

This search was undertaken at the commencement of the PhD (mid 2013) and was repeated half way through (mid 2015) and prior to completion of the final drafts of the two review papers (early 2016).

Sources: The initial search was conducted in medical databases (Ovid Medline, Ovid EMBASE, All EBM Reviews, The Cochrane Library) and the internet (via the Google search engine). Repeat searches were conducted in PubMed, The Cochrane Library and the internet via Google.

Search in PubMed: (((disinvest* OR decommission* OR defund* OR de-implement* OR de-adopt* OR "resource release" OR "resource allocation" OR reallocat* OR reinvest* OR "health technology reassessment")) AND ("1995/01/01"[PDat] : "3000/12/31"[PDat]) AND Humans[Mesh] AND English[lang]) Sort by: PublicationDate Filters: Publication date from 1995/01/01; Humans; English

Searches were adapted to suite the relevant databases.

Supplementary searches

Additional material was obtained from the following sources.

1. Health Technology Assessment International (HTAi) Disinvestment Special Interest Group regular email bulletins containing searches for disinvestment literature by Leigh-Ann Topfer, University of Alberta Health Technology and Policy Unit librarian.

Search in PubMed: ((unnecessary procedures[mh]) OR (disinvest*[tiab]) OR ("low value"[ti]) OR ("choosing wisely"[tiab])) OR (((health care rationing[mh]) OR (cost control[mh]) OR (health priorities/ec) OR (resource allocation[mh]) OR (technology assessment, biomedical[mh]) OR (biomedical technology/ec) OR (budgets[mh]) OR (investments[mh]) OR (delivery of health care/ec) OR (cost-benefit analysis[mh]) OR (diffusion of innovation[mh]) OR (formularies as topic[mh]) OR (reimbursement mechanisms[mh]) OR (comparative effectiveness research[mh]) OR (decision making[mh]) OR (decision making, organizational[mh]) OR (priority setting[ti]) OR (coverage[ti]) OR (technology[ti]) OR (technologies[ti]) OR ("cost containment"[ti]) OR (rationing[ti]) OR (decision*[ti]) OR (reimburs*[ti]) OR (pmba[ti]) OR ("program budgeting" OR "programme budgeting") OR ("marginal analysis")) AND ((("de-adopt*") OR (deadopt*) OR (delist*[tiab]) OR ("delist*"[tiab]) OR (ineffective[ti]) OR (redeploy*[ti]) OR (divest*[ti]) OR (obsolete[ti]) OR (obsolescen*[ti]) OR (abandon*[ti]) OR (decommission*[ti]) OR ("de-implement*") OR (deimplement*) OR ("phase out"[ti]) OR ("phasing out"[ti]) OR (reinvest[ti]) OR (reinvesting[ti]) OR (reinvestment[ti]) OR (discard*[ti]) OR (reassess*[ti]) OR (reallocat*[ti]) OR (disuse[ti]) OR (unnecessary[ti])) OR (defund*)))

2. Table of Contents of the International Journal of Technology Assessment in Health Care in regular email bulletins

3. Reference lists of relevant publications

Targeted searches

The need for additional searches was identified when it became apparent that

- there was no agreed definition for the term 'disinvestment', that it was used to convey multiple concepts, and that there
 were many other terms conveying the same range of concepts
- the aims, activities and outcomes of disinvestment initiatives were replicated in research and practice in other healthcare paradigms and published in various bodies of literature

Targeted searches were undertaken in the following situations to capture publications which would not have been identified using the specified disinvestment-related search terms but which were relevant to points under discussion in the reviews.

- To further explore concepts within the identified themes. Some examples include definitions for health technologies; 'optimisation'; 'Choosing Wisely'; rationale for disinvestment; examples of theories, frameworks and models for disinvestment, resource allocation, prioritisation, etc; individual challenges specific to disinvestment; principles for disinvestment; methods and tools; barriers and enablers.
- 2. To capture information related to removal, reduction or restriction of health technologies and clinical practices that had not been labelled with a disinvestment-related term; such as publications in the EBP or quality and safety literature.
- 3. To ensure that no publications had been missed prior to making statements such as 'we were unable to find....'

Inclusion criteria

English language publications including guidelines, reviews, research studies, case studies, debate or discussion papers, technical reports or policy documents that addressed disinvestment were included.

Data extraction and analysis

No critical appraisal was undertaken as only a small proportion of included publications were research studies.

After the first search was conducted, full text versions of relevant papers were obtained.

- Thematic analysis was undertaken from the perspective of the local healthcare setting [1].
- Familiarising with data: papers were read and notes taken.
- Generating initial codes: relevant features of the data were systematically coded and collated.
- Searching for themes: codes were collated into potential themes.
- Reviewing themes: themes were reviewed against the entire data set and a thematic map was developed.
- Defining and naming themes: the specifics of each theme and their place in the overall story were defined

All papers were re-read and any additional information related to the final themes that had been missed in the first reading was extracted.

Further information related to the final themes was extracted from additional publications subsequently identified by repeats of the general search and the supplementary and targeted searches.

Synthesis

The emergent themes could be categorised into two higher level themes, conceptualisation and operationalisation of disinvestment, which were used as the basis for two debate papers. The emergent themes were allocated between the two papers.

Information from the literature is considered from the perspective of the local healthcare setting and summarised narratively within each theme. This is combined with a narrative summary of findings from the SHARE Program relevant to the theme.

1. Vaismoradi M, Turunen H, Bondas T. Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. Nursing & health sciences. 2013;15(3):398-405. doi:10.1111/nhs.12048.

Appendix 7. Paper 10 Additional file

Sustainability in Health care by Allocating Resources Effectively (SHARE) 10: Operationalising disinvestment in a conceptual framework for resource allocation

Additional File: Principles for resource allocation

Contents

Categories	2
Descriptions	4
Relationships	7
Methods and Tools	8
References	

Categories

Forty-two principles were identified from the existing literature and the SHARE publications and grouped into eight categories to add further meaning and context. These are Boundaries, Ethics, Governance, Structures, Processes, Stakeholder involvement, Resources and Preconditions.

Boundaries

Clear boundaries should be established to define the parameters that the framework will operate within. At a minimum, this should include context, scope and timeframe; with additional factors where relevant. Context can play a significant role in decision-making for disinvestment or resource allocation and should not be underestimated [1-3]. Explicit statements of context and scope enable identification of all relevant stakeholders [4]. It is proposed that frameworks are implemented either as long-term ongoing programs or within a defined timeframe, such as five years, and adequate resources should be provided to achieve this [2, 5-12]. There is also a need for clear timelines around implementation of policies and delivery of outcomes [7, 8].

Ethics

Ethical frameworks for decision-making in situations of limited health resources have been produced by governments, health agencies and research bodies [13-19]. Most elements are common to all, and are also cited frequently in the literature as necessary in the disinvestment process. These are justice, fairness, equity, access, legality, honesty, clinical ethics, patient autonomy and privacy.

The terms justice, fairness and equity are frequently used together as if to convey that they have different meanings, but they are also used interchangeably. There are a range of definitions for these terms, with fairness and equity often used to define justice. Although there is considerable overlap in definitions, the frequent use of all three together suggests that authors wish to convey subtle differences. To reflect these sentiments all three have been included and definitions developed to differentiate between them in the context of this framework.

There are many types of justice. Distributive justice is used to consider what is right or just in the allocation of goods within society [20]. Distributive justice and social justice are both used to depict the concepts of fairness and equity [16, 21]. Procedural justice relates to decision-making which is included below in Processes [22]. The other forms of justice, mainly related to the legal system, are not relevant to this context. For the purposes of this framework, the principle considered here is utilitarian justice, maximising outcomes through application of resources for the greatest benefit for the most people.

Two approaches to equity in health care have been described: equity related to a concept of need and equity related to access to services [23]. For clarity, equity is being used here in relation to need and access to services has been included separately.

The four components of the Accountability for Reasonableness approach to decision-making are frequently referred to in the disinvestment literature as "*ethical factors*": 1) the process must be public and fully transparent, 2) decisions are based on reasons that stakeholders agree are relevant, 3) decisions can be revised on appeal and 4) there should be assurance through enforcement that these conditions will be met [24]. These principles are not addressed here under Ethics but are integrated into other sections of the framework: transparency and enforcement in Governance and relevance of decision-making criteria and appeals in Processes.

Governance

The principles of governance are transparency, accountability, authority, enforcement, sound management and quality improvement.

Authors note that transparency, accountability and enforcement enable fairness and equity; sound management ensures that programs and projects are delivered effectively and efficiently; and quality improvement encourages learning and ongoing development.

Structures

The desired elements of structures for decision-making in resource allocation include a systematic approach, integration, alignment, monitoring and evaluation and reporting. A systematic, integrated, aligned approach is seen to enable transparency and accountability [8, 25] which in turn enables fairness and equity [26].

It is anticipated that integration of decision-making systems and processes into existing infrastructure, alignment with local priorities and strategic objectives, and embedding the operational aspects within business plans and routine planning activities will increase the likelihood of success and sustainability and normalise the concept of disinvestment as part of day-to-day decision-making [5, 8, 9, 12, 27-30].

Integration should be system-wide at the level in which the framework is being implemented eg network, institution, department, ward, committee [5, 8, 31, 32]. This will allow all opportunities for disinvestment to be included [6, 33, 34]; shared decision-making with all stakeholders across the relevant health economy [7, 31, 35-37]; consideration of the impact of decisions on other systems, organisations and departments [5, 7, 14, 36, 38, 39]; consultation between policy-makers, business managers, clinicians and consumers [7, 39-41]; institutional learning leading to improvement [42]; and collaboration with teams working in related areas such as outcomes research, quality improvement, patient safety and system redesign [32, 37].

Processes

Processes for decision-making about resource allocation should be robust [2, 4, 7, 8, 11, 25, 28, 34, 43] and many authors cite the Accountability for Reasonableness approach as a way of achieving this [6, 16, 38, 43-46].

A robust process is based on explicit criteria, is informed by evidence, includes analysis of risks and benefits, is internally and externally consistent, has mechanisms to revise or appeal decisions, and includes effective communication activities.

There is a huge range of potentially relevant criteria for resource allocation decisions. Most authors emphasise that a list of criteria should be developed with input from all stakeholders to meet the objectives of individual situations. The commonly cited basic requirements include clinical parameters such as safety and effectiveness, economic measures such as cost-effectiveness and affordability, and social factors such as local values and priorities. Additional criteria will depend on the setting and context.

Stakeholder involvement

It is universally acknowledged that all good decision-making requires stakeholder engagement and virtually all authors writing about disinvestment, resource allocation or priority setting refer to this fundamental issue. Stakeholder empowerment refers to the ability of stakeholders to contribute to and influence decisions [47].

Although there is extensive literature on the effects of patient involvement in decisions about their clinical care [48-50], there is no clear evidence about the impact of patient or public participation in collective decisions for healthcare policy and service delivery [51-54]. However there is a growing body of work investigating methods for engaging and empowering a range of stakeholders in this generic context [8, 47, 51, 55, 56] and, more specifically, in resource allocation [52, 57, 58] and disinvestment [59-62].

Resources

The proposed activities require adequate and appropriate resources to be effective and sustainable [12, 31, 36, 37, 40, 63-68]. These include funding; time; access to high quality analytics of information such as research evidence, population health data, local health service utilisation data and economic analyses; expertise; methods and tools. Several authors call for dedicated resources and in-house "*resource centres*" to provide expertise; access to relevant methods and tools; and education, training and capacity-building [8, 9, 65, 69-72].

Preconditions

Certain preconditions must be fulfilled before program and project objectives can be achieved. Strong leadership and commitment is required at every level, as is influence and support. The organisation must be ready to change and the internal and external environments must be favourable.

Descriptions

BOUNDARIES	
Context	Specify the context where decisions will apply. These might include, but are not restricted to, 1) acute, subacute, rehabilitation, community or mental health services; health promotion and education programs; or residential aged care at 2) region, local network, institution, department, ward or committee. [1-3]
Scope	Specify the type of decisions and topics to be addressed. These might include, but are not restricted to, policy, management or clinical decisions to address capital works, plant and equipment; human resources; organisational systems and processes; guidelines and protocols; procurement or commissioning of TCPs, models of care or health programs and services. [4, 73]
Timeframes	Specify timeframes for decision-making programs (eg long-term ongoing or defined limited application such as 5 years), implementation of decisions and delivery of outcomes. [2, 5-12]
ETHICS	
Justice	Maximise outcomes; direct resources for the greatest utility or benefit for the most people, the 'greatest good for the greatest number'. [13, 15, 16, 18, 20, 22, 74, 75]
Fairness	Act impartially; not discriminating on the basis of race, nationality, colour, language, religion, gender, marital status, sexual orientation, social status, political or other opinion, capacity to pay, location of residence, ownership of property, the need for treatment arising out of past behaviour, or age (except where age may affect the outcome). [6, 13, 14, 16-18, 26, 39, 43, 66, 75-78]
Equity	Horizontal equity: Offer treatment to all patients that meet the relevant criteria, or to none; 'treating like cases alike' or 'equal access for equal clinical need.' The decision should be made for all patients in a group with similar clinical need and not for individuals. Vertical equity: Provide unequal but equitable treatment for people with unequal health needs by giving priority to groups with greater need, for example disadvantage due to social determinants of health. [2, 13-18, 21, 23, 26, 31, 38-40, 47, 78, 79]
Access	Ensure consumers or communities are able to use appropriate services determined by five dimensions of accessibility (approachability, acceptability, availability and accommodation, affordability, appropriateness) and five abilities of populations (ability to perceive, seek, reach, pay and engage). [14, 16, 23, 40, 43, 66, 78, 80]
Legality	Act within the law. Ensure decisions are made by those who are legally accountable for the resources and not made by external groups such as pharmaceutical companies, research bodies, or others with vested interests. [7, 14, 39]
Honesty	Be truthful. Do not lie or hide things. [7, 78]
Clinical obligations	Guarantee that removal, reduction or replacement of services or TCPs do not compromise clinical ethical obligations, such as beneficence, or other professional standards. [74]
Patient autonomy	Empower and encourage patients to make informed decisions about their treatment. Safeguard patient choice and informed consent. [16, 59, 74]
Privacy	Ensure patient confidentiality at all times. [74]
GOVERNANCE	
Transparency	Make all elements clear and visible eg who makes decisions, how decisions are made, reasons for decisions, how they are documented, how they will be implemented and evaluated. Seek declarations of conflict of interest and address them openly. Implement single system ie no parallel system where those who lobby could get undue priority. Record departures from process and subject them to scrutiny. [2, 6-8, 11, 12, 14, 15, 17, 25, 26, 29, 31, 32, 36, 38, 42, 43, 46, 47, 59, 62, 63, 65, 66, 75, 76, 78, 81-83]
Accountability	Ensure decisions are only made by those who have the authority to do so. Make the lines of authority and responsibility clear and be prepared to acknowledge if errors or complications occur and be accountable for correcting them. [2, 6, 15, 27, 29, 36, 39, 43, 62]
Authority	Ensure decision-makers have the knowledge and capability to make the decisions, the control and power to enact them, and the ability to move resources within and between programs, services, facilities, etc as appropriate. [6, 27, 40, 75]
Enforcement	Implement mechanisms to ensure firstly that all principles are adhered to and secondly that decisions are enacted as planned. [6, 16, 18, 43-47, 75, 84]
Sound management	Establish sound organisational, performance management and resource management structures to ensure due process is followed and implementation of decisions is achieved. Include appropriate corporate expertise from areas such as Finance, Human Resources, Contracting, Communications, Procurement, etc. [5-9, 31, 39, 40, 83]
Quality improvement	Embed opportunities for ongoing reflection on the processes and outcomes of administration of the framework and take the appropriate actions to increase effectiveness, satisfaction and other measures relevant to the stated objectives. [40, 42, 85]

STRUCTURE	
Systematic approach	Establish systems that are planned, methodical, purposeful and coherent and do not rely on ad hoc, impromptu or improvised mechanisms for decision-making and change. [2, 3, 5, 6, 9, 25, 37, 41, 43, 83, 86]
Integration	Incorporate decision-making systems and processes for resource allocation into existing infrastructure and implement system-wide at each level ie region, local network, institution, department, ward or committee. [2, 5, 6, 9, 11, 14, 27-29, 32, 34, 35, 39, 42]
Alignment	Align decision-making systems and processes with the institutional mandate, priorities, strategic goals and objectives. Integrate operational aspects within relevant business plans. [2, 5, 9, 11, 12, 29, 31, 37, 68]
Monitoring and Evaluation	Assess compliance with, and effectiveness of, the administration of the program to enable improvement in the systems and processes. Assess outcomes of decisions introducing, removing, reducing or replacing services or TCPs to inform ongoing use and appropriateness of funding. [11, 13, 31, 38, 40, 42, 43, 47, 85]
Reporting	Report outcomes of monitoring and evaluation to relevant stakeholders in a transparent and timely manner to enable enforcement and quality improvement and inform future decisions. [7, 13, 29, 40, 87]
PROCESS	
Explicit criteria	Develop appropriate and achievable criteria to meet the desired objectives, document them explicitly and adhere to them in the decision-making process. [2, 6, 8, 11, 15, 16, 18, 26, 29, 39, 40, 43, 75, 86]
Evidence-informed	Use the best available evidence for each of the specified criteria. This may include published research or research syntheses (eg systematic reviews, health technology assessments and evidence-based guidelines), population health data, health service utilisation data, cost data, health economic analyses or models, consumer and staff perceptions, or other sources. [1, 5, 7-9, 12, 16, 20, 25, 26, 29, 31, 32, 34, 37-39, 43, 47, 64, 65, 67, 68, 75, 78, 86, 88-92]
Risk-benefit analysis	Assess the risks and benefits of introducing, continuing, expanding, removing, reducing, restricting or replacing individual services or TCPs. Assess the risks and benefits of implementing a significant change initiative. [14, 15, 37, 43, 78, 87]
Consistency	Internal consistency: Ensure that the systems, processes, values and reasoning that underpin the program are consistent. In some cases, standardisation may be beneficial.
	External consistency: Ensure that local programs are consistent with regional programs, regional programs are consistent with national programs, etc.
	Consistency of information: Ensure that all materials used in communication are consistent with each other and with the systems, processes, values and reasoning of the program. [14, 15, 18, 26, 39, 42, 43, 66, 78, 82, 93]
Appeals process	Establish formal mechanisms, transparent rules and requirements, to review, revise or appeal decisions. Correct errors and address disagreements constructively. [13, 15, 18, 38, 39, 42, 47, 78]
Communication	 Document decisions. Develop channels of communication, methods and tools to: Convey information to stakeholders so they are aware of processes, requirements, decisions and actions taken. Seek input from stakeholders to identify issues and drive decisions. Seek feedback from stakeholders to evaluate the processes and outcomes of making and implementing decisions. Ensure 'top down' and 'bottom up' mechanisms to convey information and seek input and feedback are available, promoted to stakeholders and user-friendly. Distribute information to mass media and social media to educate and inform the community and facilitate public dialogue on healthcare decisions. Share information with the international community to avoid duplication of effort by publishing assessments, decisions, project initiatives and research activities. [7, 11-13, 15, 31, 32, 37, 42, 57, 66, 87]
STAKEHOLDER INVO	DLVEMENT
Engagement	Identify all relevant stakeholder groups, internal and external to the program. Examples include, but are not restricted to, government departments, local authorities, health agencies, health services, professional associations, representative organisations, advocacy groups, policy makers, managers, health practitioners, researchers, resource personnel (eg systematic reviewers, data analysts, health economists, etc) and representatives of the public. Public participation can involve patients, service users, consumers, community members, citizens, taxpayers, voters, etc. Select an appropriate model, framework or guidance document to follow and use methods and tools for stakeholder engagement relevant to the setting and context.

Empowerment	Ensure that stakeholders have the power to contribute to and influence decisions. Implement mechanisms to minimize the effect of the power differences among actors in healthcare organizations; for example give each stakeholder equal opportunities to participate at different stages of the decision-making [47].
RESOURCES	
Funding	Provide adequate funding to underpin the systems and processes to make, implement and evaluate decisions. [11, 12, 31, 36-38, 43, 68, 94]
Time	Allow all relevant stakeholders to take sufficient time for participation. [1, 6, 7, 27, 52, 63, 95]
Expertise	Ensure appropriate expertise is available to make, implement and evaluate decisions. Relevant expertise includes, but is not restricted to, finding and using information, health technology assessment, health economics, data analysis and interpretation, negotiation and meeting facilitation, project management, change management, health program evaluation and knowledge and experience in the topic under consideration. [1, 2, 5, 8, 9, 11, 12, 27, 32, 37, 43, 67-70, 96-98]
Information	Provide adequate and appropriate access to high quality information to underpin decisions including, but not restricted to, research evidence, population health data, local health service data, consumer feedback and economic analyses. [2, 6, 7, 27, 31, 38, 40, 42, 43, 98]
Methods and tools	Assist decision-makers, implementers, evaluators and support personnel to find and use appropriate, valid and reliable methods and tools relevant to program and project activities. [1, 2, 5, 8, 9, 11, 27, 32, 43, 67, 69, 70, 96-98]
PRECONDITIONS	
Leadership	Appoint and train established and emerging leaders with strengths in negotiation and conciliation, political and cultural awareness and sensitivity. [2, 5-8, 12, 27, 31, 32, 37, 41, 42, 68, 87, 97, 99]
Commitment	Establish the program in a way that allows those who are responsible and accountable, the leaders and champions, the decision-makers and support staff to be fully and openly committed, dedicated and loyal to the principles and practices within it. [2, 5-8, 27, 31, 32, 41, 42, 87, 97, 99]
Influence	Engage key stakeholders with sufficient and appropriate influence in relevant areas to facilitate and enable rigorous decision-making and effective action. Considerations might include, but are not restricted to, level of seniority, authority, credibility amongst peers, representation on relevant committees, extent of internal and external networks, etc. [5, 12, 37, 40, 47, 52, 68, 100-102]
Support	Provide support to those involved by endorsing and promoting decisions, trouble-shooting and problem solving, addressing personal and professional needs, etc. [3, 5, 7, 12, 20, 27, 31, 32, 37, 40, 44, 51, 59, 61, 62, 66, 69, 87, 103-106]
Readiness for change	Assess readiness for change at all the relevant levels prior to establishing the program and prior to implementing the decisions taken. Use a valid and reliable instrument. [5, 22, 27, 31, 68, 87]
Favourable environment	Consider factors within the internal and external environments that may influence the establishment, delivery and outcomes of the program and what the impacts might be. Examples include, but are not restricted to, setting and context, politics, economic climate, power dynamics and other relationships, priorities, values and culture. [3, 8, 23, 31, 39, 42, 43]
RESEARCH	
Consider the role of	and opportunities for research in new systems and processes; theories, frameworks and models; methods and tools.

Relationships



The principles are presented in the framework as two groups.

The first group have a hierarchical relationship depicted as a series of nested boxes. The whole program is defined by explicit boundaries, ethical principles underpin good governance, governance directs and controls structure, and structure enables and accommodates process. The decision-making settings, prompts and triggers all sit within the scaffold of these five categories.

The second group, represented as three vertical bars, are required across all of the other elements. For example, stakeholders need to be involved in defining the boundaries and establishing the ethical parameters and methods of governance; they should be included in the structures and processes and participate in the projects and research. Adequate and appropriate resources and the noted preconditions will be required to establish, maintain and improve all aspects of the framework.

The intersection of the two groups of principles also demonstrates that ethics, governance, structures and processes also apply to stakeholder engagement, resources and preconditions. For example, stakeholder engagement should be systematic and integrated, funding should be sourced ethically and influence should be transparent.

These principles and their relationships also apply to the project and research components.

Methods and Tools

The principles were derived from the disinvestment and resource allocation literature, however they are applicable in most decision-making contexts. Methods and tools to assist in implementation of many of the principles can be found in the wider health or organisational literature, for example instruments to assess leadership or readiness for change and templates for communication strategies.

Two publications provide advice in a range of areas relevant to disinvestment. A book on rationing, priority setting and resource allocation in health care discusses multiple generic and specific methods and tools suitable for disinvestment including stakeholder participation, leadership, economic evaluation and several of the steps in the disinvestment process [114]. A toolkit for decommissioning and disinvestment, defined as withdrawal of funding from the provider organisation, provides high-level guidance on governance and administrative matters for removal of health services, not individual TCPs, and some tools for assessing service performance against UK data [93].

Stakeholder involvement

There are multiple evidence-based handbooks, toolkits and similar documents regarding consumer and community involvement in healthcare decision-making. These include publications produced by international [107, 108], national [109], regional [110], and local agencies [111] as well as discipline/condition-specific publications [112]. In addition to guidance on consumer involvement, resources for engagement of multiple stakeholder groups are also available [99, 113-115].

Guidance more specifically related to topics associated with this overview include involving consumers and/or community members in health policy decisions [116, 117], the HTA process [58, 105] including HTA at the local level [56], decisions about use of health technologies [99, 118, 119], and priority setting [47]. The SHARE Program developed a model for consumer engagement in resource allocation at the local level [57] and an extensive list of all potential stakeholders to consider in decommissioning of local health services has been produced [7].

Resources

Lack of knowledge and skills in evidence-based decision-making, project management, implementation and evaluation and lack of time to carry out the related activities are widely recognised as barriers to effective change in health care generally and resource allocation in particular [1, 2, 8, 9, 27, 32, 36, 43, 67, 69-71, 96-98, 120, 121]. Generic guidance in these areas can be found in the national and international resources noted above and the wider health and organisational literature, however no specific advice regarding provision of resources to address these issues was identified in the disinvestment and resource allocation literature.

The SHARE Program investigated four in-house services to provide expertise and support to decision-makers and project teams: an Evidence Dissemination Service and Data Service to facilitate proactive use of evidence from research and local data; a Capacity Building Service to provide training in evidence-based change, implementation and evaluation methods; and a Project Support Service to provide methodological advice and practical support in project conduct and delivery [71, 121]. The Evidence Dissemination Service was successful in ensuring local practice was consistent with current evidence but was suspended due to the intensive resources required to ascertain, process and disseminate the information. The Capacity Building and Project Support Services were successful in achieving short term objectives, but long term outcomes were not evaluated. The Data Service was not implemented at all due to local factors beyond the scope of the SHARE Program. Local needs analyses, evaluation frameworks and plans, and discussion of factors that influenced decisions, processes and outcomes of the pilot projects may inform others wishing to undertake similar initiatives [71, 121].

Preconditions

In addition to the formal prompts and triggers that can be built into decision-making infrastructure, there are also informal yet systematic approaches that could be integrated into other systems and processes [122]. These are associated with the principles denoted as preconditions. For example, although these strategies may not always identify opportunities for disinvestment themselves, they may create a favourable environment for consideration of disinvestment and readiness to implement change within the organisation. Identifying clinical champions interested in disinvestment and staff who have previously undertaken disinvestment projects and assisting them in future activities facilitates leadership and provides support. Commitment and influence will be evident if discussions about disinvestment are introduced into 'Leadership Walkrounds'.

Additional systematic methods to facilitate identification of disinvestment opportunities in a local health service

Discuss principles of disinvestment and examples of successful projects at department/unit meetings, educational events, etc

Assign a group member to look for disinvestment opportunities in committee/working party decisions

Add a disinvestment question to the 'Leadership Walkround' protocol

Identify clinical champions interested in disinvestment in each program/department/unit who would look out for opportunities

Support staff who have undertaken a disinvestment project to look for more opportunities

Have disinvestment as a high priority in medication safety reviews

Encourage or require projects that are introducing something new to have a component of disinvestment

Review projects that are being conducted for other reasons and identify and focus on any disinvestment elements

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Appendix 8. Paper 11 Additional file

The SHARE Program (Sustainability in Health care by Allocating Resources Effectively) 11: Reporting outcomes of an evidence-driven framework for resource allocation in a local healthcare setting

Additional File: Summary of findings

CONTENTS

FIGURES	1
TABLES	2
PHASE ONE (SHARE Papers 2-5)	3
Specifying the context	3
Understanding the problem	4
Defining the components	21
PHASE TWO (SHARE Papers 6-8)	25
Aim 1. Systems and processes	25
Aim 2. Disinvestment projects	28
Aim 3. Support services	36
Aim 4. Program evaluation and research	48
PHASE THREE (SHARE Papers 9 & 10)	51
Terminology and concepts	51
Motivation and purpose	53
Relationship with other healthcare improvement paradigms	55
Challenges	55
Redefining disinvestment	55
Theories, frameworks and models	55
New framework for an organisation-wide approach to disinvestment in the local healthcare setting	59
Key findings and recommendations	59
REFERENCES	71

FIGURES

Figure 1.	Framework for potential mechanisms to integrate disinvestment into health service systems and processes . 4
Figure 2.	Draft frameworks for SHARE Program
Figure 3.	Framework for the resource allocation process in a local health service7
Figure 4.	Model for integrating consumer values and preferences into the resource allocation process
Figure 5.	Model for exploring sustainability in health care by allocating resources effectively in the local setting24
Figure 6.	Overview of activities for SHARE Aims 1 and 2
Figure 7.	Algorithm for identifying disinvestment projects from an evidence-based catalogue of potential TCPs 29
Figure 8.	Overview of investigation of the SHARE Support Services
Figure 9.	Development, implementation and evaluation of an in-house Evidence Dissemination Service
Figure 10.	Comparison of stakeholder roles in two models for an in-house Evidence Dissemination Service
Figure 11.	Example of an Evidence Bulletin
Figure 12.	Four adaptations of a framework for evaluation and explication
Figure 13.	Relationships between reasons for disinvestment
Figure 14.	Framework for an organisation-wide approach to disinvestment in the local healthcare setting

TABLES

Table 1.	Issues to consider in development of an organisational program for disinvestment	3
Table 2.	Decision-makers and scope and types of decisions for resource allocation	5
Table 3.	Structure and practice elements of components of the resource allocation process	7
Table 4.	Strengths, weaknesses, barriers and enablers in decision-making for resource allocation	8
Table 5.	Examples of criteria for resource allocation decisions	16
Table 6.	Examples of types and sources of evaluation data used by committees	17
Table 7.	Differences in decision-making between health professional groups	17
Table 8.	Examples of consumer-related activities generating proactive decisions to drive change	19
Table 9.	Examples of routinely-collected consumer data	19
Table 10.	Examples of publications with consumer information	20
Table 11.	Definitions of consumer-related terms	21
Table 12.	Factors that influenced decisions for SHARE program development	22
Table 13.	Additional systematic methods to identify disinvestment opportunities in a local health service	29
Table 14.	Disinvestment projects proposed in the SHARE Program	
Table 15.	Examples of criteria for selection of disinvestment projects considered in the SHARE Program	
Table 16.	Factors for success, sustainability and suitability for disinvestment in the SHARE pilot project	
Table 17.	Factors influencing the SHARE process of selecting disinvestment projects	
Table 18.	Factors influencing the SHARE pilot disinvestment project	
Table 19.	Factors that influenced decisions in development of the SHARE support services	
Table 20.	Factors that influenced processes and outcomes of the SHARE support services	
Table 21.	Unique characteristics of the SHARE EDS	
Table 22.	Activities of the Capacity Building Service	46
Table 23.	Activities of the Project Support Service	
Table 24.	Contents of the literature overviews	51
Table 25.	Examples of definitions for disinvestment	52
Table 26.	Examples of use of the term 'health technologies'	52
Table 27.	Examples of alternatives for the term 'disinvestment'	53
Table 28.	Examples of reasons for disinvestment from the literature	53
Table 29.	Potential reasons for disinvestment in the local healthcare setting	54
Table 30.	Examples of frameworks and models related to disinvestment	56
Table 31.	Definitions underpinning the framework for an organisation-wide approach to disinvestment	61
Table 32.	Concepts underpinning the framework for an organisation-wide approach to disinvestment	62
Table 33.	Principles for a program of decision-making for resource allocation	63
Table 34.	Examples of activities and settings for disinvestment within decision-making infrastructure	66
Table 35.	Examples of systematic prompts and triggers to initiate disinvestment decisions	67
Table 36.	Examples of potential barriers to disinvestment	68
Table 37.	Key messages and recommendations	69

PHASE ONE (SHARE Papers 2-5)

Based on the UK Medical Research Council framework for complex interventions [1], Phase One involved specifying the context, understanding the problem and defining the components of an optimal intervention. The findings are presented and discussed in the context of the current literature.

Specifying the context

Several factors influenced early decisions regarding the scope and direction of the program.

The search for models, methods, theoretical guidance or practical advice for an organisation-wide approach to disinvestment was fruitless; however a range of issues to consider in development of a local program was identified (Table 1) [2].

Table 1. Issues to consider in development of an organisational program for disinvestment

Reproduced with permission from SHARE Paper 2 [2]

Торіс	Issues
Organisational and	How can a systematic evidence-based approach to disinvestment be implemented in a healthcare organisation?
management	 How can disinvestment decisions be integrated into established Strategic and Business Plans
	Which is the better approach – 'top down', 'bottom up' or both?
	How to engage and get 'buy-in' from clinicians, consumers and other stakeholders?
	What are the relevant organisational change mechanisms?
	What does leadership for disinvestment involve?
Decision-makers	Who has the authority, and the will, to make and act upon decisions about disinvestment?
	Who are the appropriate decision-makers?
	 Existing decision-making bodies or specially convened groups
	 Composition: policy-makers, managers, clinicians, consumers, technical experts, others
	In-house or external
	How does the relevant information get to them?
	What other agendas do they bring to the decision-making table?
	Who has the time, relevant skills and adequate resources to identify, implement and evaluate the required
	practice changes?
Decision-making	Are all viewpoints equal?
	What criteria should be applied to disinvestment decisions and prioritisation?
	What is the nature and source of information required?
	How do decision-makers become aware of the need to disinvest certain practices?
	How are policies and guidance documents used by local decision-makers to allocate resources?
Assumptions	Are generally held assumptions true? For example
	Clinicians are reluctant to disinvest
	Disinvestment is not optimal unless an active intervention is in place
Skills and resources	 What expertise and training is required to make, communicate, implement and evaluate decisions? What recovere are required to expression expertise, expression (healifil) health exprise staff when
	• What resources are required to source expertise, source information, backfill health service stall when
Drafaccional and	participating, and support decision-making, implementation and evaluation processes?
Professional and	 What impact will professional boundaries and turn issues have on disinvestment activities? What are the rights and reconnecibilities of stakeholders?
cultural	 What are the rights and responsibilities of stakeholders: Different stakeholder views of what is meant by (little or no health benefit)
	 What is the effect of culture on dicinvestment? (authoritative versus consultative transparent versus hidden)
	 What is the effect of culture of disinvestment: (automative versus consultative, transparent versus muden) What are the motives and incentives for disinvestment?
Financial and	 What funding is required for disinvestment initiatives and where can it be found?
commercial	 How can the difficulties inherent in the complex funding arrangements within health services he overcome?
commercial	 How can savings be measured?
	 How can savings be reinvested?
Values and ethics	How can transparency of process be ensured?
	What is a 'fair and reasonable' process?
	What are the access, equity and legal considerations?
	What is the best way to deal with conflict of interest with commercial entities?
Research and	What effect will the limited evidence base for some practices have on the process?
evaluation	• How can the lack of tested methods for implementation and evaluation be addressed?
l	

There was a lack of common terminology regarding definitions and concepts related to disinvestment. The only consistent message from the literature, confirmed by local stakeholders at the time and reiterated in more recent publications, was that the term 'disinvestment' had strong negative connotations and was likely to be a barrier to successful disinvestment-related change [3-8]. It was agreed that the term would be avoided.

It is common for local healthcare facilities to make decisions within organisation-wide frameworks such as development and authorisation of policies and procedures, capital expenditure and clinical purchasing, introduction of new technologies and clinical practices (TCPs) and models of care, and delivery of programs and services. However many published examples of disinvestment initiatives report individual standalone projects where the target has been identified in an isolated process; all conducted independently of existing decision-making and project infrastructure. While this approach can potentially be successful, it can also contribute to lack of coordination, duplication, inconsistent messages and change fatigue within an organisation [9]. Making decisions to disinvest in separate processes to those for investment decisions was also thought to be artificial and possibly counterproductive [2]. Monash Health chose to take an integrated, organisation-wide approach; using existing systems and processes to identify disinvestment opportunities or, when required, incorporating new methods into the existing infrastructure. Disinvestment would be considered alongside investment in the context of all resource allocation decisions. The aim was to facilitate systematic identification of disinvestment opportunities, encourage consideration of disinvestment in routine decision-making and ensure the processes were transparent and accountable. This approach has been reiterated in more recent publications which propose that disinvestment activities are more likely to be successful if decisions are made at the local level, integrated into everyday decision-making and central to local planning [10-13].

Much of the previous research on disinvestment had been driven by health economic principles. Monash Health did not have in-house capability in health economics, but did have high level expertise in accessing and utilising evidence from published research and local data. It was decided that the program would be driven from an evidence-based, rather than economics-based, perspective.

Hence the 'Disinvestment Project' became the 'Sustainability in Health care by Allocating Resources Effectively' (SHARE) Program, an organisation-wide, systematic, integrated, transparent, evidence-based approach to disinvestment in the context of resource allocation.

Preliminary research found that Monash Health did not have any decision-making settings where 'disinvestment' was explicitly considered; therefore new systems and processes were needed. Since no guidance was available, a conceptual framework of potential mechanisms to introduce disinvestment decisions into health service infrastructure was developed based on the knowledge and experience of local stakeholders [2]. Three potential mechanisms for a systematic approach to disinvestment decisions were identified: 1) Explicit consideration of potential disinvestment in routine decision-making such as purchasing and procurement and guideline and protocol development, 2) Proactive decision-making about disinvestment driven by available evidence from published research and local data, and 3) Specific exercises in priority setting and system redesign (Figure 1).

Figure 1. Framework for potential mechanisms to integrate disinvestment into health service systems and processes Reproduced with permission from SHARE Paper 2 [2]



Understanding the problem

In order to introduce the proposed organisation-wide program, knowledge of existing decision-making systems and processes for investment and disinvestment was required.

While there was a broad understanding of where resource allocation decisions were made at Monash Health, detailed knowledge of who made them and how they were made, implemented and evaluated was lacking, and this information was also unavailable in the literature [14]. Detailed responses to surveys, interviews and workshops from a wide range of participants enabled identification of, and development of classifications for, decision-makers, decision-making settings, and type and scope of decisions (Table 2).

Table 2. Decision-makers and scope and types of decisions for resource allocation

Reproduced with permission from SHARE Paper 3 [14]

DECISION-MAKERS

Clinicians

Health practitioners delivering patient care.

Authorised individuals

Authorised individuals include Board Members, Executive Directors, Directors and Managers at all levels within the organisation. They are designated by their role in the organisation, for example 'Director of Pharmacy', rather than as a named individual 'John Smith'.

Authorised groups

Authorised groups can be classified into those with

- ongoing roles and responsibilities for decisions such as the Board, Executive Management Team, Standing Committees, Approved Purchasing Units and Profession-specific groups such as the Nursing Executive.
- a specific, often time-limited, purpose such as a project Steering Committee, a Procurement Evaluation Committee to purchase a large piece of equipment and special initiatives like the High Cost Drugs Working Party of the Therapeutics Equivalence Program.

SCOPE OF DECISIONS

Clinicians make decisions for individual patients within the limits of parameters outlined in their position description, relevant professional standards and any local credentialing requirements.

Authorised individuals and groups make decisions on behalf of the organisation which impact on all patients, all staff or identified subgroups. Individuals are authorised to make decisions on behalf of the organisation within a range of specified parameters outlined in their position description or the Authority Delegation Schedule.

Committees and other groups are authorised to make decisions on behalf of the organisation as stipulated in their Terms of Reference. Examples of the parameters decision-makers are authorised to work within include, but are not limited to, location (eg South East sites), professional group (eg occupational therapists), specialty area (eg stomal therapy), patient group (eg children), nature of purchase or resource use (eg surgical equipment and consumables) and cost limit (eg up to \$10,000).

TYPES OF DECISIONS

Clinical

Clinical decisions arise in the encounter between a health practitioner and an individual patient or client. Their purpose is to assess, treat
and/or plan ongoing management of a health issue.

Strategic, operational or professional

- Strategic decisions point the organisation in the direction it wants to go; they are captured in strategic goals and policies which reflect a
 particular position, priority or plan the organisation wishes to communicate to staff, patients and other stakeholders. Strategic planning is
 usually undertaken at organisation-level driven by the Board, Executive and Senior Managers but can also be undertaken at any level.
- Operational decisions make the strategic goals happen; they enable day-to-day operations and are undertaken by managers at all levels.
- Professional decisions address standards and methods of practice and are made by senior staff in the discipline to which they are relevant.

Routine, reactive or proactive

- Routine decisions are made on a regular basis; examples include annual budget setting processes, monthly committee meetings and reviews of guidelines or protocols at specified intervals after their introduction.
- Reactive decisions are made in response to situations as they arise; for example new legislation, product alerts and recalls, critical incidents
 and applications for new drugs to be included in the formulary.
- Proactive decisions are driven by information that was actively sought for this purpose such as accessing newly published research evidence
 to compare against current practice or interrogating local data to ascertain practices with high costs or high rates of adverse events.

Conditional or unconditional

- Conditional decisions specify requirements to be met before or after their implementation; for example availability of funding, clinical
 indications (eg disease/condition, severity, patient group), authorised practitioners (eg specific training, named individuals), monitoring of
 outcomes (eg patient outcomes, adverse events, costs), location (eg ICU, Hospital in the Home), time limitation (eg until 2 year review).
- Unconditional decisions have no requirements.

Allocating funds or non-monetary resources

- Allocating funds involves spending money or putting it aside to purchase specified items later.
- Allocating non-monetary resources can include rostering staff time; specifying health professional groups; providing clinic or operating
 room time; and developing protocols that direct use of clinical interventions, equipment, drugs, diagnostic tests and referral mechanisms.

Whether to buy or what, where and how to buy

- 'Whether to buy' is a decision about what is required, for example a new drug to improve patient outcomes, a new scanner to reduce waiting time, consumables for a piece of equipment in current use. These decisions are undertaken by authorised individuals and some of the authorised groups such as the Technology/Clinical Practice Committee, Therapeutics Committee, Falls Prevention Committee, etc.
- 'What, where and how to buy' is a decision about how the requirement is met and considers product and manufacturer reliability, availability of parts and tools, service and maintenance contracts, IT requirements for hardware and software, price negotiations, etc. These decisions are undertaken by the Approved Purchasing Units and groups established for specific purchases.

Purchase of budgeted or unbudgeted items

- Decisions to purchase budgeted items are made by the relevant authorised individual, usually the budget holder or their line manager depending on the purchase price and the designated cost limits of their respective approval levels (eg <\$10,000, <\$50,000).
- Decisions to purchase unbudgeted items can only be approved by specified committees and Executive Directors

This investigation found that most decisions to introduce or remove TCPs were usually made 'reactively' in response to internal applications or external notifications, and highlighted the opportunity to drive decisions 'proactively' using information that was specifically ascertained to identify potential for improvement.

Several of these early findings were combined in a draft framework, which was refined to include subsequent decisions, and used to seek endorsement from the Monash Health Board and apply for funding from the state health department (Figure 2).

Figure 2. Draft frameworks for SHARE Program

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Initial draft

Introduction of	Removal of
safe, effective, cost-effective TCPs	harmful, ineffective, inefficient TCPs
Reactive (current)	Reactive (current)
 Application process 	 Drug alerts, product withdrawals
Proactive (potential)	Proactive (potential)
 Identification of evidence regarding 	 Identification of evidence regarding
new TCPs that are safer, more	TCPs in current practice that are less
effective or more cost-effective	safe, less effective or less cost-effective

Revised draft

	Introduction of new TCPs
	1. Capital procurement and clinical purchasing
PROGRAM	2. Guidelines and protocols
Integrated systems	3. Proactive use of published research
and processes	4. Proactive use of local data
organisation	5. Priority setting exercises
	6. System redesign
	← Routine / Reactive / Proactive →
	Routine / Reactive / Proactive Identify change required
	 Routine / Reactive / Proactive → Identify change required Approval/prioritisation
PROJECTS	 Routine / Reactive / Proactive → Identify change required Approval/prioritisation Project ownership/planning
PROJECTS Individual projects	 Routine / Reactive / Proactive → Identify change required Approval/prioritisation Project ownership/planning Implementation
PROJECTS Individual projects to introduce or remove TCPs	 Routine / Reactive / Proactive → Identify change required Approval/prioritisation Project ownership/planning Implementation Evaluation

In addition to the specific activities of making, implementing and evaluating decisions, health service staff noted several other components in the process of resource allocation. Eight components were identified: Governance, Administration, Stakeholder engagement, Resources, Decision-making, Implementation, Evaluation and, where appropriate, Reinvestment of savings [14]. The detailed responses enabled elements of structure and practice for each component to be defined and a framework capturing the relationships between them to be produced (Figure 3 and Table 3). Strengths, weaknesses, barriers and enablers to the resource allocation process were identified, as well as examples of criteria used by different decision-making groups, the types and sources of data used in evaluation, and differences in the decision-making processes and information needs of medical, nursing, allied health and management/support groups (Tables 4-7).

The term 'disinvestment' was generally unfamiliar to local decision-makers; but the concept was readily understood and projects involving removal, reduction or restriction of current practices or reallocation of resources were easily identified [14]. At Monash Health, these activities were initiated by quality and safety issues, evidence-based practice (EBP), or a need to find resource savings, and not by a primary aim 'to disinvest' [14].

Figure 3. Framework for the resource allocation process in a local health service





Reproduced with permission from SHARE Paper 3 [14]

COMPONENTS	STRUCTURE (Who, What)	PRACTICE (How)
 Governance Administration 	 Overseers Policies for decision-making Transparency and accountability in all structures Requirements for addressing conflict of interest* Requirements for monitoring, evaluation and improvement of systems and processes Requirements for reporting Administrators Requirements for administration Relationships and coordination Communication 	 Oversight Procedures, guidelines, protocols for decision-making Transparency and accountability in all practices Methods of addressing conflict of interest Methods of monitoring, evaluation and improvement of systems and processes Methods of reporting Methods of administration, coordination, communication and collaboration
3. Stakeholder engagement	 Clinicians, Managers, Consumers, Technical experts, Funders, other relevant parties Requirements for stakeholder engagement 	 Methods of identification, recruitment and engagement
4. Resources	 Funding sources Allocation of staff Access to experts or ways to gain expertise Information sources Requirements for resources 	 Provision of appropriate and adequate funding, time, skills/training, information Utilisation of resources
5. Decision-making	 Decision-makers Clinicians Authorised individuals Authorised groups Scope of decisions Type of decisions Requirements for decision-making 	 Methods of decision-making Identification of need/application Decision criteria Ascertainment and use of evidence Reminders and prompts to consider disinvestment Deliberative process Documentation and dissemination
6. Implementation	 Purchasers Requirements for purchasing Policy and guidance developers Requirements for policies and guidance documents Implementers Requirements for implementation 	 Methods of purchasing Methods of policy and guidance development Methods of project management Methods of change management
7. Evaluation	 Evaluators Requirements for evaluation Type and source of data collected 	 Methods of evaluation
8. (Reinvestment)	Requirements for reinvestment/reallocation	Methods of reinvestment/reallocation
*Requirement is used	in the sense of performance stipulated in accordance with p	olicies, regulations, standards or similar rules or obligations

Table 4. Strengths, weaknesses, barriers and enablers in decision-making for resource allocation

Reproduced with permission from SHARE Paper 3 [14]

Factors identified in response to a specific question about barriers and enablers are noted in italics

STRENGTHS/ENABLERS	WEAKNESSES/BARRIERS
External environment	
 General Good relationships with external agencies such as Australian Council of Healthcare Standards, Victorian Department of Human Services (DHS) Projects initiated by external organisations such as Australian Quality Council, NSW Therapeutics Advisory Group and Clinical Excellence Commission Legislation, regulations, national and international standards, and professional standards must be 	Some decision-makers are unaware of mandatory requirements
followed. This provides clarity and certainty for some decisions.	
 International International bodies and national agencies of other countries provide evidence-based recommendations for use of health technologies, clinical practices, models of care, etc. Systematic reviews and Health Technology Assessments are also available. 	 Decision-makers are frequently unaware of these resources. Due to lack of time, knowledge and skills decision-makers do not actively seek these resources when making decisions and do not differentiate between high and low quality resources. Cost-effectiveness data is often based on modelling which is perceived not to reflect reality
 National The Medical Services Advisory Committee and Pharmaceutical Benefits Advisory Committee provide evidence-based recommendations for use of medical and surgical procedures and drugs. 	 Not all medical and surgical procedures and drugs are covered by these processes. Nursing and allied health practices, models of care and clinical consumables are not covered.
 State Guidance for introduction of new health technologies and clinical practices (TCPs) is provided by DHS. This includes reporting requirements. Monash Health has developed tools to implement these processes. DHS has recommended these tools to other health services. Monash Health Decision Summaries are published on the health service website. 	 DHS requirements and processes are cumbersome There is no sharing of information or decisions. Individual health services duplicate the process of finding and appraising relevant evidence, developing business cases, etc. DHS declined to coordinate sharing of information through a central database or website.
 The Victorian Policy Advisory Committee on Technology (VPACT) has an annual funding round for introduction of new high cost TCPs 	 There is no long term state-wide strategic planning for equipment purchases Lack of coordination of equipment use and procurement at state level and no communication between health networks.
 Some guidance for purchasing is provided through the Victorian Government Purchasing Guidelines, Medical Equipment Asset Management Framework (MEAMF), Targeted Equipment Replacement Program (TERP) and Health Purchasing Victoria (HPV). HPV is responsible for bulk purchasing of pharmaceuticals, clinical equipment and consumables to streamline ordering and reduce costs. If the item required is in the HPV catalogue the specified brand 	 HPV catalogue only covers 30% of Monash Health consumables Inclusion of items in the HPV catalogue is not always based on a rigorous evidence-based process Safer, more effective or more cost-effective alternatives may not be included in the catalogue HPV does not cover large items so MEAMF and TERP have no benefits from bulk purchasing and hospitals have to negotiate their own arrangements with suppliers
 must be purchased from the designated suppliers at the cost and conditions noted. The processes are transparent and accountability is clear. 	 Decision-makers do not know which of these multiple systems are relevant to a particular situation Terminology differs between systems and they are difficult to navigate
 The Victorian Aids and Equipment Program is administered by Monash Health on behalf of the DHS. The application process is standardised based on tight explicit criteria for transparency and accountability. 	 This is a 'last resort' process after other sources of funding have been exhausted. Clinicians waste valuable time writing funding applications for multiple programs which could be integrated and allocated centrally.
 The Department of Treasury is interested in supporting disinvestment initiatives but requires details of savings. If savings or reinvestments can be quantified the department may provide more funding. 	It is hard to measure the savingsThe savings are rarely realised because they are absorbed and used to treat more patients

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authorisation was required.		Individual decision-makers did not always know who to report a decision to and whether formal
		authorisation was required.

Conflict of interest	
• Conflict of Interest required as a standing item on the agendas of relevant committees. Ten of 13	 Only one committee, the Technology/Clinical Practice Committee (TCPC), considered the effect of
committees interviewed had a process for conflict of interest for committee members, and two of	conflict of interest in the provision of evidence used in decision-making
the four committees with an application process had a similar procedure for applicants.	
Monitoring, evaluation and improvement of systems and processes	
 Quality improvement of systems and processes was supported by respondents 	 No formal requirements for quality improvement of decision-making at Monash Health
• Only one committee (TCPC) had an ongoing process of monitoring, evaluation and improvement of	• At the program level it was noted that 'since there was no formal decision-making process there was
its systems and processes, however some committees had undergone a single evaluation/review and	no process of review'.
some were developing or planning to develop quality improvement processes.	
• Committees that authorise or support decisions made by other committees expected that a rigorous	No system to check or regulate this
process of decision-making and prioritisation had occurred	
Reporting	The structure and process of reporting varied with site, department/unit and health professional
 Quality Unit chart of committees related to quality and safety included lines of reporting 	group making the decisions across and between sites, programs, units, etc difficult
Most committees had reporting requirements included in their Terms of Reference	No systematic or documented process for reporting of projects
Monash Health environment: Administration	
Relationships, coordination, collaboration and communication	Lack of knowledge and awareness about
Knowing who to go to for information	• decision-making systems and processes and where to go to find out about them
Knowing who to go to for support	• information sources and tools and where to go to find them
 Networks within the organisation, particularly nursing 	Lack of information regarding how the system works and what processes need to be followed
Quality and Risk Managers are good at sharing information across the organisation	Lack of central resource/identified role to provide information about committees
 Good communication at site level (nursing) 	Lack of organisational processes for knowledge transfer
Robust and regular communication	Lack of coordination and collaboration between decision-making individuals and groups
	Lack of communication about decisions between programs, departments and other stakeholders
	Lack of communication about impending decisions and projects to enable stakeholder input
 Quality Unit chart of committees included relationships (but only for reporting purposes). 	Lack of awareness of other committees within Monash Health
Some committees recognised the overlap in their work and the potential to work together. These	 Other than reporting, there were no documented relationships between committees
were in two groups, those considering introduction of new TCPs and those involved in purchasing.	 Other than the committees considering new TCPs, there were no formal processes of referral for
People who were members of more than one committee often provided the links between them.	issues that might affect, or should be addressed by, other committees
There were many examples of cross-unit/department consultation and collaboration for policy and	Decision-making 'in isolation' was noted to be a problem in multiple settings. 'Fragmentation' and a
protocol development and implementation.	'silo mentality' were used in relation to decisions made without consideration of the areas they will
Four projects were linked to others with similar aims	impact upon or consultation with relevant stakeholders.
	No systematic processes to link projects across the organisation
Monash Health environment: Stakeholder engagement	
Involvement of broad range of stakeholders from multiple sites and a range of health professional	Lack of consultation with clinicians in decisions made by managers
disciplines	 Lack of consideration of impact of change on others when making decisions or planning projects
• Reported benefits of broad stakeholder involvement in decision-making included improved decision-	• Lack of consideration of downstream or lateral impacts eq 'cost saving measures in one area can
making, more effective dissemination of decisions and informing and encouraging others about the	result in increased costs in another area'
need to consult with the groups represented	Limited input from the Quality and the Education Units
Many respondents supported increased consumer participation and were planning to act upon this	 Only one committee (TCPC) included consumer representation in decision-making.
	Several respondents thought that consumer representation on their committees would be
	inappropriate or that consumers had insufficient technical understanding to participate.

Monash Health environment: Resources		
 Funding and staff time Provision of extra staff Availability of extra funds enhanced implementation and evaluation, eg introduction of the National Inpatients Medication Chart had external funding specifically for implementation and evaluation Some clinical pathways involve no additional costs 	 Lack of/inadequate funding resulted in lack of/inadequate administration lack of/inadequate evaluation and research compromised building cost estimates, hindering capacity to house/operate equipment properly Funding for new equipment frequently did not include funding for training staff to use it or the consumables required. Lack of information about available funding Staff dissatisfaction with the expectation of their superiors that they will do more work within existing resources Insufficient allocation of staff time impairs research and preparation for decisions implementation and evaluation of decisions project delivery training 	
 Some committees had a Secretariat comprised of 1-2 officers from named roles within the organisation. These positions were allocated sufficient time to complete the required tasks. Some projects were provided with adequate resources for implementation and evaluation Some wards had additional staffing for education support and clinical nurse support. These were invaluable resources for practice change, protocol development and implementation. Some projects had external funding from DHS, universities, etc for staff or infrastructure costs 	 Some committees used the Personal Assistant of the committee Chair in an administrative role. If a new Chair did not have a personal assistant there would be no resources to support the committee. Some respondents found it difficult to separate the role of the committee from the role of their department. Committee work significantly increased their overall workload, particularly administrative matters, and it was not always clear if these duties were part of, or additional to, their normal duties and what they could cut back in order to accommodate committee obligations. Many projects were to be carried out 'within existing resources'. Respondents noted that they either did unpaid overtime or aspects of the project were not undertaken. 	
Expertise and Training	 Lack of/inadequate skills in use of information technology finding and appraising evidence from research and data project management change management 	
 Staff in the Centre for Clinical Effectiveness (CCE) and Clinical Information Management (CIM) were available to decision-makers to provide expertise in research evidence and local data respectively. CCE ran training programs in finding and using evidence, implementation and evaluation Six of 10 projects had training for project staff in change management, leadership or IT skills. 	 CCE's funding for training was redirected due to budget cuts so it was unable to provide free in-house programs (however many staff attended the fee-paying courses CCE provided) Lack of understanding of information systems and project management in senior decision-makers was reported and training for committee members was suggested Most projects used a staff member from the department involved to deliver the project; most of these did not have project skills or expertise. Education and training is not well provided for part-time and night staff 	
Information Provision of extra computers 	 Lack of computers and/or access to computers, particularly for nurses Difficulties using intranet to find organisational data 	
 CCE and CIM were available to provide information to decision-makers Monash Health libraries provided access to health databases and electronic journals, as well as advice in searching the health literature 	 Lack of research evidence and local data to inform decisions Many decision-makers chose not to use these sources of information Priority was given to senior decision-makers and high level decisions; sometimes decisions at lower levels could not be provided with information due to limited resources 	

Decision-makers	
 Broad committee membership 	Clinical autonomy
 Dedication of committee members 	 High workload in running a committee with lack of administrative staff
 Depth and range of experience of committee members 	 Difficulty taking off 'clinician hat' and replacing it with 'manager or decision-maker hat'
Proactive clinicians who think about improving and moving forward	
 High level of skill within medical staff acting as leaders in their specialties 	
 Committee membership included a range of relevant stakeholders (except consumers) invited to 	• Some clinicians feel that if they are experts in a particular area they should not have to justify
participate because of their role in the organisation or their knowledge and skills in relevant areas.	operational decisions
Potential adopters	
• Having the appropriate profession engaging others in change process, for example nurses should be	 Resistance to change
implementing projects with nurses, not pharmacists.	 Staff cynicism about the importance of changes and relevance to them
	 Some clinicians insist on autonomy in their areas of expertise
Decision-making process	
Identification of need/application	 General perceptions that
 Decisions were instigated by 'top down' direction and 'bottom up' invitation. 	 financial drivers were stronger than clinical drivers
	 impetus for change was ad hoc, there was no systematic or proactive approach
	internal bureaucracy and red tape stifled ideas
 Some committees had a well-documented application process. 	 Complex and time consuming nature of application processes
	People by-pass the system, usually not deliberate but due to lack of awareness of the process
	 Some applications are driven by pharmaceutical or equipment manufacturers
Decision criteria	 Only one committee (TCPC) and one individual used explicit, documented decision-making criteria.
 Documenting explicit criteria was generally viewed positively. 	 Some committees had no decision-making criteria.
The committees with application forms had some documentation of criteria.	 Some individual decision-makers strongly rejected documentation of explicit criteria as 'another form
Other decision-making groups and individuals had 'mental checklists' of criteria they considered.	of paperwork that will waste clinician's time'.
 Most committees considered the Monash Health Strategic Plan, quality, safety, access and equity. 	Organisational priorities dominated eg
 All committees considered financial factors. 	'Sound practice is not always affordable practice'
	• 'The operational aspects of nursing (Key performance indicators that are reported to DHS) come
	first and professional aspects comes second'
	 There was a perception that there was 'too much emphasis on financial return for investment'
Ascertainment and use of evidence	Amount of time needed to search the literature or collect data
 Strong knowledge of the literature 	 Access to evidence is not easy or coordinated
 Attendance at conferences 	• Lag time between what universities teach and latest research evidence so new staff are not always
 Using research evidence and local data in decision making was considered to be important. 	aware of best practice
All respondents reported using research evidence and data in decision-making to some extent.	 Drug company marketing
 Most committees sought a broad membership in order to utilise expertise in the consideration of 	• Only one committee (TCPC) required explicit inclusion of research and local data and considered the
research evidence and for decision-making with limited evidence.	quality and applicability of this evidence. Only one of the projects appraised the evidence used.
Four out of ten projects sought research evidence from the literature to inform the project.	• The other committees had no process to seek evidence from research. When evidence from research
	and data was used it was not usually appraised for quality or applicability.
	 Due to difficulty finding uninterrupted blocks of time, slow computers and lack of skills in finding and
	analysing evidence, decision-makers relied on clinical expertise and advice from colleagues.
	Appropriate local data was frequently reported to be lacking, unavailable and 'manipulated'.

Reminders and prompts to consider disinvestment	
• One application form (TCPC) had an explicit question about what the new technology will replace	• (It's all you well to ask the question but it's you hard to get a clinician to say they will stop doing
and what can be disinvested	comothing'
	Sometining .
Behust and kenest conversations	 Process not seen as priority for some Come committee members do not attend
Kobist and honest conversations	Some committee members do not attend
 Autonomous decision-making Desision making decision for a decision for a decision and an access 	Meetings too short for proper deliberation
Decision-makers expressed a desire for a documented standard process.	 Some decisions made reactively, on the run , due to lack of consultation or not joilowing process Long lag time between application and decision
 Many respondents noted that the main goal of discussion was to reach decisions by consensus. 	 Long log time between application and decision Lack of standardised process
	• Many of the current processes were perceived to be unclear, 'ad hoc' and lacking objectivity
	 Lobbying, both covert 'behind the scenes' and overt 'squeaky wheels', was perceived to result in favourable decisions.
Most committees required not only the presence of a quorum to make decisions but also attendance	• Not all committees had a defined quorum. Of those that did, some made decisions in the absence of
of members with relevant knowledge or expertise to the decision at hand	a quorum and some made decisions even if a meeting was cancelled due to lack of a quorum
	Some decisions were made outside committee meetings or by the Chair only
Documentation and dissemination	Large size, nature and diversity of the organisation increases
 One committee (TCPC) published Decision Summaries which were formally distributed to the 	difficulty in dissemination of information
Therapeutics Committee, EMT, DHS, the Applicant, Department Head and Program Head and made	 frequency and range of communication methods required
publicly available on the internet.	 Not everyone uses email
 Most committees recorded minutes; these were considered to be confidential and were not 	 Using email too often dilutes the effect
published, but were available to appropriate requestors by contacting the committee secretariat	The majority of committees did not publish minutes or anything similar.
• All of the individual decision-makers interviewed reported disseminating decisions to people they	 One committee did not keep any records.
considered appropriate and, when deemed necessary, disseminating decisions organisation-wide.	 Although some related committees exchanged minutes there was a lack of formal communication
 Many respondents reported others disseminating decisions to them. 	across committees.
	 Documentation and dissemination of decisions made by individuals was informal and ad hoc.
	 Not all projects communicated decisions to other staff members or the wider organisation. Unless
	people were directly involved, some projects appeared not to make project work or associated
	decisions public knowledge.
	 Lack of processes for knowledge transfer, especially across sites.
Implementation	
Purchasing	
Robust organisational processes that met annual audit requirements	Use of evidence in purchasing decisions was not outlined in the Purchasing Policy Guidelines.
 Electronic ordering was controlled through an approval hierarchy with delegation thresholds. 	Those making the decision of 'whether to buy' were responsible for ascertaining evidence of safety,
It was assumed that the decision to purchase was made with due process before reaching the	effectiveness and cost-effectiveness in the first stage; however there was no system to check that
purchasing unit.	this has been done before the second stage.
Health Technology Services, the Product Evaluation Committee and working parties set up to	 Difficulty managing expectations eg 'once something is approved people want it immediately'
evaluate large individual capital purchases considered appropriateness of equipment to Monash	 Some were unaware of this process and went directly to the manufacturer. If this was overseas it
Health, availability of spare parts, life expectancy, servicing requirements, related consumables,	may be difficult or expensive to get parts, there may not be relevant skills for local maintenance and
availability of technical expertise and fit with the DHS Asset Management Framework. They also had	It excludes benefits that may already exist with a local manufacturer that could supply the same
expertise in contract negotiation.	product under better terms and conditions. Re-negotiating contracts, or establishing new ones,
Descharting of elizited encourse black within herebeats elizeration is chose electron. 1. U. Elizited encourse black within the electron is chose electron. 1. U. Elizited encourse black within the electron is chose electron. 1. U. Elizited encourse black within the electron is chose electron. 1. U. Elizited encourse black within the electron is chose electron. 1. U. Elizited encourse black within the electron is chose electron. 1. U. Elizited encourse black within the electron is chose electron. 1. U. Elizited encourse black within the electron is chose electron. 1. U. Elizited encourse black within the electron is chose electron. 1. U. Elizited encourse black within the electron is chose electron. 1. U. Elizited encourse electron is chose electron. 1. U. Elizited encourse electron is chose	creates bao reeling and wastes lots of time.
Purchasing of clinical consumables within budget allocation is done electronically. Electronic authorization is non-vised for items of our individual limits (or Nume Linit Manager Electronic)	Inere is little assessment of safety, effectiveness or cost-effectiveness of clinical consumable items
authorisation is required for items above individual limits (eg Nurse Unit Manager approval up to	
\$10,000, items above this require authorisation)	

Policy and guidance	 Lack of structure and standardisation of processes, especially between sites
Monash Health was developing a new Policy and Procedure Framework	
 Broad support for increased standardisation of practice through policies and procedures 	
Development process seen as a communication tool between professional groups and across sites	
Implementers	• Some project staff felt isolated and would have liked support from others who had done the same or
 Finding others who have done the same work for support, advice and information 	similar work
 Establishing Working Parties and Steering Committees for support, endorsement, troubleshooting 	It was not always clear who was responsible for project management
Project leader whose primary role is 'at the coal face'	Lack of/inadequate project management and communication resulted in multiple people
 Decisions made at program level that involve multiple wards, departments or sites are usually 	making inconsistent changes
implemented by multidisciplinary teams	 contacting equipment vendors with requests and ideas for change
Practice change	 Unrealistic project timelines
At site level there is good 'buy-in' for change and people are keen to make things work (nursing)	 Variability in current practice and lack of standardisation increases number of practices to change
 Allowing wards to nominate themselves for participation in projects 	• Large size, nature and diversity of the organisation increases complexity of implementation across
• 'Bottom up' approach to develop individual implementation plan in each ward	departments with different needs
 'Bottom up' training to gain staff 'buy in' combined with 'top down' supportive strategy 	 Lack of effective implementation pathways
 Flexible and adaptable staff 	Things take a long time to implement, to the point that they 'fall off the agenda'
 Lots of preparation including training and communication with all stakeholders 	Staffing issues, including leave, mean that a lot of projects are on hold
 Use of pre-existing (and pre-tested) tools from other organisations 	 Project-specific barriers such as logistical challenges with product being implemented
Some committees provide an approval process only and the applicant is responsible for	Sometimes practice change is required beyond the applicant and their department. Committees do
implementing the decision. In most cases the applicant has control over the process (eg head of	not require applicants to have or acquire knowledge and skills in implementation.
department implementing a new procedure) and is motivated to implement the change	
Training and education activities and 'champions' were reported as the two key strategies used to	Lack of knowledge and skills in project management, change management and use of information
effect change and encourage sustainability of the intervention.	technology were exacerbated when interventions were complex and required high levels of training
Most projects had a champion and/or Executive sponsor. Project champions were generally the head	Lack of known, standardised processes for implementation at Monash Health
of the relevant department; others included the Chief Executive Officer, Executive Directors who	
were Steering Committee Chairs and 'Ward Champions' selected to encourage and promote change.	
• Those with champions unanimously considered champions important to the success of the project.	
Training or education included passive methods using posters and memos, interactive learning on	
new equipment and participatory approaches involving staff in design and implementation.	
Seven projects involved training for the target group, most of which was done by external providers	
of new equipment.	
 Most considered their project sustainable and believed the change was embedded in the system. This 	 Only two considered sustainability in the design of the project.
was reportedly achieved by involving a variety of staff and 'bottom-up' approaches to change.	
 Half of the projects tailored the implementation plan to anticipated barriers and enablers sourced 	One project had no implementation plan
from other health services, literature searches and personal experiences of project staff.	 Half of the projects did not consider barriers and enablers
Half reported that implementation was conducted as planned. Some noted that it mostly went to	
plan but 'amendments were made continually to improve the process'.	
The benefit of the proposed practice change is clear and observable	Lack of baseline data meant that potential adopters were unable to see the benefit or relevance to
	their situation resulting in less 'buy in' and poor uptake.

Evaluation of outcomes of decisions	
General	• Quality and Risk Managers are not included at the beginning to help with collection of baseline data
 Use of pre-existing (and pre-tested) tools from other organisations eg audit tools 	and evaluation design
Evaluation and monitoring were considered important and had broad support	Lack of baseline data
 Monitoring of projects after implementation was thought to increase sustainability 	• A lack of data was seen to contribute to the current state of 'little or no process of evaluation'.
	Limited funds, knowledge and/or skills inhibited both the planning and conduct of evaluation.
Evaluators	
 CCE was establishing an in-house Evaluation Service at the time of these interviews. 	 No specified evaluators with appropriate training or expertise had been utilised by the respondents
Requirements for evaluation	
 Monitoring, evaluation and reporting of outcomes was required by DHS sponsored projects and 	 Monash Health had no requirements for evaluation of outcomes of decisions or projects.
TCPC. The Therapeutics Committee requested reports for some decisions.	 Most committees had no planned evaluation of outcomes of decisions or implementation projects.
 Routine clinical audits and monitoring of adverse events undertaken for hospital accreditation 	• The purpose of reports for TCPC and Therapeutics was questioned by some respondents who noted
purposes provided indirect evaluation of decisions in some situations.	that it may be inconsistent with the knowledge needed for program staff.
 Half of the completed projects had been evaluated; all but one project reported achieving its planned 	 Only 2 projects planned evaluation as a project component. Some were evaluated post hoc.
objectives.	
Reinvestment	
 Reinvestment or reallocation of resources would be an incentive to disinvestment 	 Lack of planning for resource reallocation
 SHARE Steering Committee keen to establish and support methods for reinvestment/reallocation 	 Lack of transparency and consultation in reallocation of savings creates disillusionment
• Flexibility and thinking laterally to include novel methods/indicators such as reducing waiting lists,	 Staff dissatisfaction that savings generated are not reallocated
getting patients out of Emergency Department faster, freeing up time in procedural/operating suites,	A health economist is required to do this properly, Monash Health had no resources for this
freeing up bed days that are used to treat another patient group faster (eg X procedure saved y\$/bed	• 'We don't look far enough for downstream effects; we're too simplistic in assessment of savings'.
days which was used by z patients).	It was noted that savings made in a project in one area sometimes increased costs in other areas;
	hence reallocation of the savings to the project department would be unfair.
	 Savings of bed days or time in procedural/operating suites were used immediately to treat another
	patient group so were never realised
	• Accounting practices did not enable measurement and/or reallocation of savings in some areas, for
	example changes to one TCP may affect multiple cost centres eg department, ward, ICU, pharmacy

Table 5. Examples of criteria for resource allocation decisions

WHETHER TO BUY			WHAT, WHERE AND HOW TO BUY			
Organisation-wide Committee	Program Committee	Department	Individual decision- makers	Approved Purchasing Units	Organisation-wide Committee	Department
Introduction of new health technologies and clinical practices	Purchase of capital equipment	Purchase of capital equipment	Determination of clinical practices and purchase of clinical equipment	General purchasing	Purchase of clinical consumables	Purchase of pharmaceuticals
Explicit criteria required for decision-making	Criteria 'usually' considered A weighted ranking is used for prioritisation	Theoretical 'ideal' criteria developed in workshop (different to criteria used in current practice)	Criteria 'usually' considered	Criteria 'usually' considered	Criteria 'usually' considered	Criteria 'usually' considered
 Conflict of interest (Applicant and Committee members) Evidence of safety, effectiveness and cost- effectiveness (quality of evidence, size of effect and applicability addressed) Cost Clinical feasibility (resource implications, training, credentialing and competency assurance addressed) Access and equity Legal and ethical implications Suitable patient information brochure 	 Equipment serviceability and impact Clinical risk Occupational Health and Safety risk Accreditation and regulatory requirements Strategic importance to Monash Health Savings in operational cost and/or ability to generate funds Improved access 	 Workload management Clinical evidence Patient benefit Need Prioritisation of patient groups Waiting list Benchmarking Replacement for obsolescence Staff capacity Allocated budget Ongoing costs Funding opportunities Financial benefit to health service Multi-use of expensive capital State-wide planning and coordination Impact on other areas 	 Quality and safety/clinical risk Reducing complications Ease of use Staff capacity Cost/cost effectiveness Consumer demand Delivery time of machines Brand changes (implications for spare parts, training, etc) Training needs of staff and consumers Quality of care 	All APU purchase decisions are made with commercial/financial consideration including Price Cost-effectiveness Improved supply chain efficiencies Other factors considered Clinical need Legal issues including Health Purchasing Victoria contract requirements	 Price Australian standards and regulations for quality and safety Infection control/ Occupational Health and Safety standards Serviceability Business administration such as supply chain and logistics Meets organisation's clinical emphasis and infrastructure requirements Clinical acceptability and effectiveness 	 Labelling Quality Price Pharmaceutical Benefit Scheme status Acceptance

Table 6. Examples of types and sources of evaluation data used by committees

Reproduced with permission from SHARE Paper 3 [14]

Process (implementation) and Impact (practice change)

- Progress Reports for new TCPs including number of patients treated, number waiting, new referrals (6 monthly)
- Medication safety audits (twice yearly)
- Continual Review Evaluation through Australian Council of Healthcare Standards Guide (dates in Nursing Strategic Plan)
- Established surveillance mechanisms of transfusion practices (ongoing)
- Audits of transfusion practice (random, on behalf of Department of Human Services)
- Incident reports (as they arise, documented in Riskman software)

Practitioner outcomes

- Survey/interview data including user satisfaction and comments (after project implementation)
- Clinical practice audits (quarterly)
- Incident reports (as they arise, documented in Riskman software)

Patient outcomes

- Progress Reports for new TCPs including patient outcomes and adverse events (6 monthly)
- Reports of adverse events related to new TCPs (at the time of occurrence)
- Infection Control surveillance mechanisms (ongoing)
- Incident reports (as they arise, documented in Riskman software)

Economic outcomes

- Clinical Information Management databases of routinely-collected data used to assess
 - Cost of falls and falls-related injuries (as required)
 - Cost of increased length of stay (as required)
 - Costs of products (as required)
 - Costs of procedures (as required)

System outcomes

- Applications for new TCPs including anticipated implications of new TCP on other areas such as intensive care or pharmacy
- Reports of 2 year review after introduction of new TCP including actual implications of new TCP on other areas

Table 7. Differences in decision-making between health professional groups

Decision-making processes (Reproduced with permission from SHARE Paper 3 [14])

There were notable differences in the decision-making practices of the doctors and nurses interviewed.

There were more levels of accountability and pathways for operational and clinical support and oversight of nursing decisions compared to medical decisions. Nursing staff reported a hierarchy of decision-making and reporting within the program, the site and the organisation. In the clinical program selected, the Medical Program Director gave the medical department heads sole accountability for their decisions as he considered they were the most senior experts in their specialty areas.

Nurses reported making more decisions about changing policies and procedures and fewer decisions regarding large equipment purchases; doctors reported the reverse.

For the individual decision-makers, there was a general feeling among medical interviewees that decisions were made in the best possible way without the use of consistent, explicit, documented criteria and that efforts within the organisation to introduce this encountered resistance. Conversely, some nursing staff welcomed the use of documented criteria for the potential benefits of increasing transparency, standardising practice, decreasing the unintended consequences of some decisions and reducing adverse events.

While research evidence and local data were valued in decision-making for both groups, nursing staff reported the use of local data more often than medical staff. Medical staff noted the use of research evidence in guiding decisions more often than nurses, and also commented on the shortage of research evidence in many of their specialty areas.

Information needs (Reproduced with permission from SHARE Paper 7 [15])

The surveys found that medical staff used systematic reviews and original research, and accessed health databases and the Cochrane Library, more often than nurses. They also had higher levels of confidence for all aspects of finding, appraising and using evidence in decisions. Allied health staff came somewhere between the two for most findings. These findings are consistent with others [16, 17], but also in contrast to the review by Younger (2010) who found no significant differences [18].

When selecting a preferred format for education in searching for, accessing and appraising evidence medical staff preferred self-paced online tutorials, nurses interactive workshops (eg ½ to 1 day), allied health staff short courses (eg 2-3 days) and the management/support staff had equal preference for lecture series (eg 1 hour per week for 10 weeks) and interactive workshops. The preferred formats for education in implementation of change were slightly different with medical staff still choosing self-paced online tutorials but nursing, allied health and other staff all preferring interactive workshops.

Consumer engagement was acknowledged as integral to the proposed program; however there was a lack of guidance about systematic approaches to identify, capture and incorporate consumer perspectives into resource allocation decision-making, implementation and evaluation [19]. Several consistent messages for consumer engagement relevant to this context emerged from the literature and local research. Two concepts were identified by the consumer participants but were not found in the literature: sources of information regarding consumer values and perspectives in publications and locally-collected data and methods to use them in health service decision-making and the need for mechanisms within health services to receive and act upon consumer-initiated contributions. A model bringing these elements together was developed to integrate consumer values and preferences into organisation-wide decision-making for resource allocation. Definitions of the terms used in the model were included. (Figure 4 and Tables 8-11) [19].

Figure 4. Model for integrating consumer values and preferences into the resource allocation process

Reproduced with permission from SHARE Paper 4 [19]

SCOPE PRINCIPLES · Corporate, Clinical, Research · Follow guidance in relevant handbooks, toolkits or guidelines for consumer engagement · Organisation, Program, Site, Department, Unit, Ward Use a combination of engagement techniques; select methods to suit the type of · Continuum of decisions from investment to disinvestment decision being made, the context and who will be affected Routine, reactive and proactive decisions Develop clear and specific aims, objectives and outcomes for all consumerrelated activities PRECONDITIONS · Evaluate all engagement processes, report findings and utilise outcomes for · Organisational commitment to consumer involvement continuous improvement · Willingness to share power in decision-making · Provide consumers with as much technical and topic-specific information as · Culture of mutual trust and respect possible · Consumer input is valued and considered

· Inform consumers in advance about how their contributions will be used and provide them with feedback afterwards about the outcomes

Imparting or excha

Accountability for the consumer engagement process

COMPONENTS

OF RESOURCE

ALLOCATION

PROCESS

USE OF CONSUMER

EVIDENCE

Consumer

perspectives found in

nublications and

ACTIVITIES

Including consumers and community members in health service activities					
Communication Consultation		Participation			
parting or exchanging information	Seeking consumer and community views	Meaningful involvement of consumers and community members in health service decision-making processes			

CONSUMER ENGAGEMENT

				data sources
To consumers Communicate with consumers to advise them of decisions and	Consult with consumers to seek their opinions and advice	Develop policies and procedures Determine requirements and methods for consumer involvement and reimbursement, monitoring and evaluation of the processes	GOVERNANCE	Use consumer evidence to drive and/or inform decisions
outcomes Examples include reports, press releases, websites,	Examples include public meetings, opinion polls.	Develop methods for identifying and recruiting consumers, implementing communication strategies, and establishing relationships	ADMINISTRATION	Examples include: • Research literature
Methods and target audience will depend on the nature and context of the information	healthcare forums, consumer reference groups, focus groups, surveys and feedback forms, social media	Determine requirements to support consumer- related activities such as reimbursement and access to translations and translators Establish access to sources of consumer information Train staff and consumers regarding inclusion of consumers in decision-making processes	RESOURCES	 Consumer publications Routinely- collected data Purposefully- collected data
From consumersMethods and targetEstablish mechanismsaudience willand designate staff todepend on theaccept and act uponnature and contextconsumer-initiatedof the issue under		Embed consumer representation in decision- making infrastructure such as committees, working parties, guideline and protocol development groups	DECISION-MAKING	(new/existing)
contributions, feedback and suggestions	consideration	Embed consumer representation in project teams, steering committees and working groups. Determine consumer-relevant implementation strategies and evaluation measures	IMPLEMENTATION EVALUATION (REINVESTMENT)	

Table 8. Examples of consumer-related activities generating proactive decisions to drive change

Reproduced with permission from SHARE Paper 4 [19]

Research	Regularly scanning published research evidence such as reviews by the Cochrane Consumer and Communication Group or publications from relevant consumer agencies for applicability to the local context and comparing the findings with current practice to determine whether there is a need for change			
Data	Actively exploring local sources of routinely-collected data such as complaints registers or patient satisfaction surveys for trends or emerging themes that identify opportunities for improvement			
Engagement	(Communication) Establishing mechanisms to encourage, accept and act upon consumer-initiated feedback			
	(Consultation) Seeking regular consumer feedback to initiate change in targeted areas, for example:			
	 Topics that are important to patients such as pain management and early discharge 			
	 Topics that are important to the health service such as cost containment of high volume or high cost procedures where consumer priorities may inform selection of suitable alternatives 			
	 Big problems for patients and health services such as falls and medical mishaps 			
	 Patients with high usage of health services such as those on renal dialysis 			
	 Patients interacting with areas of the health service undergoing frequent or significant change 			
	 Patients with cultural, ethnic or language differences that require additional resources 			

Table 9. Examples of routinely-collected consumer data

Reproduced with permission from SHARE Paper 4 [19]

SATISFACTION SURVEYS

Victorian Patient Satisfaction Monitor (VPSM) is a state-wide survey that selects respondents at random; users are sent a unique ID to complete the survey by invitation only.

The Victorian Healthcare Experience Survey (VHES) is a state-wide survey that allows a wide range of people to provide feedback on their experiences and features specialised questionnaires for adult and child inpatients and emergency department attendees, including parents/ guardians, and maternity clients. Surveys are distributed in the month following the admission or attendance. People may respond either online or on paper with a freepost return. Surveys are available in English and a range of community languages.

COMPLAINTS, COMPLIMENTS, COMMENTS

Monash Health

Complaints, compliments and comments can be made by completing an online form, mailing a printable version of the form, or in person by phone. Complaints are dealt with by the Consumer Liaison Officer on each campus. Details are kept by the Quality Unit.

The Office of the Health Services Commissioner (OHSC)

Complainants can also correspond directly with the OHSC.

The OHSC's role is to receive, investigate and resolve complaints from users of health services, to support healthcare services in providing quality healthcare and to assist them in resolving complaints. The legislation also requires that information gained from complaints be used to improve the standards of healthcare and prevent breaches of these standards.

This information was the subject of the first study of its kind in Australia in 2014 leading to recommendations for change. The report is available at http://docs.health.vic.gov.au/docs/doc/Study-of-people-lodging-a-complaint-with-the-Victorian-Health-Services-Commissioner

OTHER

Individual health services and state health departments conduct service reviews, audits and other studies that include patient and consumer information

Table 10. Examples of publications with consumer information

Reproduced with permission from SHARE Paper 4 [19]

CONSUMER HEALTH JOURNALS

Health Voices – Journal of the Consumers Health Forum of Australia is published two times a year to promote debate on health care issues affecting all Australians and of interest to health consumers, government and industry. <u>https://www.chf.org.au/health-voices.php</u>

The Australian Health Consumer was the official journal of the Consumers Health Forum of Australia from 2001 to 2007. It provided a consumer-focused appraisal of the current and ongoing major health issues of the day in the state, national and international health sector. https://www.chf.org.au/australian-health-consumer.php

The Patient: Patient-Centered Outcomes Research is the only journal that aims exclusively to examine the needs, values and role of the patient in an increasingly complex healthcare landscape in which funding and decision-making require ever-greater awareness of the patient's perspective. The journal deals with the full range of patient-centered studies, reviews and commentary ranging through techniques such as conjoint analysis, patient reported outcomes, studies on compliance and satisfaction through to patient-directed health plans and patient literacy. <u>http://www.springer.com/adis/journal/40271</u>

Patient Intelligence is an international, peer reviewed, open access journal that characterizes and measures the central role of patient behavior and intention in optimizing healthcare management in all areas of disease and complaint types. An improved understanding of patient intelligence coupled with predictive analysis helps an organization contribute more effectively to achieving better outcomes. The journal is characterized by the rapid reporting of reviews, original research, methodologies, analytics, modeling, clinical studies and patient surveys across all disease areas. Specific topics covered in the journal include: Patient and healthcare literacy, Patient information and healthcare professional communication/interaction, Patient behavior, attitude and trends, Behavior management programs, Quantitative and qualitative research, Data collection systems Business performance management, Benchmarking, assessment and reporting systems, Patient preference, satisfaction, convenience, acceptability and adherence, Patient involvement in the design and development of new treatments and management protocols to optimize outcomes, Decision support systems incorporating patient intelligence.

http://www.dovepress.com/aims-and-scope-patient-intelligence-d203-j90

Patient Preference and Adherence is an international, peer reviewed, open access journal that focuses on the growing importance of patient preference and adherence throughout the therapeutic continuum. The journal is characterized by the rapid reporting of reviews, original research, modeling and clinical studies across all therapeutic areas. Patient satisfaction, acceptability, quality of life, compliance, persistence and their role in developing new therapeutic modalities and compounds to optimize clinical outcomes for existing disease states are major areas of interest for the journal. <u>http://www.dovepress.com/aims-and-scope-patient-preference-and-adherence-d16-j20</u>

Patient Related Outcome Measures is an international, peer-reviewed, open access journal focusing on treatment outcomes specifically relevant to patients. All aspects of patient care are addressed within the journal and practitioners from all disciplines are invited to submit their work as well as healthcare researchers and patient support groups. Areas covered will include: Quality of life scores, Patient satisfaction audits, Treatment outcomes that focus on the patient, Research into improving patient outcomes, Hypotheses of interventions to improve outcomes, Short communications that illustrate improved outcomes, Case reports or series that show an improved patient experience, Patient journey descriptions or research.

http://www.dovepress.com/aims-and-scope-patient-related-outcome-measures-d188-j84

CONSUMER HEALTH ORGANISATION NEWSLETTERS

Consumers Shaping Health is a bi-monthly newsletter published by the Consumers Forum of Australia (CHF) for members, consumer representatives and stakeholders in health. It promotes current advocacy work of CHF in its three priority areas: safety and quality in health care; health care for people with chronic conditions; and safe and appropriate use of medicines.

https://www.chf.org.au/consumers-shaping-health.php

COCHRANE CONSUMERS AND COMMUNICATION REVIEW GROUP

The Cochrane Consumers and Communication Review Group is part of the international Cochrane Collaboration. The Group coordinates the preparation and publication of systematic reviews of interventions which affect the way people interact with healthcare professionals, services and researchers. These reviews are published in The Cochrane Library. http://cccrg.cochrane.org/welcome

QUALITY OF CARE REPORTS

All Victorian health services are required to publish an annual Quality of Care Report each financial year. The primary audience includes consumers, carers and the health service community. Health services should consult with consumers, carers and community members and/or their Community Advisory Committee about the specific content. Minimum requirements include:

- Consumer, carer and community participation
- Quality and safety reporting at least four key measures annually (from preventing and controlling healthcare associated infections, medication safety, preventing falls and harm from falls, preventing and managing pressure injuries, clinical indicators for dental services, safe use of blood and blood products)
- A review of their local clinical governance policy against the Victorian clinical governance policy framework
- A report of the health service's response to needs of consumers, families or carers and the community across the continuum of care.
- Examples or stories that show how these initiatives work in practice.

OTHER

Consumer driven healthcare is designed to help health care organizations respond effectively to the shift in market power, become consumer-centric, and position themselves to become market leaders in the new consumer-driven market.

http://go.galegroup.com.ezproxy.lib.monash.edu.au/ps/i.do?action=interpret&v=2.1&u=monash&it=JIourl&issn=1542-0914&p=AONE&sw=w&authCount=1

Table 11. Definitions of consumer-related terms

Health consumers	Patients, potential patients, current and previous users of health services; parents, guardians or carers of patients; organisations representing consumers' interests; members of the public who are targets of health promotion programs (adapted from ACSQHC [20], CHF [21])
Consumer representatives	Members of a committee, steering group, working party, panel or similar decision-making group who voices the consumer perspective and takes part in the process on behalf of consumers (adapted from CHF [21])
Community	Group of people sharing a common interest including cultural, social, political, health and economic interests and/or a geographic association (adapted from CHF [21])
Consumer engagement	Inclusion of consumers and/or community members in a continuum of activities from passive behaviours such as receiving information, through more active participation, to shared decision-making with equal power. These activities include, but are not limited to, provision of information, consultation, development, participation, collaboration and empowerment (adapted from Sarrami-Foroushani et al [22], O'Mara-Eves et al [23])
Communication	Consumers and/or community members are engaged through imparting or exchanging information. Information can be verbal, written or provided by other methods. Communication can go both ways between consumers and/or community members and health service staff
Consultation	Consumers and/or community members are engaged through requests to provide their views, preferences, comments and suggestions to inform the decision-making process, but the consumers and/or community members may not be engaged in subsequent decision-making or action (adapted from PICS [24], CHF [21])
Participation	Consumers and/or community members are engaged through meaningful involvement in decision-making processes for health policy and planning, healthcare management and service delivery, care and treatment, and the wellbeing of themselves and the community (adapted from Victorian Department of Human Services[25], CHF [21])
Consumer evidence	Consumer opinions, perspectives and preferences found in publications and data sources
Routine decisions	Decisions made on a recurring basis or scheduled via a timetable eg annual budget setting processes, six-monthly practice audits, monthly Therapeutics Committee meetings, reviews of protocols at specified intervals after their introduction, etc [14].
Reactive decisions	Decisions made in response to situations as they arise eg new legislation, product alerts and recalls, applications for new drugs to be included in the formulary, critical incidents, emerging problems, etc [14].
Proactive decisions	Decisions driven by information that was actively sought for this purpose eg accessing newly published synthesised research evidence such as Cochrane reviews to compare against current practice, interrogating routinely-collected datasets to ascertain practices with high costs or high rates of adverse events, etc [14].
ACSOHC Australian Co	Nuncil on Safety and Quality in Health Care, CHE Consumer Health Forum, RICS Paediatric Integrated Cancer Service

Reproduced with permission from SHARE Paper 4 [19]

usuhe Australian Council on Safety and Quality in Health Care, CHF Consumer Health Forum, PICS Paediatric Inter

Defining the components

Information from the published literature and local research was synthesised to identify the most sustainable, effective and appropriate approach to disinvestment at Monash Health [3]. Multiple factors for consideration in establishment of the new program were extracted (Table 12). These findings led to definition of the program elements: four components, their aims and objectives, relationships between the components, principles that underpin the program and preconditions for success and sustainability. The principles were agreed upon, the preconditions were established, and implementation and evaluation plans were developed. These findings were incorporated a model for sustainable healthcare through allocation of sustainability in health care by allocating resources effectively (SHARE) in the local healthcare setting (Figure 5) [3].

The initial SHARE proposal had two aims, to develop systems and processes for decision-making and to undertake disinvestment projects. The systems and processes would lead to identification of target TCPs to be disinvested in individual projects. This sequential process is represented by an arrow from Aim 1 to Aim 2.

Based on information from the literature and stakeholder feedback it was clear that these two aims would not be successful without provision of expertise and support to facilitate decision-making (systems and processes) and implementation of change (projects). These needs are represented by arrows from Aim 3 to Aims 1 and 2.

Detailed program evaluation and research to measure and understand the change process were considered to be a vital fourth component and would be applied to the other three components. The double headed arrows between Aim 4 and Aims 1, 2 and 3 indicate that evaluation and research inform further development of the components which in turn would be evaluated and researched. The Principles and Preconditions sit above and below the four aims indicating that they apply to the whole program.

Table 12. Factors that influenced decisions for SHARE program development

Finding	Source	Decision	Program element
Potential benefits of disinvestment identified	Literature		
External environment supportive of disinvestment program	Literature & DHS docs	- Fatablish a supersus suplaving disinvestorent at Menach Health	SHARE
Internal environment supportive of disinvestment program	Monash Health Staff	Establish a program exploring disinvestment at Monash Health.	program
Capacity for leadership in this area demonstrated	New TCP program		
The word 'disinvestment' is associated with negative connotations, high risk of engendering suspicion and distrust and getting stakeholders offside.	Literature Monash Health Staff	Proceed carefully, avoid the term 'disinvestment' and use positive language.	Principles
'Top down' approach seen as negative. Needs to be balanced with 'bottom up' strategies and	Literature	Implement 'top down' and 'bottom up' strategies, make stakeholder engagement a priority, integrate methods for staff to	Principles
involvement of stakeholders.	Monash Health Staff	drive change into the new systems and processes.	Preconditions
A systematic integrated approach would be better than ad hoc decisions, individuals 'championing' causes or projects undertaken in isolation.	SHARE leaders International experts	Focus on organisation-wide approach to decision-making that integrates new and current systems and processes.	Principles
Perceived lack of transparency and accountability and suboptimal use of evidence in current decision- making processes. Power struggles and hidden agendas perceived to influence outcomes.	Monash Health Staff	Ensure the new systems and processes are transparent, accountable and evidence-based.	Principles
Lack of transparency and accountability in reallocation of funding released through disinvestment would be significant barrier to effective program.	Project team	Introduce explicit criteria for disinvestment decisions.	1 melpics
Lack of consistent terminology, absence of decision-making criteria and no guidance to inform an organisational approach.	Literature International experts	Develop our own frameworks and methods.	Principles
Disinvestment should not be considered in isolation but alongside other decisions. Investment and disinvestment decisions are often linked, disinvestment occurs when something new is introduced.	Monash Health Staff SHARE leaders Project team	Do not focus on 'disinvestment' or 'investment' alone. Consider 'resource allocation'. Establish processes along decision-making continuum from introduction to removal.	Principles
Health service staff perceive management priorities to be focused on saving money. The concepts around 'disinvestment' accentuate this.	Literature Monash Health Staff	Focus on 'effective application of health resources' to facilitate a positive approach.	Principles
The program needs a strong positive image that reflects the new focus on 'effective application of health resources'. Being compatible with 'iCARE', the familiar acronym for Monash Health values would be beneficial.	Monash Health Staff SHARE leaders Project team	Change name from 'Disinvestment Project' to 'SHARE' (Sustainability in Health care by Allocating Resources Effectively)	Name
Six potential opportunities to integrate disinvestment decisions into organisational infrastructure, systems and processes were identified.	Literature SHARE leaders	Investigate methods to implement disinvestment decisions in the six settings identified.	Systems and Processes
Undertaking disinvestment projects was a key element of the original proposal. Waiting for investigation of the six settings is too long to delay pilot projects. Some 'quick wins' would be valuable.	SHARE leaders Monash Health Staff	Develop methods to identify and prioritise potential target TCPs in parallel with the investigation of the six settings. Undertake pilot projects to disinvest them.	Disinvestment projects
Current decisions are made 'routinely' or 'reactively'. Introduction of TCPs is based on applications from clinicians or managers and removal of TCPs is based on emerging problems or product alerts and recalls. Research literature and local data could be used 'proactively' to drive health service practice.	Monash Health Staff SHARE leaders Project team	Build on current 'routine/reactive' processes that are done well. Develop new processes to use evidence 'proactively' to drive decisions and/or priority setting. Make these explicit elements of the new program.	Principles
Using evidence 'proactively' requires time and attention from decision-makers. The information	Monash Health Staff	Develop methods to identify appropriate high-quality information,	Systems and

Finding	Source	Decision	Program element
provided must be trustworthy, applicable and sufficiently important to warrant adding to their workload.	SHARE leaders	process and package it for ease of use and deliver it to the relevant decision-makers.	Processes
Decisions for resource allocation are delegated to committees and individuals. There are opportunities for improvement in the governance of these processes and to introduce routine consideration of 'disinvestment'.	Monash Health Staff SHARE leaders Project team	Review processes and governance of decision-making by committees and the authority delegation schedule	Systems and Processes
There is no guidance on consumer participation in disinvestment activities.	Literature		
With a few exceptions, committees and project teams do not routinely involve consumers in making or implementing decisions and the organisation does not have a framework for engaging consumers.	Monash Health Staff Project team	and integrate them into the new program.	Processes
The systems and processes for evidence-based decision-making cannot be delivered without appropriate and adequate skills and support	Literature Monash Health Staff	Develop support services that enable capacity-building and provide expertise and practical assistance	Support Services
With a few exceptions, staff do not routinely seek evidence for decisions, are unaware of best practice in implementation and do not evaluate outcomes.	Monash Health Staff Project team	Provide expertise, training and support in accessing and utilising evidence in decisions. Provide expertise training and support in implementing and	Support Services
and resources.	Monash Health Staff	evaluating evidence-based change.	Scivices
Health service projects are not usually well supported. It is common for funding to be insufficient, timelines inadequate and staff lacking in knowledge and skills in project management, data collection and analysis.	Monash Health Staff Project team	Influence planning of disinvestment projects to ensure adequate resources and appropriate timelines. Provide expertise, training and support in project methods and administration	Support Services
Disinvestment projects are generally based on health economic principles	Literature		
Monash Health does not have expertise in health economics and does not intend to fund this in the foreseeable future	Monash Health Leaders	Utilise in-house expertise and take an 'evidence-driven', rather	Principles
Safety, effectiveness, local health service utilisation and benchmarking parameters are possible alternative considerations for disinvestment.	SHARE leaders	than 'economics-driven', approach to investigation of disinvestment in the health service context.	
Monash Health has high-level expertise in accessing and using research evidence and health service data to inform decisions.	Project team		
Monash Health does not have the level of expertise in health program evaluation required for SHARE and has no expertise in health economics.	Project team	Engage consultants in health program evaluation and health economics to assist in development and evaluation	Preconditions
There is no guidance to inform a systematic organisational approach.	Literature	Undertake action research to investigate the process of change in	
In addition to detailed program and economic evaluation, understanding what happened in the process of investigation, what worked, what didn't work and why is required.	SHARE leaders Project team	addition to program and economic evaluations. Run a national workshop to learn and share information. Disseminate all findings.	Evaluation and Research
This large program will need funds. It is consistent with the disinvestment agenda of the Victorian DHS who are sympathetic to a funding application.	DHS documents DHS staff	Seek funding from the state health department.	Preconditions
To be successful this ambitious proposal will need endorsement, support and strategic direction from the highest level and links to those with power and influence in the organisation.	Literature SHARE leaders Project team	Increase membership of the Steering Committee to reflect those best able to provide the appropriate influence, direction and support.	Preconditions
All projects should be aligned to the Monash Health Strategic Goals. Program activities will be facilitated if integrated into the organisation Business Plan.	SHARE leaders Project team	Align SHARE with the Monash Health Strategic Goals and include program activities in the annual Business Plans	Principles

Abbreviations DHS: Victorian Department of Human Services, TCP: Technology or clinical practice, iCARE: Integrity, Compassion, Accountability, Respect, Excellence

Figure 5. Model for exploring sustainability in health care by allocating resources effectively in the local setting

Reproduced with permission from SHARE Paper 5 [3]

Sustainability in Health care by Allocating Resources Effectively AIM 1: Systems and Processes AIM 3: Support Services PRINCIPLES Develop, implement and evaluate Develop, implement and evaluate services Focus on 'effective application of health resources' organisation-wide systematic, transparent, Consider 'resource allocation' rather than 'investment' or 'disinvestment' in isolation accountable and evidence-based decision-Explore support in four settings: Introduce 'proactive' use of information to drive decisions and build on existing 'routine' making systems and processes for resource a. Providing expertise to deliver research and 'reactive' processes allocation related to health technologies evidence to decision-makers Use evidence from research and local data rather than economic factors to drive decisions and clinical practices. Implement both 'top down' and 'bottom up' strategies Explore six decision-making mechanisms: to decision-makers Take evidence-based approach to development, implementation and evaluation of all a. Purchasing and procurement program components and include action research to investigate the process of change Guideline and protocol development Ensure alignment with Monash Health Strategic Goals and integration into Business Plan b. local data in decision-making and to Proactive use of published research c. RELATIONSHIPS on these decisions Proactive use of local data d. 1. Systems and Processes e. Economic approaches to priority Making systematic, transparent, setting data collection, analysis and project accountable, evidence-based decisions f. System redesign 3. Support Services administration Providing expertise and facilitating action AIM 2: Disinvestment Projects AIM 4: Program Evaluation and Research Explore disinvestment in pilot projects 2. Disinvestment Projects Evaluate to measure outcomes Identifying, prioritising and a. Identify TCPs suitable for implementing change Undertake action research to disinvestment understand the processes b. Establish prioritisation and decision- Deliver the first national workshop making processes on disinvestment c. Develop, implement and evaluate 4. Program Evaluation and Research Disseminate learning through evidence-based disinvestment Learning and sharing publications and presentations projects PRECONDITIONS Strategic Direction, Influence, Support and Endorsement Funding Expertise Stakeholder Project costs Engagement Executive Directors (3) **Program Directors** Legal counsel Evidence-based practice Establishment costs Medical Committee representatives Information Services Knowledge brokering Managers Nursing Ongoing costs Technology/Clinical Practice Clinicians Health service data analysis Procurement

Biomedical Engineering

Consumer representatives (2)

- **Research Ethics** ٠
- Clinical Ethics
- Allied Health
- Pharmacv
- Diagnostic services

Organisational readiness for change

Health program evaluation Consumers Health economics Funders

to provide expertise and facilitate action.

- b. Providing expertise to deliver local data
- c. Building capacity in the health service workforce to use research evidence and implement and evaluate change based
- d. Providing expertise in project methods and tools and providing assistance in

PHASE TWO (SHARE Papers 6-8)

Phase Two of the framework for complex interventions [1] involves a series of exploratory trials assessing acceptability and feasibility of the components and identifying methodological issues for implementation and evaluation. The aims identified in Figure 5 were investigated in Phase Two. The nature of the innovations and methods to deliver them would be explored, those thought to be feasible would be piloted and those found to be sustainable, effective and appropriate would be established as ongoing processes.

Funding was reduced in the final year of the program resulting in limitation of some implementation and evaluation activities due to the shortened timelines.

A summary of the activities in Aims 1 and 2 is provided in Figure 6.

Aim 1. Systems and processes

The focus of Aim 1 was to explore the six decision-making mechanisms with potential to systematically identify opportunities for disinvestment proposed in Figure 1 [2].

Aim 1.1 Purchasing and procurement

Health services have well-established infrastructure for spending money such as purchasing of drugs and clinical consumables and capital procurement for building and equipment. Incorporating prompts, triggers and mandatory requirements to consider disinvestment into these existing systems and processes might be achieved quickly and, once established, delivered with no additional costs [2].

Only one prompt to consider disinvestment was identified in the wide range of decision-making contexts investigated at Monash Health [26]. The SHARE activities resulted in some positive outcomes related to introduction of new TCPs, but no changes regarding identification of opportunities for disinvestment were implemented [27]. This was due to local barriers; in particular that the relevant processes were outside the control of the SHARE team.

The current literature includes discussion about smart, innovative and evidence-based purchasing [28, 29], and the need to consider economic evaluations in purchasing decisions [30], but we were unable to find mention of purchasing or procurement processes being used to identify local disinvestment opportunities.

Aim 1.2 Guideline and protocol development

In addition to processes that allocate funding, health services also have systematic mechanisms for allocating nonmonetary resources such as local guidelines and protocols that determine use of drugs and equipment, diagnostic tests, surgical procedures, clinic capacity, etc [2]. There are potential opportunities for disinvestment in all of these activities which could be initiated through prompts, triggers and mandatory requirements in document development, authorisation processes, implementation strategies and evaluation activities.

CCE staff members were simultaneously developing a new Policy and Procedure Framework for Monash Health and included a prompt in the instructions to document developers to consider whether any current practices could be discontinued [31]. CCE handed the new framework over to the department with oversight of organisational documents for implementation and ongoing governance. The disinvestment prompts, along with other instructions, were removed by the implementers with the intention of making the process less onerous for document developers [27].

While many authors refer to the potential to use guidelines for implementation of disinvestment recommendations [13, 32-35] none propose local guideline and protocol development as a method to identify disinvestment opportunities.

Aim 1.3 Proactive use of published research

There is a growing body of evidence about practices that are harmful, of little or no benefit, or where a more effective or cost-effective alternative is available. Searches for evidence-based disinvestment opportunities could be undertaken and the findings delivered directly to decision-makers [2]. Once potential disinvestment opportunities are identified from research, local data could be used to assess the burden of disease, volume of use, likely outcomes and potential cost of change. If an issue only affects a few patients or practitioners, or the burden of disease and hence potential impact are small, particularly in comparison with other issues, resources for change may be better employed elsewhere.

The SHARE team developed a catalogue of 184 potential disinvestment targets from known sources of high quality synthesised evidence [36-40] and evidence-based publications focused on disinvestment [41, 42]. Use of the catalogue to identify disinvestment projects is discussion in Aim 2 below [27]. A broader approach to proactive use of research evidence was piloted as an Evidence Dissemination Service which is discussed in Aim 3 [43].

Figure 6. Overview of activities for SHARE Aims 1 and 2

OBJECTIVES	APPROACHES TO BE INVESTIGATED	Αςτινιπες	APPLICATION AT MONASH HEALTH	CONCLUSIONS
	Purchasing and procurement	Interviews, Document analysis, Consultation	Not applied, local barriers	Insertion of prompts to consider disinvestment into purchasing processes and documentation has potential
	Guideline and protocol development	Development of new policy and procedure framework	Not applied, local barriers	Insertion of prompts to consider disinvestment into processes and documentation for guideline development has potential
	Proactive use of published research	Database searches, development of catalogue and taxonomy	Not applied: no criteria for use were developed	Catalogue of evidence-based disinvestment opportunities potentially useful if criteria for searching and systematic prompts to trigger use are developed
To identify potential	Proactive use of local data	Consultation with data experts and quality program staff	Not applied: local barriers	Interrogation of local data potentially useful if criteria for searching and systematic prompts to trigger use are developed
disinvestment opportunities	Economic approaches to priority setting	Literature review Workshop	Not applied: no health economist	PBMA useful for identifying disinvestment opportunities but need a health economist to implement
	System Redesign	Literature review Interviews, Workshop	Not applied: not useful for identification	System redesign not useful for identifying disinvestment opportunities but potentially useful for implementing and/or quantifying disinvestment
	Expressions of interest	Criteria development Application process	2 EOIs received and investigated	EOIs potentially useful if proposals are fully considered, evidence-based, and intervention and objectives are clear
	Additional systematicmethods identified	Not investigated	Not applied	Potentially useful, requires investigation
	Non-sy	Non-systematic proposals		No evidence of benefit, did not work in SHARE Program
To establish	Prioritisation frameworks	Literature review Framework development	Partial implementation, no evaluation: local barriers	Currently available methods and tools are potentially useful. SHARE problems were unrelated to the frameworks
prioritisation and decision-making processes	Decision-making frameworks	Consultation with key informants	No systematic, process developed: local barriers	Currently available methods and tools are potentially useful. SHARE problems were unrelated to the frameworks
processes	Non-sy	stematic decisions	proposals accepted	No evidence of benefit, did not work in SHARE Program
To develop, implement and evaluate projects	Methods for project development, implementation and evaluation	Literature review Interviews Surveys	1 project commenced SHARE Program ended prior to project completion	Currently available generic methods and tools for planning, project management, implementation and evaluation are potentially useful for disinvestment projects
To measure	Methods and measures to	Adaptation of a theoretical framework and taxonomy for use	Assessment of factors influencing SHARE processes	Generally negative: difficulty identifying suitable projects, lack of systematic approach, nominations made by proposers not directly involved, lack of clarity and rationale in proposals, lack of authority to change practice
outcomes and under stand processes	effectiveness, process of change and outcome measures	Application of framework to SHARE findings	Assessment of factors influencing the disinvestment project	Generally positive: good evidence, clear objectives, pathway to be changed was well-documented, external funding provided, detailed data collection, strong local ownership, champions sought training and advice, 'win-win' for staff involved, resources reallocated to same department

The concept of a catalogue of disinvestment opportunities has been discussed widely in the literature under the more recently coined term 'low value' lists [44]. Unfortunately, not all the lists are as trustworthy as the high-quality sources noted above. Some are based on expert opinion only, some from a combination of evidence and expert opinion, and some do not specify methods or provide an explicit definition of 'low value' [45].

Aim 1.4 Proactive use of local data

Hospitals and other health facilities routinely collect large amounts of data. Monash Health decision-makers often used local data reactively to understand problems or develop solutions, but they did not use it proactively to review current practice, seek opportunities for improvement or drive priority setting [14]. Three approaches to targeted analysis of routinely-collected data to discover opportunities for disinvestment were proposed [2]: to identify areas where disinvestment might have the greatest impact, to investigate variations in practice, and to explore less commonly used data sources such as complaints registers or patient satisfaction surveys. In the same way that local data could be used to substantiate a decision to disinvest arising from research evidence, research evidence would inform a decision arising from local data by identifying best practice in the relevant area and confirming whether change is needed and what the appropriate alternatives are [2].

The first two approaches were to be explored within the Data Service discussed in Aim 3 below [15]. The third approach was to be considered in a consumer engagement framework, however limitations of incident reporting software and consumer information available from other sources prevented exploration at the time [19].

There is a large body of literature on examination of practice variation [46]. Two recent studies have used practice variation in national and regional settings specifically to identify ineffective practices and consider the potential to do so at local health service level [47, 48]. They also note that procedures with high variability are often not on the 'low value' lists, indicating additional possibilities to identify disinvestment opportunities from this approach [48]. While local data is potentially valuable in identifying and substantiating need for change, problems with validity, reliability, comprehensiveness and degree of sensitivity to disinvestment requirements remain significant barriers [8, 13, 48-51].

Aim 1.5 Economic approaches to priority setting

Priority setting exercises use economic principles to weigh up options for investment and disinvestment and select preferred alternatives using pre-determined criteria [2].

Four methods met the criteria of economic analysis applicable at the local health service level; however all had limitations in their ability to identify disinvestment opportunities in this context [27]. Program Budgeting and Marginal Analysis (PBMA) is the most widely used method, the process is well-tested and guidance is available [52, 53]. The lack of in-house health economics capability was the key factor in the decision that priority setting exercises were not feasible at Monash Health [27].

Although decision-makers acknowledge the usefulness of PBMA, it remains quite difficult to achieve in practice [49, 50, 54]. The major limitations for all priority setting approaches are lack of standardisation in cost-accounting, lack of sufficient high quality data to inform decision-making, and lack of time and skills to undertake the process and implement the decisions [10, 49-51, 53-55].

Aim 1.6 System redesign

System redesign describes a range of methods and tools to review whole systems of care. It is a familiar process in health services, it offers a well-accepted context to introduce practice change, and it could be integrated into a systematic organisation-wide approach to disinvestment [2].

No examples of system redesign that specifically related to resource allocation decisions for TCPs were identified from the literature or by Monash Health respondents with expertise in this area [27]. However, some of the objectives of system redesign are consistent with principles of disinvestment such as better use of existing resources, maximising value and eliminating waste, increasing efficiency and reducing duplication of services [56-58]. The SHARE Steering Committee decided that system redesign methods would not be used to identify opportunities for disinvestment, but may be useful in implementing decisions to disinvest.

The potential for system redesign in implementing disinvestment has been confirmed in more recent literature [5, 10, 12] and also suggested as a method to quantify disinvestment [5].

Aim 2. Disinvestment projects

Investigation of pilot disinvestment projects was proposed to understand the processes involved, assess the resources required, provide practical guidance for future projects and, if successful, be used as positive examples to promote subsequent disinvestment activities. Findings of these SHARE activities are in Paper 6 [27] and summarised below. Detailed discussion of methods and tools for identification; prioritisation and decision-making; project development, implementation and evaluation of disinvestment projects is available in Paper 10 [45].

Aim 2.1 Identification of disinvestment opportunities

Given that it would take some time to identify disinvestment opportunities from the six potential mechanisms to be investigated in Aim 1, a supplementary method was required to find suitable TCPs for immediate implementation in pilot projects in Aim 2. An 'Expression of Interest' (EOI) process where health service staff nominated their own projects was introduced to achieve this [27]. In addition to these seven methods, a range of other potential systematic methods to identify disinvestment opportunities were proposed informally during the SHARE Program but not investigated (Table 13) [27].

Although an evidence-based catalogue of disinvestment opportunities had been developed for this purpose, an *ad hoc* process whereby SHARE Steering Committee members submitted disinvestment proposals at meetings dominated the decision-making process and the catalogue was not used [27]. An algorithm for identifying disinvestment projects from the catalogue was developed (Figure 7), however the planned development of transparent criteria to be used in its application was not undertaken [27]. Two EOIs and 17 *ad hoc* proposals were investigated as potential pilot disinvestment projects [27]. The nature of the proposed change and reason for nomination are summarised in Table 14.

Three published frameworks for disinvestment also propose using applications from stakeholders in the identification process [59-61]; however the effectiveness of this approach has not been established [45, 48]. Identifying disinvestment opportunities through local proposals has been referred to as "*soft intelligence*" [48] and found by others to be unsustainable [48, 62].

Aim 2.2 Prioritisation and decision-making

The literature review found guidelines and systematic reviews for prioritisation of new and existing TCPs [63-68] and consultation identified state health department requirements. Since there were no decision-making settings where disinvestment was explicitly considered at Monash Health, the SHARE team adapted the available guidance into a tool that could apply to both investment and disinvestment, with a plan to pilot it in the annual capital expenditure funding round. The tool was not tested; the capital expenditure process was cancelled in the following two years as Monash Health had no spare capital [27].

Prioritisation tools primarily focus on characteristics intrinsic to the TCP. However the SHARE experience identified that additional criteria may influence whether a TCP is selected to be the focus of a practice change initiative; for example likelihood of success or sustainability, availability of external funds, or value of the evaluation to other processes (Tables 15 and 16). The EOI stipulated that the project must be based on high-quality evidence, be endorsed by Program and Department Heads, have appropriate resources allocated to undertake the project, have a documented clinical pathway and clear measurable outcomes, and each TCP proposed through the *ad hoc* process had one or more promising attributes [27]. However no explicit criteria were established for the decision-making committee to prioritise or make final decisions regarding pilot projects.

Decisions were pragmatic, based on likelihood of 'quick wins' and unspecified factors related to the proposed TCP. Prioritisation did occur, but the reasoning was not transparent. Of the 19 proposed TCPs, four were not investigated as the Steering Committee directed the SHARE team to disregard them in favour of subsequent proposals which were thought to have greater potential; two had incomplete investigations for the same reason; nine were rejected for a range of issues; and four were accepted as pilot projects (Table 14). Two of the four successful applications were from the EOI process and the other two had external funding from the Victorian Policy Advisory Committee on Technology (VPACT). The funding was to implement a new technology; however each had an element of disinvestment as both new TCPs were replacing a clearly identified TCP in current use.

Subsequently, lists of criteria for consideration in prioritisation and decision-making have been published for disinvestment [69, 70], resource allocation [71, 72] and general decision-making [73], and software applications are now available to facilitate prioritisation processes [53, 74].

Table 13. Additional systematic methods to identify disinvestment opportunities in a local health service Reproduced with permission from SHARE Paper 6 Harris et al [27]

- Consider disinvestment explicitly in long term planning exercises
- Discuss principles of disinvestment and examples of successful projects at department/unit meetings, educational events, etc
- Assign member of decision-making committees to look for disinvestment opportunities in their decisions
- Add a disinvestment question to the 'Leadership Walkround' protocol
- Identify clinical champions interested in disinvestment in each program/department/unit who would look out for opportunities
- Support staff who have undertaken a disinvestment project to look for more opportunities
- Have disinvestment as a high priority in medication safety reviews
- Encourage or require projects that are introducing something new to have a component of disinvestment
- Review projects that are being conducted for other reasons and identify and focus on any disinvestment elements
- Introduce thinking about disinvestment into quality improvement training programs

Figure 7. Algorithm for identifying disinvestment projects from an evidence-based catalogue of potential TCPs



Table 14. Disinvestment projects proposed in the SHARE Program

Potential projects and reason for nomination		Source	Result of investigation
1.	Reduce use of therapeutic intervention due to concerns about safety and effectiveness	Committee member	Rejected : Lack of clarity regarding explicit problem, patient groups, etc
2.	Reduce use of therapeutic intervention as thought to have no benefit over less expensive alternative	Committee member	Rejected : Preference to wait until large RCT underway at the time provided conclusive evidence
3.	Reduce ordering of 'routine' diagnostic tests in specific setting as thought to be unnecessary and result in increased costs to hospital and/or patient, and increase risk of adverse events	Committee member	Rejected : Specific setting already planned to be investigated by others in organisational review but timing was unspecified
4.	Reduce ordering of 'routine' diagnostic tests in specific setting as thought to be unnecessary and result in increased costs to hospital and/or patient, and increase risk of adverse events	Committee member	Not investigated: Further clarification of problem postponed in favour of subsequent proposals
5.	Reduce ordering of diagnostic tests in specific setting due to lack of evidence of benefit and concern about validity, reliability and performance of equipment	Committee member	Not investigated: Further clarification of problem postponed in favour of subsequent proposals
6.	Reduce ordering of diagnostic tests in specific setting as thought to be of little diagnostic value	Committee member	Not investigated: Further clarification of problem postponed in favour of subsequent proposals
7.	Replace therapeutic intervention in specific patient group with one considered to be safer, more effective and more cost- effective and funded by state health department	VPACT project	Accepted then became Unavailable: Clinicians not convinced by evidence and elected to undertake RCT
8.	Replace therapeutic intervention in specific patient group with one considered to be safer, more effective and more cost- effective and funded by state health department	VPACT project	Accepted: Project undertaken with SHARE support but evaluation incomplete due to loss of funding
9.	Reduce use of therapeutic intervention in specific patient group due to concerns about patient safety, not recommended in clinical guidelines used elsewhere	Committee member	Decision postponed : While proposer confirmed evidence Rejected : When discovered that project had commenced
10.	Restrict use of therapeutic intervention in specific patient group as local practice thought to be inconsistent with recently published national guidelines	Expression of interest	Accepted then Withdrawn: Clinicians not convinced by evidence, local practice found not to be inconsistent
11.	Reduce ordering of diagnostic tests considered to be inappropriate in certain unspecified situations	Expression of interest	Accepted then Rejected: Inopportune timing due to external accreditation process and introduction of new computer database and electronic ordering system
12.	Cease use of therapeutic intervention in specific patient group due to published debate questioning effectiveness	Committee member	Rejected : Evidence not relevant to patient population
13.	Replace diagnostic test in specific patient group for one thought to be more appropriate	Committee member	Investigation not completed: Directed by Steering Committee to pursue Therapeutic Equivalence projects
14.	Reduce admission of specific patient group as thought to be unnecessary in many cases	Committee member	Investigation not completed: Directed by steering committee to pursue Therapeutic Equivalence projects
15.	Replace drug with lower cost but equally effective alternative in appropriate cases as project being undertaken anyway and it would be good way to learn about the change process	Therapeutic Equivalence project	Rejected: Project was already underway
16.	Replace drug with lower cost but equally effective alternative in appropriate cases as project being undertaken anyway and it would be good way to learn about the change process	Therapeutic Equivalence project	Rejected: Project was already underway
17.	Replace equipment with alternative thought to be cost-saving due to reduction in adverse events and would improve patient outcomes in specific patient group	Project champion	Not investigated : Project identified too late to be completed within SHARE timelines
18.	Reduce ordering of 'routine' diagnostic tests in specific patient group as thought to have no evidence of benefit	Committee member	Rejected : Department could not provide backfill to replace project champion who would undertake project
19.	Reduce use of therapeutic intervention as thought to have no evidence of benefit	Committee member	Rejected: Evidence for change unclear

Table 15. Examples of criteria for selection of disinvestment projects considered in the SHARE Program

Reproduced with permission from SHARE Paper 6 [27]

Criteria in the SHARE Expression of Interest application
 The project must aim to remove, restrict or replace a technology or clinical practice
 There must be high-quality evidence for the proposed change (as indicated by existing systematic review or body of evidence from peer reviewed articles)
Department and Program heads endorse the proposed change
 Department or Program agrees to provide EFT/project leader to implement the proposed change
 The current clinical pathway is documented or a commitment is given to document this pathway before the project begins There are clear, measurable outcomes and ability to collect baseline and comparison data
Criteria that may increase the likelihood of project success or sustainability
 Project leaders who have the power to make change happen in their area of responsibility such as Unit Managers or Department Heads Project champions who are respected and trusted by the potential adopters
 Interested, engaged clinicians working in the topic area
Available funding
Projects that propose reallocation of resource savings
Criteria that may be useful for selection of pilot or demonstration projects in disinvestment
Projects that are already planned for another reason that also contain an element of disinvestment
Projects to introduce a new TCP where disinvestment of an existing practice can be made a focus of the project
Opportunity for a 'quick win'
Criteria that may increase the usefulness of a pilot or demonstration projects in disinvestment
 Projects that are required to collect detailed data, for example reporting requirements of external funders Projects with robust data at baseline

Table 16. Factors for success, sustainability and suitability for disinvestment in the SHARE pilot project

SUCCESS	SUSTAINABILITY	SUITABILITY FOR DISINVESTMENT
A proposal is more likely to be successful if	A proposal is more likely to be	Factors in the pilot project considered likely to be
it meets the following criteria	sustainable if it has appropriate and	favourable for a disinvestment project at Monash
0	adequate provision in each category	Health
Based on sound evidence or expert	Structure	✓ The current practice to be replaced and the
consensus	✓ The new procedure is carried out	new practice to be implemented were clear
✓ Systematic review of multiple RCTs:	within existing nursing and allied	and patient eligibility was determined
surgeons, nurses and allied health staff	health structures with appropriate	✓ The proposal for change was clear with clear
in agreement with findings	governance and supports	objectives
Presented by credible organisation	Skills	 Department and Program heads endorsed the
\checkmark Review undertaken by the Australian	 Nursing and allied health staff were 	change
Safety and Efficiency Register of New	upskilled in the new procedure:	 ✓ External funding was available
Interventional Procedures – Surgical	changes in scope of practice were	✓ The clinical pathway and referral process
(Roval Australasian College of Surgeons)	documented and approved	were documented
Able to be tested and adapted	 ✓ Clinical project team leaders attended 	 Detailed data collection and reporting was a
 There was limited onnortunity to test 	training and welcomed support and	requirement of the external funding
and adapt as the VPACT funding	direction in project management	\checkmark Baseline data had been collected and
required complete roll out	implementation and evaluation	supporting data on patient group, burden of
Relative advantage is evident	Resources	disease and impact of the new technology
\checkmark Clear evidence of multiple improved	\checkmark Europing was provided for staffing	was available
nations and health service outcomes:	equinment and consumables	\checkmark There was strong local ownership and clinical
increased safety and effectiveness	 Einal funding was less than the 	champions
reduced costs	amount approved in the application	\checkmark 'Win-win' scenario for adopters where
Low complexity	process leaving the project short of	nursing and allied health staff were keen to
\checkmark The new technology is easy to use	one machine and associated	take on new procedural skills and surgeons
Compatible with status quo	consumables	were hanny to relinquish these cases to make
\checkmark Referrers use the same referral process	✓ Assistance from the Canacity Building	operating theatre time available for other
but divide nations into those eligible for	and Project Support Services was	nationts
the new procedure and those who	provided	\checkmark Surgeons were allowed to keep the theatre
should still undergo the old procedure	Commitment	time released by the changes and reduce their
The new service was provided at a	 The project had organisational 	own waiting lists (rather than reallocation to
different compus and nationts and staff	commitment from the	other surgical specialties or closing theatres
had to adapt	Tochnology/Clinical Practico	to realize savings)
There is some impact on other	Committee, and program and	\checkmark Dotontial (quick win' scopario for a
 Interess some impact on other departments that also have to adapt 	departmental commitment from	disinvestment demonstration project as the
Attractive and accessible format	clinical loaders and managers	proposal was already fully developed funding
The new procedure is attractive to		had been approved, and deadlines were in
 The new procedure is all factive to patients as it replaces surgenumith an 	Leaver Sillp	nau been approved, and deadimes were m
patients as it replaces surgery with an	 Ine clinical project team domonstrated offective leadership 	piace.
outpatient/beuside procedure	demonstrated effective leadership	KEV: V Desitive factors * Negative factors
		KET: V POSITIVE factors * Negative factors

Table 17. Factors influencing the SHARE process of selecting disinvestment projects

Based on the framework for evaluation and explication Figure 12.3 below.

POSITIVE	NEGATIVE
 External environment The SHARE program was adequately funded (until the final phase of the program) Two proposals that received state health department funding and endorsement were considered favourably. Two proposals were triggered by new national guidelines, one by an editorial in the Medical Journal of Australia, and others by journal articles, email bulletins, attendance at conferences and proposers awareness of practice elsewhere. 	 The state health department withdrew funding for the final phase of the SHARE program resulting in reduction of the proposed evaluation activities. One project was rejected due to difficulties implementing change during the national accreditation process for this department's services.
 Organisational environment (Monash Health) Monash Health encourages and supports innovation High level expertise was available from CCE and Clinical Information Management 	 Waiting for responses to email correspondence and requests for appointments to meet with key personnel; time lags due to annual and long service leave and decisions by committees that only meet monthly delayed the processes of identification, prioritisation, decision-making and project development. Delays in deciding that unsuitable projects would not go ahead prevented other potentially suitable projects from being investigated. The proposer of one project was unaware of an existing organisational review into the problem. Delays related to introduction of a new computer database and electronic ordering system contributed to one project being rejected.
 Identification process The 'bottom up' Expression of Interest process was the only systematic approach used, resulting in two projects being received and accepted (but both later rejected). 	 The 'top down' evidence-based catalogue of disinvestment opportunities was not utilised in identifying potential projects. The 'ad hoc' process of nominations and decision-making dominated Most proposals were made by 'outsiders' who not involved in the nominated clinical pathway. Only two proposals were made by the potential adopters, although one subsequently withdrew their application.
 Prioritisation and decision-making process All discussions were held within meetings and documented in the minutes; there were no attempts to be covert or follow hidden agendas. Conflict of interest was addressed as a routine agenda item. All clinical programs, health professional disciplines, consumers and technical experts in evidence, data, legal, ethics, finance, purchasing, biomedical engineering and information technology were represented in decision-making. 	 There were no explicit processes for risk assessment, deliberation or appeal. It was not always clear how decisions had been made. The SHARE Steering Committee did not have authority to direct change. Proposals were put to department heads who declined to follow them up (based on reasoned arguments that they should not to go ahead).
 Rationale and motivation Safety and effectiveness were the primary reasons for nominating TCPs for disinvestment, cost- savings were a secondary benefit 	
 Proposal for change Six proposals were submitted based on guidelines, systematic reviews or health technology assessments; the four accepted projects were in this group. Four proposals had supporting data, two regarding unnecessary diagnostic imaging tests and the two VPACT projects. The two VPACT projects presented defined objectives. One project had a clear reinvestment plan which allowed operating theatre time previously used by patients now undergoing the new non-surgical procedure to be used by other patients 	 In 13 proposals, the nominator did not provide supporting evidence. Many of the proposals did not clearly define the TCP, patient population group, circumstances of restriction, etc. This is difficult to quantify as clarification may have been forthcoming but the proposals were not investigated further

on the waiting lists, this was the implemented pilot project.	
Potential adopters	
 Three nominations were made by the potential adopters; one was the pilot project accepted and implemented, one was accepted as a pilot project but was subsequently withdrawn by the applicants and the other was nominated too late to be included in the SHARE timeframe 	 Decisions regarding eight proposals were declined by heads of the departments responsible for the proposed TCP. Reasons included lack of clarity of the problem, lack of supporting evidence, or the evidence was not relevant to local patient groups. In two of the accepted projects, the key adopters reversed their decisions about the supporting evidence and withdrew.
Potential patients	
	 Two proposals were rejected when it became clear that the evidence did not apply to the Monash Health population.
Implementation and evaluation plans and resources	
 The CCE/SHARE support staff had appropriate expertise and knowledge of methods and tools for implementation and evaluation. The CCE team provided access to research literature and liaised on behalf of the clinical project teams with the Clinical Information Management (CIM) unit who were happy to provide access to data and assistance with analysis. All implementation activities within the control of the SHARE project team were completed Detailed evaluation plans were developed in consultation with an external health program evaluator and health economist One proposal had assistance of a research fellow to undertake the project work (but this did not go ahead for other reasons). The clinical project leads of two accepted projects attended workshops in evidence-based change, implementation and evaluation 	 Lack of evaluation funding precluded understanding of the barriers that prevented implementation of the planned systematic evidence-based processes Lack of evaluation funding limited evaluation activities in the last year of the program One project was rejected by the department head because they could not provide backfill for the clinical duties of the project leader.

Table 18. Factors influencing the SHARE pilot disinvestment project

Based on the framework for evaluation and explication Figure 12.3 below.

POSITIVE	NEGATIVE
External environment	
The project funders had significant impact on the project	The project funders had significant impact on the project
 Political support for new technology 	– Monash Health informed that they had to lead a consortium of health services in implementing
The other health services in the consortium also had significant impact	the new technology, adding complexity to the original application
- Collaboration with some of the other health services in writing pathway and documents and	 Lack of consultation in choice of partner health services
developing database and implementation strategies was helpful	 Requirements for data collection and reporting changed during the project
 Manufacturer's information was useful 	The other health services in the consortium also had significant impact
 Manufacturer's technical representative was helpful 	 Slow and difficult to coordinate when working with other health services
	– Lack of accountability in some of the other health services
	 Lack of 'buy-in' from other health services through the entire process
Organisational environment (Monash Health)	
 Monash Health's reputation as a leader will facilitate new technology support 	 Organisational processes appear to be changing regularly
 Monash Health encourages innovation 	 Lack of clarity around organisational structures and processes eg who to go to for what, when etc
 Support from Centre for Clinical Effectiveness (CCE) 	• Lack of communication eg machine delivered to a corridor on a Friday afternoon and left unsecured
 Support from Clinical Program Directors 	over the weekend. A component was lost and a new component had to be purchased.
 Support from Finance Department and having someone who can translate the finance jargon 	• Relevant patient group and clinical expertise in this area located at site A and new machine is at site
 Clinical Resource Nurse monthly meetings 	B. Patients usually scheduled for surgery at A will have to transfer to B.
 Nursing/Allied Health collaboration 	Sites have different cultures and processes and patients and staff will have to adapt
• Although staff leave and secondments are difficult there can also be an advantage of working with	Impact on other departments eg Sterilisation department has to learn new procedure
replacement staff who become familiar with the project	 Staff secondments and/or leave
Identification process (VPACT application process for introduction of new TCP)	
Proposed by potential adopters (nursing/allied health and surgeons)	Application form is really long and a lot of work
 Support from CCE to provide supporting evidence 	Lack of awareness of the workload prior to commencing work on application
 Support from Clinical Information Management to provide supporting data 	
Prioritisation and decision-making process (SHARE process to determine disinvestment project)	
 VPACT funding and endorsement 	
 Clinical project team keen to access CCE expertise and support for project delivery 	
Rationale and motivation	
 To reduce harm, improve patient outcomes, improve service efficiency, save money 	Emphasis on financial/economic outcomes
Proposal for change	
 There is good evidence to support the new technology 	 Longer time to set up than other treatment options
 Data on patient group, burden of disease, impact of new technology provided in detail 	 Lots of protective clothing which can be uncomfortable
New technology does not cause long lasting/irreversible damage	 Mentally and physically tiring
Easy to use	The whole process of change including administration, training, support, etc is a lot of work
 Proposal for change is clear 	
 Relative advantage is clear: improved outcomes for both patients and health service 	
 Endorsed by clinical leaders, good local engagement, clinical champions 	
 Surgeons allowed to keep the theatre time and reduce their own waiting lists (rather than 	
reallocating to other surgical specialties or closing theatres to realise savings)	
Potential adopters (Nursing and Allied Health staff to undertake new procedure, surgeons to reduce	old procedure, junior medical staff to refer patients appropriately
---	---
 Most surgeons happy to relinquish old procedure to allow them to undertake other procedures 	 One group of surgeons less likely to refer patients for new procedure, do not appreciate role of
Surgeons involved in VPACT application have become an authority on the new technology	podiatrist in patient care, lack of understanding of treatment options
Senior clinical staff read up on new technology as they don't want to lose face	 Some surgeons/medical staff have issues with territorialism and ego
 Registrars (referrers) are supportive of/have an interest in new technologies 	
 General interest among staff 	
 Nursing/Allied Health team look professional, able to build credibility and trust with patients 	
Potential patients	
 Patients with chronic conditions are more open to trying new treatments 	 This group of patients are less likely to be comfortable travelling to different hospitals
	 Lack of English language can be a problem
Implementation plan	
 Small training workshops with medical teams 	Should have performed barriers and enablers analysis earlier in process
Support from CCE	 Involvement of other hospitals with staff who are not dedicated/committed (eg disputes among
 Support from Clinical Program Directors 	doctors from another site)
 Maintenance of a booking system 	 Having to repeat training every 3-6 months due to staff rotations
 Quarterly meetings with all participating health services 	 Attrition of podiatrists and Clinical Nurse Consultants as they are often young women who leave or work part-time to have or care for children
	Keeping the team motivated is hard
	 VPACT did not meet costs stipulated in application; fewer machines, limited consumables, etc
	 Lack of dedicated treatment room increases time for preparation and cleaning. Clinical time is small in comparison to set up/clean up time. Inadequate ventilation (aerosols are created with treatments)
Evaluation plan	
 Support from CCE in development of evaluation plan 	 'Shifting the goal posts' by VPACT regarding data collection and reporting
 Having a person in charge of data entry 	
Implementation and evaluation resources	
 Other clinical staff voluntarily take up extra workload (both barrier and enabler) 	 Inadequate funding for clinical staff to implement and evaluate change process
 Support from CCE in design of a database, assistance with data entry and reporting 	 Other clinical staff voluntarily take up extra workload (both barrier and enabler)
 Support from SHARE health economist in development of cost-comparison plan 	 Time needed to write up new scope of practice documents
 Monash Health 'Scope of practice' processes and documents were helpful 	

Aim 2.3 Development, implementation and evaluation of disinvestment projects

No published guidance regarding development, implementation or evaluation of disinvestment projects in the local health service context was identified [2, 4]; however Monash Health staff provided details of strengths, weaknesses, barriers and enablers in these processes (Table 4) [14] and needs for assistance to undertake projects [15]. Implementation and evaluation methods were planned for the SHARE disinvestment pilot projects, however only one reached the implementation stage and evaluation was limited due to the reduction of funding in the final year [27].

The overview of the literature includes a discussion of available methods and tools for disinvestment projects [45].

Influencing factors

Factors influencing the SHARE process for identification, prioritisation and decision-making, implementation and evaluation of potential projects and those influencing the pilot project selected are outlined in Tables 17 and 18.

Aim 3. Support services

Although Monash Health staff identified evidence from research and local data as key elements of decision-making, local research confirmed the findings of other studies that evidence from research and local data is not used systematically or proactively to drive decisions; that health service personnel usually lack the time, knowledge, skills and resources to access and identify the information they require and appraise it for quality and relevance; that clinicians charged with undertaking projects commonly do not know how to implement and evaluate change or manage projects effectively; and that projects are generally under-resourced [3, 14, 16, 26, 75-80]. Respondents were aware of their limitations and those of their colleagues in undertaking projects and they welcomed advice and support [15]. Four support services were proposed to address these barriers in Aim 3 (Figure 5). Details of these investigations are reported in Papers 7 and 8 [15, 43] and an overview and summaries of factors that influenced development, processes and outcomes of the support services are found in Figure 8 and Tables 19 and 20.

The effectiveness of evidence products and capacity building strategies to address the need for education, training, support and assistance from experts to enable EBP is well documented [2, 14, 16, 26, 75-78] and in-house 'resource centres' have been proposed as a solution [10, 59, 81-83] but, other than capacity building for research [84], we were unable to find any examples that had been evaluated.

Figure 8. Overview of investigation of the SHARE Support Services

OBJECTIVES	COMPONENTS TO BE INVESTIGATED	ACTIVITIES	APPLICATION AT MONASH HEALTH	CONCLUSIONS
Evidence Service To provide high quality synthesised research evidence to clinicians, managers and policy makers for use in decision-making	 Identification, capture and process of synthesised evidence Translation into user friendly formats Dissemination to decision-makers 	Development Assessment of current practice Analysis of barriers, enablers and needs Ascertainment of 	Two models implemented	 'Self-selected participants in a voluntary framework' has limitations 'Designated decision-makers in a mandatory governance framework' achieved objectives
Data Service To provide health service data to clinicians, managers and policy makers for use in decision-making	 Identification of high risks and variations in practice Translation into user friendly formats Dissemination to decision-makers 	preferred content, format and methods of service delivery – Literature review – Surveys – Interviews	Four models explored None implemented	 Lack of success due to incorrect assumptions and local factors beyond control of SHARE project All four models have potential and warrant further investigation
Capacity Building Service To educate, train and support clinicians, managers and policy makers to use research and data in decision-making and implement and evaluate evidence-based change	 Training in accessing and using evidence and data Training in implementation and evaluation Mentoring and support 	 Workshops Implementation Implementation strategies Stakeholder involvement 	 Some training delivered successfully, some not implemented Support delivered but limited participation Online resources not explored due to reduced funding 	 Short term objectives achieved but long term outcomes not evaluated due to reduced funding Proposed model has potential and warrants further investigation
Project Support Service To provide methodological advice and practical support for effective implementation and evaluation of decisions	 Methodological advice Assistance with project development and administration Assistance with data capture, data entry and analysis 	 Evaluation & Research Outcomes measured Application of framework for evaluation and explication of change 	 Only one project Implementation not complete due to reduced funding 	 Short term objectives achieved but long term outcomes not evaluated due to reduced funding Proposed model has potential and warrants further investigation

Table 19. Factors that influenced decisions in development of the SHARE support services

	E\ S	/IDENG	CE E	DATA SERVICE		CAPACITY BUILDING SERVICE			PROJECT SUPPORT SERVICE			
	Identify, capture and process synthesised evidence	Translate into user friendly formats	Disseminate to decision-makers	Identify high risks and variations in practice	Translate into user friendly formats	Disseminate to decision-makers	Provide training in accessing and using evidence and data	Provide training in implementation and evaluation	Mentor and support	Provide advice regarding methodologies and methods	Assist with project development & administration	Assist with data capture, data entry and analysis
BARRIERS												
Lack of time and opportunity [16, 18, 76, 77, 80, 85-93]			~			~					~	~
Lack of skills [10, 16, 18, 49, 54, 77, 78, 80, 86-88, 90, 92-95]	~	~	~	~	~	~	~	~	~	~	~	~
Lack of confidence [16, 96]	~	~	~	~	~	~	~	~	~	~	~	~
Lack of interest or competing priorities [75, 87, 93, 96, 97]			~			~	~		~			
Lack of awareness of research and data [10, 16, 75, 78, 80, 90]	~		~	~		~	✓					
Lack of use of available research and data [10, 50, 75, 78, 95]		~	~		✓	~	✓	~	✓	~	~	
Lack of relevant research and data [77, 78, 85, 87-89, 91, 92, 94, 98] particularly for disinvestment [30, 49, 62, 92, 93]	~			~			~					
Poor quality of health data [78, 85, 92, 95, 98-100]				~	~	~						
Unfamiliar or difficult to use formats of research and data [16, 78, 90, 92, 93, 95, 98]		~			*		~					
Lack of policies and interventions for data-informed decision- making [78, 85, 101]				~	~	<						
Difficulty accessing or using online resources [16, 18, 75, 77, 78, 86-88, 90-92, 94, 98]	~			*			~		~			
Lack of infrastructure and technical support [10, 16, 76, 85, 91, 93, 95, 99, 102]	~	~	~	~	~	<	~	~	<	~	~	~
Inadequate resources [76, 77, 85, 87, 91, 101, 102]	~		~	~		~					~	~
Negative attitudes or resistance to change [16, 76, 80, 93]		~			~		~	~				
Professional groups with different perspectives of evidence, knowledge base and skill set [62]								<	<			
Lack of triggers to initiate disinvestment discussions [5, 50, 82, 103]			~			~						
Lack of standardised processes for project delivery, responsibilities and accountability [49, 53, 104]								~	~	~	~	~
Unrealistic project timelines [104]								~	~	~	~	~
ENABLERS												
Training in use of evidence and data [16, 86, 90, 95, 99, 101]							~	~	~	~	~	~
Dissemination of research and data [77, 90, 101, 105]			~			~						

	E\ S	/IDENG	CE E	DATA SERVICE		CAPACITY BUILDING SERVICE			PROJECT SUPPORT SERVICE			
	ldentify, capture and process synthesised evidence	Translate into user friendly formats	Disseminate to decision-makers	Identify high risks and variations in practice	Translate into user friendly formats	Disseminate to decision-makers	Provide training in accessing and using evidence and data	Provide training in implementation and evaluation	Mentor and support	Provide advice regarding methodologies and methods	Assist with project development & administration	Assist with data capture, data entry and analysis
Clarity, relevance, credibility and reliability of research findings [77, 90, 92, 106, 107]	~	~					~					
Quality and timely data from health information systems [78, 92, 95]				~	~		~					
Organisational willingness to invest in a knowledge translation culture [76, 101, 108]	~	~	~	~	~	~	~	~	~	~	\checkmark	~
Infrastructure or policy for accountability in knowledge use [76, 101]			~			~						
Links to researchers or knowledge brokers [76, 77, 92, 108, 109]			~			~	<	~	~	~	~	~
Initiatives to integrate data into routine decision-making processes [105]				~	~	~						
ADDITIONAL NEEDS												
Capacity-building and provision of expertise and practical assistance [8, 10, 59, 78, 83, 90, 100]	~	~	~	~	~	~	~	~	~	~	~	~
New processes to use research and data 'proactively' to drive decisions [59, 78, 99, 100]	~	~	~	~	~	~						
Analysis, synthesis, interpretation and review of data in decision-making [78, 95, 99]				~	~	~	~	~	~	~		~
Incentives to change [50, 53, 101]										~	~	~
Support to be tailored to units and professional needs [78, 107, 108]		~			~		~	~	~	~	>	~
Provision of a range of expertise in evaluation methods [84, 99]										~	~	~
Support from others who had done the same or similar work to address feelings of isolation							~	~	~	~	\checkmark	~
EVIDENCE-BASED INTERVENTIONS												
Dissemination of summaries of systematic review evidence [75, 110, 111]		~	~									
Tailored targeted messages [75, 112-114]		~	~		~	~						
Training in critical appraisal [111, 113, 115]							~		~			
Interactive workshops [75, 115]							~	~	~			
Multifaceted educational intervention [75, 115]							~	~	~	~	~	~

Table 20. Factors that influenced processes and outcomes of the SHARE support services

CHARACTERISTICS OF THE DETERMINANTS OF EFFECTIVENESS*					DS	CBS	PSS
	Political	Disinvestment was a priority topic for Department of Treasury v	which encouraged Department of Human Services to investigate it further	✓	✓	~	✓
External	Financial	Department of Human Services funding for SHARE enabled all t	ne activities	✓	✓	✓	✓
environment	Initial Cal Withdrawal of funding in final year of program prevented implementation of some interventions and many of the evaluation activities Monach Health funding for SHAPE also enabled all the activities				×	×	×
	Financial Monash Health funding for SHARE also enabled all the activities Monash Health funding for ES continued after Department of Human Services funding withdrawn		✓	✓	~	✓	
			~				
Organisation	Leadership	Support and endorsement was provided at senior levels (Board,	Executive Management Team, Clinical Program Directors)	✓			
	Monash Health had multiple databases, housed with different custodians, with a range of methods of access; there was no coordination			×			
	Processes	Evidence Service was implemented in a governance framework	requiring mandatory responses from decision-makers	✓			
	Culture	Organisational (ES) and departmental (CBS) culture was support	tive of evidence-based practice	\checkmark		\checkmark	
		Most target users viewed the proposals positively		✓		~	✓
Detential	Attitudes	Target users acknowledged their limitations, were enthusiastic	about training and support and were willing to take advice and direction			✓	✓
adopters		Committees declined support in accessing and using data			×		
	Support Pharmacy staff had support from management to attend training				\checkmark		
	Leadership	Pharmacy staff, pharmacy-related committee members and SHARE pilot project teams demonstrated leadership by their participation				\checkmark	✓
Evidence		Developed from research and local data identifying barriers, en	ablers and expressed needs for content and format	✓	✓	\checkmark	✓
	Good supporting evidence of effectiveness of chosen interventions		ons	✓	✓	~	✓
	Engagement and	Centre for Clinical Effectiveness has ownership of the project ar	nd authority to implement change	~		>	\checkmark
	champions	Centre for Clinical Effectiveness does not have ownership of the	e project and authority to implement change		×		
Innovation	-	Within Centre for Clinical Effectiveness skill sets and priorities		✓		~	✓
	Compatibility	Not within Centre for Clinical Effectiveness skill sets and prioriti	es		×		
	with status quo	Proposal is not deliverable in original format (multiple often ina	ccessible datasets, lack of local capacity and capability)		×		
	Tata la billio i	All services were implemented in pilot mode and participants w	ere informed that their feedback would be used to refine the processes	✓		~	\checkmark
	Trialability	Implementing with small groups resulted in lack of critical mass	for ongoing support services			×	
	Tailored to	Barrier and enabler analysis focused on development of the inn	ovation and not on development of implementation strategies	×	×	×	
	enablers	Tailored to needs of individual projects and project teams					✓
Implementation	Knowledge and	Centre for Clinical Effectiveness team had skills in implementati	on of change	✓		✓	✓
strategy	skills	Health economist and health program evaluator engaged as consultants to the project team				~	✓
	Pasaursas	Adequate resources initially		~	✓	>	✓
	nesources	Inadequate resources after Department of Human Services fund	ling withdrawn		×	×	×
* Not all factors fr	om the taxonomy a	re listed, only those that influenced the pilot projects.	# ES = Evidence Service, DS = Data Service, CBS = Capacity Building Service, PPS	S = Proje	ct Supp	ort Ser	vice
Some factors only	influenced some of	the support services.	\checkmark = Positive influence, \varkappa = Negative influence				

Aim 3.1 Evidence Dissemination Service

The Evidence Dissemination Service (EDS) was conceived as a method of identifying disinvestment opportunities by delivering recently published, high quality, synthesised evidence directly to decision-makers [43]. But it became clear during development that this could be a way to ensure that all practice at Monash Health was consistent with current evidence. Two models were implemented (Figure 9).

Figure 9. Development, implementation and evaluation of an in-house Evidence Dissemination Service

Based on UK Medical Research council framework for evaluation of complex interventions (three phases) [1] and the SEAchange model for sustainable, appropriate and effective evidence-based change (four steps) [116].





Model 1 involved identification, capture, classification and storage of eligible publications; repackaging into user-friendly formats; and dissemination to decision-makers. 'Evidence Alerts' were sent weekly by email or RSS feed and publications were stored in a searchable website. Alerts contained citations which were hyperlinked to abstracts which were hyperlinked to full text. This was undertaken by the EDS team, knowledge brokers from CCE. Decision-makers were required to subscribe to receive the Alerts, appraise the evidence for quality and local applicability, take appropriate action, and report the decisions and actions within their routine monthly reporting structure using a template developed for this purpose.

This model could not achieve its aims. The main factor was lack of governance; there was no process to ensure that the appropriate person with authority in the area affected by the evidence had considered the information, made a decision or taken any action. The second factor was lack of time to undertake the steps required; this was reported by both the EDS team and the decision-makers. In addition, many publications were already known to recipients, not relevant to their area of practice, not applicable at Monash Health, consistent with current practice, not important enough to instigate change or reported lack of evidence; hence required no action. This resulted in time wasted by both the EDS team and the decision-makers.

Model 2 addressed these issues by adding a governance element to ensure the evidence was reviewed and acted upon by the appropriate decision-makers, by limiting selection of publications to areas of high priority to reduce the workload of the EDS team, and by reallocating most of the decision-maker's activities to either the EDS team or the new governing body to reduce the workload of busy clinicians and managers (Figure 10). The Technology/Clinical Practice Committee

(TCPC) already had the authority to require responses from organisational decision-makers and impose changes in practice related to introduction of new TCPs and was deemed an appropriate body to undertake governance of TCPs in current use.

Figure 10. Comparison of stakeholder roles in two models for an in-house Evidence Dissemination Service Reproduced with permission from SHARE Paper 8 [43]

Model 1. Self-selected an	d targeted participants in	in Model 2. Designated decision-makers in				
a voluntary	rframework	a mandatory governance framework				
Delivery of the EDS	Utilisation of the evidence	Delivery of the EDS	Governance	Utilisation of the evidence		
Knowledge brokers with	All staff members authorised to	Knowledge brokers with	Body with authority to ensure	Designated staff members with		
appropriate skills and	make decisions on behalf of the	appropriate skills and	transparency and accountability	responsibility for decisions		
experience (CCE)	organisation	experience (CCE)	for EBDM (TCPC)	related to the evidence		
Identify Capture Classify by taxonomy (eg clinical setting, professional group, specialty area, etc) Store on website, provides searchable database Repackage 'Evidence Alerts' Focused on delivery of evidence to drive EBDM Format • Email: all publications • RSS feed: publications in selected areas of interest Content • Citations hyperlinked to abstracts hyperlinked to full text Disseminate to all EDS subscribers Abbreviations CCE: Centre for Clinical Ef EBDM: Evidence-based du EDS: Evidence Dissemina: PICO: Patient, Interventic RSS: Really Simple Syndic TCPC: Technology/Clinica	Engage with the EDS Subscribe to the EDS Review all publications within the Evidence Alerts Self-identify as person responsible for decisions related to the evidence Retrieve full text Assess the evidence Local applicability Consistency with local policies and procedures Quality Apply the evidence Confirm need for change Take action as required Report to manager monthly using template provided (7 fields to be completed) fectiveness ecision-making tion Service in, Comparator, Outcomes ation IPractice Committee	Identify Capture Classify by nature of evidence (eg harm, benefit, cost-effectiveness, lack of benefit, lack of effect) Assess the evidence • Consistency with local policies and procedures • Quality Filter before forwarding Repackage 'Evidence Bulletins' Focused on governance processes to drive EBDM Format • MS Word document summarising single publication Content • Nature of evidence • Deadline for response • Citation hyperlinked to full text • Author's conclusion • PICO elements • Quality appraisal • Consistency with local policies and procedures • Template for response	Assess local applicability Identify potential need for change Identify the person with designated responsibility for decisions related to the evidence Disseminate to designated decision-maker Review response Take relevant action if in disagreement Report to Chief Executive monthly *Timeframes for response Evidence of harm: 1 month Evidence of clinical or method Evidence of a more cost-effect Evidence of lack of effect: 6 me Lack of evidence: for informati	Confirm need for change Assess need to communication with other stakeholders Take action as required Respond to TCPC within specified timeframe* using template provided (2 fields to be completed) clogical effectiveness: 3 months ive alternative: 3 months onths on only, no response required		

In the final version of Model 2, processing of publications was limited to those demonstrating evidence of harm, lack of effect and availability of a cost-effective alternative which were priorities of Monash Health at the time. The findings of these studies were compared with current documented practice in local policies and procedures. If there was no local documentation, or it was inconsistent with the evidence, the publication was appraised for quality and forwarded to the TCPC to assess local applicability and identify the relevant organisational decision-maker, usually a department head or committee chair. The EDS team then developed an 'Evidence Bulletin' which included information extracted from the publication, the quality appraisal findings and a reporting template (Figure 11). Bulletins were sent to the relevant Executive or Program Director who forwarded them to the authorised decision-maker within their portfolio with a request to confirm whether current practice was consistent with the evidence, and if not, what measures were being taken to address this, or an explanation of why change was not required. The Chief Executive determined that this was an organisational priority; when there was evidence of harm, responses to other Evidence Bulletins were required in three or six months. Publications containing evidence of effectiveness or lack of evidence were not processed and were disseminated for information only, no response was required.

While this was successful in aligning local practice with current evidence, it was a very resource-intensive process and CCE had insufficient staff capacity to maintain it while meeting other commitments. The EDS was suspended in the last few months of the SHARE Program, however it has subsequently been reinstated and is focused on the 'Choosing Wisely' literature [117].

Figure 11. Example of an Evidence Bulletin

Reproduced with permission from SHARE Paper 8 [43]

Southern Health

Technology/Clinical Practice Committee Evidence Bulletin_164

This bulletin is part of a process to ensure that Southern Health practice is consistent with current evidence. Your response is required by the date below. You can find more information about this process on the <u>TCPC website</u>.

The publication below indicates evidence of **Potential HARM (due to significant adverse events/side effects but lack of evidence of effectiveness)** related to Tricyclic antidepressants for autism spectrum disorders (ASD) in children and adolescents. Responses related to evidence of **Potential HARM** are required within **ONE month.**

Please complete and return this bulletin to by 11 June 2012

Bibliographic Source

Hurwitz R, Blackmore R, Hazell P, Williams K, Woolfenden S. Tricyclic antidepressants for autism spectrum disorders (ASD) in children and adolescents. Cochrane Database of Systematic Reviews 2012, Issue 3. Art. No.: CD008372. DOI:10.1002/14651858.CD008372.pub2. <u>http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD008372.pub2/pdf</u>

Author's Conclusion

Clinicians considering the use of TCAs need to be aware of the limited and conflicting evidence of effect and the side effect profile when discussing this treatment option with people who have ASD and their carers. Further research is required before TCAs can be recommended for treatment of individuals with ASD.

Applicability to Southern Health

Patient / Population	Inclusion was limited to children and adolescents (birth to 18 years of age) with a diagnosis of an autism spectrum disorder (ASD), using a standardised diagnostic instrument (for example, ADOS, ADI-R, DISCO, CARS) or using established diagnostic criteria as defined by DSM-IV or ICD-10, that is Pervasive Developmental Disorder, excluding Rett Syndrome and Childhood Disintegrative Disorder.
N	3 studies – number of participants unclear
Setting	Outpatient setting
Intervention	Any oral tricyclic antidepressants, regardless of dosage used, duration of use or frequency of administration. Tricyclic antidepressants include amitriptyline (amitriptyline hydrochloride), amoxapine, clomipramine (clomipramine hydrochloride), dothiepin (dosulepin hydrochloride or dothiepin hydrochloride), doxepin, imipramine (imipramine hydrochloride), iofepramine, nortriptyline, trimipramine, desipramine, florpiramine, dibenzepin, iprindole, protriptyline and modified tricyclic antidepressants such as tianeptine.
Comparison	Placebo
Outcomes	Primary outcomes
	 Core symptoms of autism, for example, impainments in communication, recipical social interaction and behavioural problems, such as repetitive behaviours and rituals, obsessional behaviour and stereotypy. Non-core symptoms, including challenging behaviours, sleep disturbance and aggression. Comorbidities, including depression and anxiety. Adverse effects. Secondary outcomes Parental, child or family quality of life. Parental or family stress. We planned to examine short-term (up to three months), medium term (three to 12months) and long-term (greater than 12 months) outcomes if the data were available. We used the primary and secondary outcomes to populate the 'Summary of findings' tables. Types of measures: Standardised diagnostic assessment instruments (Childhood Autism Rating Scale, Autism Diagnostic Interview- Revised, Autism Diagnostic Observation Schedule, Diagnostic Interview for Social and Communication Disorders). Standardised communication assessments. Quality of life questionnaires.
	4. Rating scales of emotions and behaviour, including depression, anxiety, aggression, obsessive-compulsive behaviour and social reciprocity.
	5. Global Clinical Impression Rating Scales.
	6. Other Health Outcome Rating Scale.
Inclusion Criteria	Randomised controlled trials (RCTs).
Exclusion Criteria	

Quality of Evidence

Quality of this Systematic Review or Health Technology Assessment

CCE staff appraised the methods used in this publication and found the **risk of bias** to be **LOW**. This means that you can use the findings of the review with confidence as all of the quality criteria have been fulfilled or where criteria have not been fulfilled it is very unlikely the conclusions of the study would be affected.

Quality of the evidence contained in this Systematic Review or Health Technology Assessment

The review authors appraised the available evidence and found it to consist of **Level II Evidence (one or more randomised controlled trials)**. The available evidence included in the review is of **variable quality**.

Consistency with Southern Health documented practice

No Southern Health policies or procedures on this topic were identified.

Response

- Click once on the shaded box to select the appropriate response
- Click once on the shaded rectangle to provide a typed comment

Practice at Southern Health (please select one response only, tick the box and provide relevant details)

Not applicable at Southern Health eg the patient group is not treated at Southern Health (please explain)
Practice is consistent with the evidence (please add comments if relevant)
Practice is not consistent with the evidence for a good reason (please explain)
Practice was not consistent with the evidence, remedial action has been undertaken and completed (please explain)
Practice is not consistent with the evidence and remedial action has been commenced/planned (please explain)

Communication

Should this information be disseminated more widely? If so, to whom?

Other comments

Feedback

This is a pilot of new processes being implemented by the Technology Clinical Practice Committee and the Centre for Clinical Effectiveness Evidence Dissemination Service.

We would appreciate any comments regarding what works, what doesn't work and how we can improve the process.

Name:		
Position:	Date:	

Thank you

This study provides the details of a systematic process for recently published, high quality, synthesised evidence to be *"captured from outside, circulated internally, adapted, reframed, implemented, and routinized in a service organization"* [117]. To our knowledge, this is the only report of development, implementation and evaluation of an in-house EDS implemented in a governance framework within a local healthcare setting.

Existing evidence services deliver bulletins on selected topics to individual subscribers [118-120]. Types of evidence products have also been defined [121]. There are many similarities between these examples and the SHARE EDS, however there are several key differences between the models explored here and those trialled by others.

The main distinctions are related to the in-house systematic approach to using evidence proactively to ensure organisational practice is consistent with current evidence.

Many studies have explored the characteristics and use of publications as evidence products [90, 107, 121-130]. In addition to content and format of the products, others have noted the need to target individual decision-makers [121, 123, 126] who are authorised to implement change [16, 51, 54, 77, 91, 131, 132] with timely [75, 133] and locally relevant information [90, 107, 121]; actively deliver the evidence directly to decision-makers [126, 133]; create an organisational culture supportive of EBDM [121, 126]; make use of existing formal infrastructure [16, 102, 133, 134] in a governance framework to provide legitimacy and engagement [135] particularly in the case of disinvestment where a governance committee is thought to *"make contentious decisions more palatable and defensible"* [10, 53, 136, 137]; and clearly identify requirements for accountability [91, 124, 127, 135] including mandated responses [138] and use of reporting tools [135].

The EDS Model 2 may be the first to integrate all of these. It builds on earlier findings by focusing on new organisationwide systems and processes embedded in existing infrastructure, such as CCE, TCPC, authorised decision-makers, and reporting networks, in which to disseminate evidence within a governance framework.

The Evidence Bulletins had elements of each of the defined categories [121] – summaries, overviews and policy briefs – but they also had critical differences with other disseminated evidence products (Table 21).

Table 21. Unique characteristics of the SHARE EDS

- The nature of the evidence, such as evidence of harm, clinical or cost-effectiveness, lack of effect, or lack of evidence, was defined for each publication and used to determine the next steps for knowledge brokers and decision-makers.
- Each article was critically appraised for quality and an appraisal summary and its implications was provided for the reader; low quality reviews were not disseminated.
- Local implications were considered.
 - Publications were only disseminated if they were inconsistent with organisational policies and protocols or there was no relevant local guidance on this topic.
 - Applicability was assessed by senior managers prior to dissemination and PICO characteristics were extracted and summarised to enable the authorised decision-maker to confirm local applicability.
- Specific time-critical actions were required of the recipients; for example in the case of evidence of harm, decision-makers had to
 determine whether practice change was required, develop a plan for action, and respond with the details within one month.
- The governance elements ensured transparency through clear systems and processes and accountability through reporting
 requirements. The EDS was given high priority by the Chief Executive who instigated the mandatory responses and implementation was
 integrated into the organisational Business Plan.

Aim 3.2 Data Service

The Data Service was initiated to complement the EDS by delivering local data to decision-makers. The aims were 1) to interrogate routinely-collected data to identify potential disinvestment opportunities and communicate this information to appropriate decision-makers; 2) to respond to requests from decision-makers to assess local data related to potential disinvestment opportunities that had been identified from the research literature; and 3) to provide training, advice and support in accessing and utilising local data to the Capacity Building and Project Support Services [15]. Investigation of routinely-collected data would include:

- patterns of current practice to identify areas where disinvestment might have the greatest impact such as high volume; high cost; high rates of mortality, adverse events, readmission, reoperation; and long length of stay.
- variations in practice that might indicate overuse or inappropriate practices, for example between sites, departments and individuals at Monash Health; between Monash Health and similar health services; or over time.

Four models of a Data Service were explored, but none were implemented due to local factors such as limited staff capacity and problems with local data access and coordination [15]. As a result, proactive use of health service data was not employed to identify disinvestment targets for pilot projects.

Aim 3.3 Capacity Building Service

The aim of this service was to train and support staff to use research evidence and data in decision-making and then implement and evaluate these decisions in successful projects [15]. The proposed activities included (Table 22):

- education and upskilling programs in critical appraisal, data interpretation, change management, implementation and evaluation through teaching modules, online resources and masterclasses.
- support programs such as problem solving workshops, clinical fellowships and mentoring programs.

The Pharmacy Department and four medication-related committees (Therapeutics, Medication Safety, Adverse Drug Reaction and High Cost Drugs) were chosen to pilot the Capacity Building Service based on their roles in decisions for purchase and/or use of pharmaceuticals and their interest in disinvestment. Staff involved in the SHARE disinvestment projects were also invited to participate [27].

Evaluation immediately after workshops showed participants' knowledge and confidence improved in all aspects of the evidence-based change process and the concepts of EBP, implementation and evaluation. There were further improvements after three months, however there were only a small number of responses. Participants reported high rates of satisfaction and noted that the workshops met or exceeded their expectations [15].

Due to the reduced funding in the final year of the SHARE Program, the service was not expanded beyond the target audience of the pilot and the online resources, fellowships and mentoring program were not established.

Aim 3.4 Project Support Service

Health service staff report that they do not have the necessary skills and frequently have insufficient time and resources to deliver projects effectively [15]. The Project Support Service was established to investigate the nature and amount of guidance and support required to meet the needs of the SHARE disinvestment project teams [27].

Four SHARE disinvestment projects were commenced. It was anticipated that methodological advice and support would be delivered in a range activities related to project planning, governance and administration; implementation and evaluation and practical assistance provided for data capture, entry and analysis (Table 23). One of the clinical project teams required support in all of these areas. The other three were still in the decision-making and development phase and needed assistance in searching the literature, appraising evidence, analysing local data, determining the nature and scope of the problem, clarifying the intervention and assessing feasibility and risk before they were ready to proceed. These projects were subsequently withdrawn based on the outcomes of this process.

Each of the four clinical project teams acknowledged their lack of skills and experience in using evidence in decisionmaking, project management, implementation and evaluation. They were appreciative that support was available and were willing to accept guidance.

Due to the reduced funding, the fourth project had not completed implementation when the SHARE Program ceased. Although evaluation of project outcomes could not be undertaken as planned, the clinical project team provided feedback on the Project Support Service. Expertise of CCE staff, practical support in development of the evaluation plan and design of a Microsoft Access database, and assistance with data entry and reporting were noted as positive factors.

Table 22. Activities of the Capacity Building Service

Reproduced with permission from SHARE Paper 7 [15]

Training workshops

Interactive workshops to improve knowledge and skills

- Evidence-based change process (½ day)
 - To understand the steps in developing, implementing and evaluating a change process
 - To apply the principles of evidence based practice to each step
 - To outline methods of collecting the information required to develop, implement and evaluate your project using this framework
 - To learn and share practical hints and tips for successful evidence-based change
- Evidence-based practice (4 x ½ day)
 - To understand PICO elements and develop a searchable question
 - To learn the best research design to answer specific questions
 - To learn methods for searching health databases and undertake your own searches
 - To understand the role of chance, bias and confounding
 - To learn methods for critical appraisal and undertake appraisal exercises
- Introduction to implementation (½ day)
 - To understand the principles of evidence-based implementation
 - To learn methods for identifying barriers and enablers and developing implementation strategies
 - To learn and share practical hints and tips for successful evidence-based implementation
 - To design an implementation plan for your project
- Introduction to evaluation (½ day)
 - To understand evaluation: What? Why? When?
 - To understand evaluation frameworks and plans and data collection methods and sources
 - To consider the role of ethics in evaluation
 - To understand Program Logic Models
- Using evidence in decision-making (1½ hours) (planned but not delivered)
 - To consider the deliberation process and the role of decision-making criteria
 - To discuss the principles of evidence-based decision-making (EBDM)
 - To understand the implications of research design, level of evidence, quality, applicability, lack of evidence
 - To apply the learnings in worked examples
 - To be introduced to resources and services that support EBDM

Problem solving/support sessions

Rotating 4 weekly series of open workshops to provide ongoing support to workshop participants undertaking projects.

- Week 1: Finding and appraising evidence and interpreting results
- Week 2: Planning and implementing projects
- Week 3: Evaluating programs and projects
- Week 4: Developing guidelines and protocols

Online resources/teaching (to be sourced or developed)

- Electronic workbook
- PowerPoint presentation/s
- Self-assessment quizzes

Table 23. Activities of the Project Support Service

Stage of Project	Activities		SHARE projects					
			1	2	3	4		
Decision-making	Searching literature			~	✓			
and project development	Appraisal of evidence			✓	✓			
	Analysis of local data				✓			
	Determination of nature and scope of problem			~	✓			
	Clarification of the intervention			✓	✓			
	Analysis of feasibility and risk				✓			
Project planning	Confirmation and documentation of scope, objectives, background, etc	~	✓	~	✓	✓		
	Identification of needs of clinical project team	~		~	✓	✓		
	Identification of stakeholders	~				✓		
Project	Confirmation and documentation of governance processes	~				✓		
management	Establishment of management and administration systems and processes	~				✓		
Implementation	Capture and analysis of barriers and enablers	✓				✓		
planning	Identification of strategies to address barriers and enablers	~						
	Development of implementation plan (including communication plan)	~				✓		
	Liaison with committees/departments for authorisation of practice change	✓				✓		
	Liaison with committees/departments for authorisation of documentation	~				✓		
Evaluation	Development of evaluation framework and plan	~				✓		
planning	Development of costing/economic evaluation plan	~				✓		
	Identification of relevant tools	~				✓		
Development of	Liaison with Health Information Management to determine codes	✓				✓		
data collection	Liaison with Clinical Information Management to access patient data	✓				✓		
-,	Liaison with data analysts, statistician, health economist, other experts	✓				✓		
	Development of data collection tools	✓				✓		
	Development of electronic database (eg Access or Excel)	✓				✓		
	Training project workers in use of database programs	✓				✓		
Evaluation	Assistance with data entry	✓				✓		
	Assistance with data cleaning	✓						
	Assistance with data analysis	✓						
Reporting	Development of reporting schedule	✓				~		
	Assistance with reporting	✓						

Aim 4. Program evaluation and research

Aim 4 addresses the lack of information about factors influencing resource allocation, processes for implementing disinvestment decisions, and perspectives and experiences of healthcare staff undertaking disinvestment.

Although each of the first three aims included evaluation in their pilot and implementation phases, a fourth aim was specified to highlight the importance of evaluation, research and dissemination in capturing and understanding what happened and sharing this with others interested in developing similar models.

Aim 4.1 Evaluation and explication

An evaluation framework and plan was developed for the overall SHARE Program and included evaluation domains, audience, scope, evaluation questions, outcomes hierarchy, sources of data, methods of collection and analysis, reporting and timelines [139]. More detailed evaluation plans were developed for individual projects.

Due to the size and complexity of the SHARE Program, its interconnectedness with other Monash Health activities, and the inability to separate out factors that influenced economic outcomes, an economic evaluation of the overall program was not possible. Economic evaluations were planned for the disinvestment pilot projects and support services, but were not undertaken due to the reduction in funding in the final year of the program.

Factors that influenced development, processes and outcomes of individual projects were identified using an existing framework and taxonomy for evaluation and explication of evidence-based innovations [140] which was adapted for use in the SHARE Program (Figure 12) [141].

Figure 12. Four adaptations of a framework for evaluation and explication

These adaptations are based on an existing framework for evaluation of implementation of an evidence-based innovation [140]

1. SHARE Program

Reproduced with permission from SHARE Paper 1 [141].

A taxonomy for this framework is also available in Paper 1.

A. Components



B. Evaluation and research activities for SHARE Program and pilot projects

Determinants of effectiveness	Process of change	Outcomes			
Analysis of barriers and enablers	Assessment of perceptions of participants, adopters and patients	Process, impact and outcome evaluation			
Documentation of observable characteristics	Documentation of observable characteristics Detailed documentation of implementation and evaluation process				
Reflective self-evaluation of project team's experience					

2. Investigation of organisational decision-making

Reproduced with permission from SHARE Paper 3 [14]



3. Investigation of disinvestment process

Reproduced with permission from SHARE Paper 6 [27]

A taxonomy for this framework is also available in Paper 6.

A. Components



B. Evaluation and research activities for SHARE Program and pilot projects

Determinants of effectiveness	Process of change	Outcomes				
Analysis of barriers and enablers Assessment of perceptions of		Process, impact and outcome evaluation				
	participants, adopters and patients	(Assessment of reinvestment or reallocation)				
Documentation of observable characteristics	Assessment of sustainability and spread					
Reflective self-evaluation of project team's experience						

4. Investigation of an in-house Evidence Dissemination Service

Reproduced with permission from SHARE Paper 8 [43]

A taxonomy for this framework is also available in Paper 8.

A. Components



B. Evaluation and research activities for in-house evidence products and services in a local healthcare setting

Determinants of effectiveness	Process of change	Outcomes		
Analysis of barriers and enablers	Assessment of perceptions of participants, adopters and patients	Process, impact and outcome evaluation		
Documentation of observable characteristics	Detailed documentation of implementation and evaluation process	Assessment of sustainability and spread		
Reflective self-evaluation of project team's experience				

Aim 4.2 Action research

Action research was undertaken based on the "*researcher as facilitator for change*" model defined by Meyer: researchers working explicitly with and for people rather than undertaking research on them [142, 143]. In this capacity, CCE staff were both the SHARE project team and the action researchers. An agenda item for 'Learnings' was scheduled at the beginning of every team meeting. Participants were invited to consider anything that had affected the project since the last meeting using the framework 'what worked, what didn't, why and how it could be improved' [116]. Each issue, its effect on the project, and potential changes that would build on positive outcomes or remove or minimise future problems were discussed. The learnings and actions were documented; actions were assigned, given timeframes and followed up to ensure completion. Project team observations and reflections were used for ongoing improvements to the program components, implementation and evaluation processes, and explication of the influencing factors. These methods worked well.

Aim 4.3 National workshop

The first Australian national workshop on disinvestment was conducted to share knowledge and develop links for future collaboration. More than 70 participants attended from Australia and New Zealand representing national and state government departments, health services and providers, academic and research groups, professional associations and consumers. Disinvestment was considered from three perspectives: health policy researchers, health economists and health service decision-makers. All findings and presentation materials were published [144, 145].

Aim 4.4 Dissemination

To address some of the gaps in knowledge and contribute to the understanding of systematic approaches to disinvestment and resource allocation in the local healthcare context, the SHARE Program activities are presented in this thematic series.

PHASE THREE (SHARE Papers 9 & 10)

To achieve this aim of addressing some of the gaps in knowledge and understanding of disinvestment at the local level, a review of the current literature incorporating the SHARE findings was undertaken. This is presented as two papers; the contents of both reviews are listed in Table 24. Paper 9 considers the conceptual elements of disinvestment across four themes that have specific relevance to disinvestment in local healthcare services and proposes a new definition and two potential approaches to disinvestment [146]. Paper 10 presents the literature from an operational perspective in the context of a new framework for disinvestment as a component of resource allocation in the local setting [45].

Some of the findings from the reviews have been integrated into the discussions above; some additional findings particularly relevant to the SHARE Program are summarised briefly below.

Table 24. Contents of the literature overviews

Reproduced with permission from SHARE Paper 9 [146]

Conceptual overview (Paper 9)	Operational overview (Paper 10)	
 Terminology and concepts 	 Existing theories, frameworks and models 	
 Health technologies 	 New framework 	
– Disinvestment	– Audience	
 Resource allocation 	 Application 	
 Optimising health care 	 Definitions 	
– Reinvestment	– Concepts	
 Motivation and purpose 	– Components	
 Impetus for disinvestment 	 Principles of decision-making 	
 Rationale for disinvestment 	 Settings 	
 Relationships with other health paradigms 	 Decision-making infrastructure 	
 Evidence based health care 	 Specific initiatives 	
 Quality improvement 	 Individual decision-makers 	
 System redesign 	 Prompts and triggers 	
 Health economic approaches 	 Steps in the disinvestment process 	
Challenges	 Methods and tools 	
 New approach to disinvestment 	 Barriers and enablers 	

Terminology and concepts

There are multiple definitions for the terms 'disinvestment' and 'health technology', a lack of common understanding of the reasons or objectives that underpin the concepts, and disparity in use of the terms between the research and practice settings (Tables 25 and 26). This creates difficulties in the interpretation of disinvestment, application of research findings, and establishment of a systematic approach in the local healthcare setting.

In the absence of common terminology, there is one notably consistent message: that the word 'disinvestment' has negative connotations and is likely to be a barrier to successful implementation of disinvestment-related change. To reduce undesirable effects, other terms have been intentionally introduced to replace 'disinvestment' (Table 27) and other concepts have been proposed as alternative, potentially more successful, approaches. For example, 'resource allocation' and 'optimisation of healthcare' draw the focus away from cost-cutting and redirect it towards effective use of limited resources to maximise health gain.

Table 25. Examples of definitions for disinvestment

Reproduced with permission from SHARE Paper 9 [146]

Definition	Measure	Decision criteria	Position	Action
Disinvestment is an explicit process of taking resources from one service in order to use them for other purposes that are believed to be of better value [35]	Any	Less value than available alternative	Relative	Reallocation
Disinvesting in health interventions that offer no or low health gain (eg are unproven, outdated or cost ineffective) provides an opportunity to invest in alternative proven and cost effective health interventions [147]	Effectiveness, Currency or Cost-effectiveness	Unproven, outdated or cost-ineffective	Absolute	Reallocation
Disinvestment is the process of reducing or ceasing health technologies and clinical practices that provide less favourable outcomes than known alternatives [4]	Any	Less favorable outcome than available alternative	Relative	Removal or Reduction
Disinvestment relates to the withdrawing (partially or completely) of health care practices, procedures, technologies and pharmaceuticals that are deemed to deliver no or low health gain and are thus not efficient or appropriate health resources allocations [82]	Effectiveness	No or low health gain	Absolute	Removal, Reduction or Restriction
Disinvestment can take a number of forms in a healthcare settingand includes full withdrawal or decommissioning, retraction, restriction and substitution [12]	Any	Unspecified	Unspecified	Removal, Restriction or Replacement
Disinvestment refers to processes by which a health system or service removes technologies, without necessarily replacing them [33]	Any	Unspecified	Unspecified	Removal
Disinvestment relates to the withdrawal of funding from a provider organisation and the subsequent stopping of the service [104]	Any	Unspecified	Unspecified	Defunding (resulting in Removal)
Disinvestment includes the withdrawal or reduction of relatively ineffective healthcare, as well as full withdrawal or rationing of equally worthy alternatives due to resource constraints [10]	EffectivenessAffordability	Relatively ineffectiveUnspecified	RelativeAbsolute	Removal,Reductior or Restriction
Disinvestment: the displacement of non-cost-effective technologies for resource reinvestment or reallocation [137]	Cost-effectiveness	Non-cost-effective	Absolute	Reallocation
Disinvestment involves the development & application of epidemiological, economic, ethical & policy appraisals of existing health care interventions that are cost-ineffective or inappropriately applied within health care, leading to displacement of these practices to make way for resource re-allocation towards practices and programs offering greater benefit [148]	Cost-effectivenessAppropriate use	Cost-ineffectiveInappropriate use	Absolute	Removal and Reallocation

Table 26. Examples of use of the term 'health technologies'

Scope	Definition or use
Definition encompasses all elements across the spectrum of healthcare delivery	"drugs, diagnostic tests, including indicators and reagents, devices, equipment and supplies, medical and surgical procedures, support systems, and organizational and managerial systems used across the spectrum of health care"
Definition based on a selection of elements from the extensive list above	"drugs, devices, procedures and screening", "drugs, devices and procedures", "pharmaceuticals, devices, diagnostic tests and interventional procedures"
No definition, but wording suggests that health technologies are separate from other elements	"health care practices, procedures, technologies and pharmaceuticals", "health technology, drug or intervention", "health technologies, practices, and procedures"
No definition, but wording suggests that health technologies are products and devices	"purchasing health technologies", "maintenance and repair", "sunk costs and capital infrastructure", "manufacturers and industry stakeholders", "technology lifecycle"

Table 27. Examples of alternatives for the term 'disinvestment'

epioduced with permission non-shake raper 9 [140]				
Scope	Alternative terms			
Used interchangeably with disinvestment	decommission, remove ineffective services, resource release, defund, ration			
Introduced to capture an aspect of disinvestment	health technology reassessment, de-implementation			
Proposed to capture the process of disinvestment better	displacement, reallocation, reinvestment			
Used to avoid the word disinvestment	prioritisation, reappraisal, reprioritisation, optimisation, substitutional reinvestment, evidence- based reassessment, value for money, therapeutic equivalence, allocative reinvestment, reducing waste, bending the cost curve, contract variation, contract management, service redesign			

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Motivation and purpose

While definitions and terminology related to disinvestment are common in the literature, the reasons underpinning specific disinvestment activities are not widely discussed although they are likely to affect all aspects of the process from identification and prioritisation through to implementation and evaluation.

Many of the multiple definitions include or imply a reason for disinvestment which can be summarised in seven main themes. An eighth option, 'for any reason', is added for completeness (Table 28 and Figure 13). There is considerable overlap between some themes but others appear to be mutually exclusive. There are many more reasons for removing, reducing or restricting use of TCPs from the perspective of a local healthcare service than those captured in the definitions for disinvestment (Table 29).

Understanding the reason for disinvestment is crucial to project planning. If the objective is to reinvest, the savings need to be measured and explicit decisions about redeployment of the funds are required. However if the purpose is to reduce patient harm or improve health outcomes, the evaluation parameters will be patient measures and there may no savings to reinvest and possibly increased costs to find. The barriers and enablers to implementation and evaluation of these two scenarios are likely to be quite different.

Table 28. Examples of reasons for disinvestment from the literature

Reproduced with permission from SHARE Paper 9 [146]

Objective	Scope
Any reason	This is the broadest sense of disinvestment and refers to cessation or limitation of something that was previously in practice. It could apply to services, programs, use of equipment or clinical interventions. Words used interchangeably with disinvestment in this context are decommissioning, de-implementation, removal, replacement, restriction
To optimise health care	This is also a broad concept. It incorporates investment, disinvestment and reinvestment. The focus is on effective allocation of resources to achieve maximum benefit and combines the concepts of safety, effectiveness, cost-effectiveness and eliminating waste. The approach of 'optimal targeting' is also captured here.
To optimise resource use	A similarly broad concept to optimising health care with considerable overlap of intentions. The difference is in the emphasis on economic outcomes rather than other aspects of health care. This is the objective of Program Budgeting Marginal Analysis (PBMA) and other prioritisation activities.
To improve patient outcomes	This relates to removal of harmful or ineffective practices which result in adverse outcomes for patients and/or replacement with more effective alternatives. The focus is safety and effectiveness but the terms 'low value' and 'of little or no health gain' are also used in this context. There is potential to increase costs rather than save money.
To reduce waste	This could also be thought of as improvement in health service outcomes. From the perspective of disinvestment this primarily addresses inappropriate use of diagnostic tests and therapeutic interventions and failure of care coordination.
To get value for money	This is based on consideration of cost-effectiveness and/or risk-benefit analysis. It may be defined by specifying acceptable cost/QALY ratios or based on local values.
To release resources	This can have two elements: to save money in times of financial constraint or to redirect funds to a preferred alternative. Terms used in this context are cost saving, rationing, priority setting, reinvestment and reallocation. Priority setting exercises may also have this as an objective to use disinvestment to enable investment.
To withdraw funding	The focus of this concept is on the process of disinvestment rather than the reason for doing it. Disinvestment defined in this way refers to the act of withdrawing funding from a provider organisation which results in cessation of a service.

Figure 13. Relationships between reasons for disinvestment

Reproduced with permission from SHARE Paper 9 [146]



Table 29. Potential reasons for disinvestment in the local healthcare setting

Financial	Patient care
To save money to meet budget cuts	 To improve patient health outcomes
To find money to spend on something else	 To reduce patient harm
 To prioritise where money is spent 	 To target populations or indications for best results
 To redistribute within or between budgets 	 To improve patient flow and reduce waiting times
 To support investment in new technologies 	 To improve patient satisfaction or reduce inconvenience
 To support continued investment 	 To improve patient access and equity of service provision
 To get value for money 	 To reduce unnecessary tests or treatment
Organisational	Health technology, clinical practice or service
 To meet strategic goals and priorities 	 To keep equipment up-to-date
 To ensure sustainability 	 To remove obsolete or superseded technology
 To increase productivity 	 To remove or restrict TCPs that are harmful
 To work within organisational capacity 	 To remove or restrict TCPs that have little or no value
 To work within staff capability 	 To replace TCPs with alternatives of greater benefit
 To rationalise services eg only provide orthopaedics at hospital A 	 To remove services that are not performing as intended
and oncology at hospital B	 To remove services that are not meeting the needs of the target
 To enable system redesign 	population
 To reduce health service utilisation 	
 To reduce risk to staff, finances or reputation 	
 To reduce waste 	
 To address specific problems 	
Economic	External
 To maximise benefits from resource use 	 To address political priorities
 To improve efficiency 	 To meet legislative, regulatory or accreditation requirements and
 To maintain quality without extra expenditure 	professional standards
To remove TCPs with unacceptable cost per QALY	 To meet national recommendations
	 To address legal and ethical issues
	 To be sensitive to the environment
Evidence Based Practice	Social judgement
 To ensure practice is consistent with current evidence 	 To ensure public funds are spent wisely
 To actively identify evidence of harm or lack of effect and remove 	 To reduce public funding on discretionary services eg some
relevant TCPs	cosmetic procedures
To update evidence-based guidelines and protocols	

Relationship with other healthcare improvement paradigms

Disinvestment is frequently portrayed as if it is a new paradigm for health improvement. It has been described as an 'emerging field'; disinvestment approaches, processes and initiatives are discussed; 'research agendas' are considered; and the need for mechanisms, frameworks, methods and tools are widely acknowledged. Although there are existing health improvement paradigms that address disinvestment-type activities, these are not routinely promoted in implementation and evaluation of disinvestment. For example, EBP, quality improvement and system redesign all have mature frameworks with validated methods that are widely-used and well-accepted in local health services. It is not clear why there is a need for new methods specific to disinvestment in preference to building on existing familiar processes.

Challenges

The nature of disinvestment brings some particular challenges to achieving change. These include a sense of loss experienced by patients and health professionals; challenges to the clinical expertise of providers; need for more convincing evidence before change is accepted; possibility of benefit of the TCP in some cases; heterogeneity of outcomes that suggest benefits to some groups but not others; lack of data and formal methods for quantifying savings and benefits; lack of standardised methods for decision-making; lack of transparency in disinvestment processes; nomination of disinvestment targets by 'outsiders' who are not directly involved in use of the TCP; lack of clarity and rationale and insufficient information to support disinvestment proposals; and conflicting roles of local decision-makers who wear many 'hats' as advocates for their patients, their department, the health service and the wider population.

Redefining disinvestment

There is little evidence of active and successful implementation of specific 'disinvestment initiatives' in the local healthcare setting and specifically seeking out targets when the expressed aim is 'to disinvest' has not been effective. Yet successful removal, restriction and replacement of technologies, clinical practices, programs and services are commonplace at the health service level. These changes are not called disinvestment and the impetus for change is not 'to disinvest' but to meet more constructive aims such as to improve patient safety, implement evidence-based practices, address changing population needs or redirect resources to more pressing priorities. This suggests that the construct of 'disinvestment' may be problematic in the local healthcare setting. After more than a decade of limited success, it may be time to consider new ways of approaching disinvestment. To stimulate research and debate, we put forward two options that address some of the issues identified [146].

The first proposed that if the concept of 'disinvestment' is to remain as a specific aim and activity, it must be clarified and consolidated from three perspectives: 1) Terminology, to achieve a common understanding of disinvestment between researchers and decision-makers and improve communication in disinvestment initiatives; 2) Research, to define and agree upon theoretical underpinnings, scope and methodologies; and 3) Application, to define and agree upon frameworks, models, methods and tools.

The second proposed that the concept of disinvestment is 1) simplified so that it is not a specific aim or activity, but is the outcome of a resource allocation decision, and 2) assimilated within familiar health improvement paradigms to build on existing knowledge and expertise in the health workforce.

In the second option, the term 'disinvestment' would be used in the broadest sense, effectively the opposite of investment, as 'removal, reduction or restriction of any aspect of the health system for any reason'. This can be applied to products, devices and equipment; clinical practices and procedures; health services and programs; information technology and corporate systems. Unlike most of the research definitions for disinvestment, this version is not constrained by a specified purpose (eg withdrawing practices of low value), defined criteria (eg effectiveness or cost-effectiveness) or anticipated outcome (eg reallocation of resources) which do not address cessation or limitation of TCPs for other purposes, based on other criteria, for different outcomes, which are likely to arise in local health services [146].

In contrast, we propose that 'health technologies' is defined in the narrowest sense, as products, devices and equipment (eg prostheses, implantable devices, vaccines, pharmaceuticals, surgical instruments and diagnostic tools) which reflects common use by health service staff and consumers but excludes clinical practices, health programs and services, support systems, information technologies, and managerial systems which are included in research definitions [45].

Theories, frameworks and models

There is little discussion of the role of theory or theoretical approaches to disinvestment in the literature, however 15 frameworks and models related to disinvestment, resource allocation and priority setting were identified; eight of them from the SHARE Program (Table 30). These are mostly conceptual and untested. They include projects to identify and disinvest individual TCPs, programs for sector-wide investment and disinvestment, evaluation, and stakeholder engagement; but none consider a systematic, integrated, transparent, evidence-based, organisation-wide approach to disinvestment at the local level.

Table 30. Examples of frameworks and models related to disinvestment

Framework/Model	Setting	Aims	Method of development	Components	
Projects to identify a	Projects to identify and disinvest individual TCPs				
Framework of potential settings and methods for disinvestment [2]	Organisation- wide program in local health service network	To identify potential settings and methods for disinvestment decision- making within local health service systems and processes	Literature review; survey of external experts, interviews and workshops with local stakeholders	Three organisational contexts that provide potential opportunities to introduce disinvestment decisions into health service systems and processes are presented in order of complexity, time to achieve outcomes and resources required: 1. Explicit consideration of potential disinvestment in routine decision-making for purchasing and procurement and development of guidelines and protocols, 2. Proactive decision-making about disinvestment driven by available evidence from published research and local data, 3. Specific exercises in priority setting and system redesign.	
Algorithm for selecting a disinvestment project from a catalogue of potential opportunities [27]	Organisation- wide program in local health service network	To facilitate decision- making for identification of potential and selection of actual disinvestment projects	Literature reviews; surveys, interviews and workshops with local stakeholders; document analysis; consultation with experts; taxonomy development	Five steps in selection process: 1. Assess highest risk, 2. Assess importance and potential, 3. Assess quality and strength of evidence, 4. Assess extent of problem, 5. Assess implications of change. Three key decision-making steps between Steps 2 and 3, 3 and 4, and after 5. After selection: Notify decision; Implement; Evaluate; Report Each step includes the activities, who will undertake them, and the decision options	
Model for an Evidence Dissemination Service [43]	Organisation- wide program in local health service network	To facilitate use of recently published synthesised evidence in organisational decision- making	Literature reviews; surveys, interviews and workshops with local stakeholders; document analysis; consultation with experts; taxonomy development	Methods and tools to identify sources of high quality synthesised evidence; automate methods of capture; classify, collate and store materials in useful categories; prioritise based on user and health service needs; repackage into suitable formats based on user needs; identify relevant individuals or groups to receive information; disseminate to the appropriate target groups, and report use of evidence	
Guideline for Not Funding Health Technologies (GuNFT) [60]	Two versions are provided, one for application at national and regional level and the other at local level.	To facilitate establishment of a transparent, systematic and explicit process for assessing the potential for disinvestment in certain health technologies or in some of their indications	Literature review; face-to-face meeting, teleconference and emails using Nominal Group Technique with ten experts representing health care delivery, administration, technology assessment and consumers to draft the guideline; validation by two external experts in HTA; wide circulation for comment and approval	Seven phases: 1. Identification through applications; 2. Validation of applications; 3. Prioritisation (if necessary); 4. Assessment; 5. Decision making; 6. Development of an action plan; 7. Diffusion of the decision, the reasons why it has been taken and the action plan. Applications are submitted by health care professionals; validation, prioritisation and assessment of the applications are undertaken by a HTA agency or the health service Technology Assessment Committee; and the decision, development of the action plan and diffusion is undertaken by the health service or regional health authority management team or other multidisciplinary body. Tools are available.	
Disinvestment framework to guide resource allocation decisions in health service delivery [59]	Health service delivery organisations	To aid disinvestment activity in the local setting.	Thematic analysis of systematic review and a scoping review of the public sector and business literatures. Draft framework critiqued by Decision Maker Advisory Committee (Chief Financial Officers from Canadian health services) and External Reference Group (international academics) before being finalised.	Seven steps: 1. Determine objectives and scope; 2. Identify strategic priorities; 3. Identify options and risk; 4. Rank options; 5. Develop implementation plan; 6. Conduct disinvestment; 7. Assess outcomes and processes. Oversight Committee (senior managers and clinical leaders) is responsible for the majority of the process components including making final decisions; independent Assessment Committee (managers, clinicians, other staff and public representatives) defines the criteria, weights and scale used to assess disinvestment options, Support Committee (researchers and financial personnel) assists in the assessment of disinvestment options in the form of evidence, financial analysis and evaluative measures.	

Programs for sector-wide investment and disinvestment				
Framework of components in the resource allocation	Organisation- wide program in local health	To represent components in the process of resource	Interviews and workshops with stakeholders, thematic analysis of responses, document analysis, use of	Eight components: Governance, Administration, Stakeholder engagement, Resources Decision- Making, Implementation, Evaluation, and, when appropriate, Reinvestment. Details of elements of structure and practice within each component are provided. Structure is
process [14]	rocess [14] service network allocation and the relationships between them existing frameworks to synthesise findings	described as 'who' and 'what' and includes people, systems, policies, requirements, relationships and coordination. Practice addresses 'how' through processes, procedures, rules, methods, criteria and customs.		
Model for Sustainability in	Organisation- wide program	To develop, implement and evaluate	Three literature reviews; online survey, interviews and structured workshops with	Four components, each with multiple elements: 1. Systems and processes; 2. Disinvestment projects; 3. Support services; 4. Program evaluation and research
Health care by Allocating Resources Effectively (SHARE) [3]	in local health service network	organisation-wide systematic, transparent, accountable and evidence-based decision- making systems and processes	stakeholders; consultation with experts in disinvestment, health economics and health program evaluation; drafted in consultation with staff, consumers and external experts; assessed against framework for success and sustainability	The model outlines each component and the relationships between them, their aims and activities as well as the underlying principles and the preconditions required for success and sustainability. There is also detailed discussion of the antecedents, barriers and enablers.
New Zealand National Health Committee	National government decision-	To provide the Minister of Health with recommendations for	Not documented	The program addresses which technologies should be publicly funded, to what level and where technology should be provided and how new technology should be introduced and old technology removed.
Workplan [61]	making	use and funding of health technologies		Six phases: 1. Identification, 2. Prioritisation, 3. Analyse and Assess, 4. Recommend, 5. Implement, 6. Evaluate.
Health technology reassessment and	National or provincial	To create a model for assessing the health	Focused narrative literature review and input from experts.	Two components: 1. Health technology life cycle and reassessment, 2. Reassessment and Decommissioning Model, with Oversight Committee, Triggers, and Possible Outcomes.
decommissioning framework/model [137]	government decision- making	technology life cycle to identify and delist obsolete technologies		Second component includes triggers and processes, structure (oversight committee), decisions and outcomes
Program evaluation				
Framework for evaluation of priority setting [149]	National, regional and individual healthcare facilities	To develop a framework for the evaluation of priority setting practice at macro and meso levels	Literature review and thematic analysis	Two evaluation domains: 1. Consequentialist outcomes: Efficiency, Equity, Stakeholder satisfaction, Stakeholder understanding, Shifted (reallocation of resources), Implementation of decisions, 2. Proceduralist conditions: Stakeholder engagement, Empowerment, Transparency, Revisions, Use of evidence, Enforcement, Community values
SHARE Program Evaluation Framework and Plan [3]	Organisation- wide program in local health service network	To assess the effectiveness of the SHARE program, implementation fidelity and factors for successful change	Drafts prepared by project team in consultation with Consultant in Health Program Evaluation to meet the information needs of key stakeholders and the internal capacity of staff conducting the project; revised and finalised in consultation with key stakeholders	Seven evaluation domains: 1. Improved patient care, 2. Improved resource allocation for health technologies and clinical practices, 3. Improved decision-making, 4. Improved staff capacity in use of evidence and data in decision-making and implementation of practice change, 5. Barriers and enablers, 6. Implementation fidelity, 7. Sustainability and spread. Includes an outcomes hierarchy based on the SHARE program components and a research program based on a theoretical framework for implementation of an evidence-based innovation.

Framework for evaluation and explication of the processes and outcomes of a disinvestment project [27]	Organisation- wide program in local health service network	To adapt a framework and taxonomy for evaluation of evidence- based innovations to enable evaluation and explication of disinvestment projects	Literature review, surveys and interviews with stakeholders	Three components: 1. Determinants of effectiveness (characteristics of external environment, organisation, proposal for change, rationale and motivation, potential adopters, potential patients, identification process, prioritisation and decision-making process, implementation plan, implementation resources); 2. Process of change (delivery of implementation strategy and stages of change); 3. Outcomes (process and impact for patient, practitioner, systems, economic, reinvestment, sustainability and spread). Taxonomy containing details within each component is provided.
Integrative framework for measuring overuse [150]	Relevant settings within health care systems	To assess the impact of efforts to reduce low- value care.	Not documented	Provides list of measurement tools linked to specific project/program goals and discusses advantages and disadvantages of each approach
Stakeholder engage	ment			
SHARE model for incorporating consumer views into decisions for resource allocation [19]	Organisation- wide program in local health service network	To involve consumers in organisation-wide decision-making, capture their perspectives and incorporate them into decisions for resource allocation.	Literature review, individual and group interviews with Consumer Working Group and health service staff, workshop with Community Advisory Committee, drafting and revision with consumer participation.	Four components: 1. Principles, 2. Scope, 3. Preconditions, 4. Activities Activities include Consumer engagement (communication, consultation and participation) and use of Consumer evidence (consumer perspectives found in publications and data sources). Details of activities are reported in the context of the components of the resource allocation process noted above
New Zealand National Health Committee Workplan [61]	National government decision- making	To seek advice and engage with the health sector	Not documented	Tiered approach to engage with and seek advice from clinicians via colleges and specialty societies; providers such as District Health Boards, NGOs and private facilities via Health Sector Forum; international Health Technology Assessment agencies; Universities and Research Institutes, international and domestic manufacturers.

New framework for an organisation-wide approach to disinvestment in the local healthcare setting

While there is no overarching framework for disinvestment in this context, there are clear and consistent messages in the literature which are used as the basis for a new framework for operationalising disinvestment (Figure 14). The details of each of the framework components are clearly articulated in the literature and many are derived from extensive work with stakeholder groups including decision-makers, policy-makers, health service staff, patients and members of the public.

The framework is proposed as an organisation-wide application, embedded within existing systems and processes, which can be responsive to local needs and priorities, and employed in policy, management or clinical contexts.

It brings together the definitions, concepts, principles, decision-making settings, potential prompts and triggers to consider disinvestment, and steps in the disinvestment process found in the literature. It also seeks to remove barriers when it is possible to do so through establishment of new or adjustment of existing operational mechanisms.

Definitions for essential terms and key concepts underpinning the framework have been made explicit to address the lack of consistent terminology. To avoid the negative connotations of the term 'disinvestment' and the problems inherent in considering disinvestment in isolation, the proposed framework is based on 'resource allocation' to address the spectrum of decision-making from investment to disinvestment.

The framework is composed of three interconnected and interdependent components: 1) a program for organisationwide decision-making, 2) projects to implement decisions and evaluate outcomes, and 3) research to understand and improve the program and project activities. The program consists of principles for decision-making and settings that provide opportunities to introduce systematic prompts and triggers to initiate disinvestment. The projects follow the steps in the disinvestment process. Each component has a number of elements which are outlined in detail in Paper 10 and summarised in Tables 31-35.

Potential methods and tools are presented and discussed in Paper 10, however the framework does not stipulate project design or conduct; allowing application of any theories, methods or tools at each step. Barriers are discussed and examples illustrating constituent elements are provided (Table 36).

Key findings and recommendations

The key findings and recommendations from the overall SHARE Program are summarised in Table 37.

Figure 14. Framework for an organisation-wide approach to disinvestment in the local healthcare setting



Table 31. Definitions underpinning the framework for an organisation-wide approach to disinvestmentReproduced with permission from SHARE Paper 10 [45]

Health technologies	Health products, devices and equipment used to deliver health care (eg prostheses, implantable devices, vaccines, pharmaceuticals, surgical instruments, telehealth, interactive IT and diagnostic tools). This is a narrow definition reflecting the common use by health care decision-makers and consumers. Clinical practices, support systems, or organisational and managerial systems are NOT considered to be health technologies in this context.
Health technologies and clinical practices (TCPs)	Therapeutic, preventative and diagnostic procedures (eg use of products, devices and equipment PLUS medical, surgical, nursing, allied health and population health interventions). This is a pragmatic term to reflect the scope of most resource allocation decisions in the local healthcare context.
Health programs and services	Agencies, facilities, institutions and the components within them that deliver health care, rehabilitation or population health practices such as health promotion and education.
Disinvestment	Removal, reduction or restriction of any aspect of the health system for any reason. Removal indicates complete cessation, reduction is a decrease in current volume or delivery sites, and restriction is narrowing of current indications or eligible populations. This is a broad definition, in essence the conceptual opposite of investment. This could apply equally to products, devices and equipment; clinical practices and procedures; health services and programs; information technology and corporate systems.
Principles	Fundamental qualities or elements that represent what is desirable or essential in a system.
Criteria	Standards against which alternatives can be judged in decision-making.
Routine decisions	Decisions made on a recurring basis or scheduled via a timetable eg annual budget setting processes, six-monthly practice audits, monthly Therapeutics Committee meetings, reviews of protocols at specified intervals after their introduction, etc.
Reactive decisions	Decisions made in response to situations as they arise eg new legislation, product alerts and recalls, applications for new drugs to be included in the formulary, critical incidents, emerging problems, etc.
Proactive decisions	Decisions driven by information that was actively sought for the purpose of healthcare improvement eg accessing newly published synthesised research evidence such as Cochrane reviews or Health Technology Assessments to compare against current practice, interrogating routinely-collected datasets to ascertain practices with high costs or high rates of adverse events, etc.
Prompt	An informal reminder or encouragement for thought or action.
Trigger	A formal mechanism that initiates or activates a reaction, process or chain of events.
Diffusion	Passive processes by which an innovation is communicated over time among members of a social system; usually unplanned, informal, untargeted, uncontrolled, decentralised, and largely horizontal or mediated by peers.
Dissemination	Active processes to spread knowledge or research eg publications, presentations and other deliberate strategies; planned, formal, often targeted, controlled or centralised, and likely to occur more through vertical hierarchies.
Maintenance	Active processes to sustain recently implemented change after project support is removed; to integrate the change into organisational systems, processes and practices; and to attain long-term viability of the change.
Methods and tools	Approaches, instruments or other resources that identify 'what' tasks are needed at each step and/or 'how' to undertake them. This is a pragmatic inclusive definition developed for use in this overview to assist health service staff in disinvestment. This broad definition allows frameworks and models to be included if they meet these criteria.

Table 32. Concepts underpinning the framework for an organisation-wide approach to disinvestmentReproduced with permission from SHARE Paper 10 [45]

Concept	Implication for framework	
Use of the term disinvestment as a driver or justification for change is associated with negative connotations such as focusing on cost cutting, engendering suspicion and distrust, and getting stakeholders offside.	Do not use 'disinvestment' as the basis for the framework or the aim of change initiatives	
Conducting disinvestment activities independently of existing systems and processes does not represent the reality of health service decision-making. It may be counterproductive: lacking incentives for change and introducing disincentives. Disinvestment should not be considered as an isolated activity, but integrated within existing systems and processes in the context of all resource allocation decisions, covering the spectrum from investment to disinvestment.	Implement disinvestment activities in the context of 'resource allocation'	
Removal or restriction of practices that are harmful or of little or no value; replacement of inferior practices with more effective or cost-effective alternatives; and reduction of organisational waste, systematic error and inappropriate use of TCPs all arise from good policy, management and clinical decisions. If these are based on evidence from research, local data and/or stakeholder views there are sound positive drivers for action. There is no need for the concept of disinvestment to be introduced as a reason for change.	Focus on the positive reasons driving removal, reduction or restriction of current practices	
It has been proposed that disinvestment activities are more likely to be successful if decisions are transparent, integrated into everyday decision-making and central to local planning rather than ad hoc decisions, individuals 'championing' causes or standalone projects		
Disinvestment driven from a positive perspective focusing on optimisation of health care through allocation or reallocation of finite resources for maximum effectiveness and efficiency is more likely to be successful.	Use existing systems, processes, expertise, methods and tools whenever possible	
Existing healthcare improvement paradigms such as Knowledge Translation, Evidence Based Practice, Quality Improvement, System Redesign and Health Economics offer theories, frameworks, methods and tools for decision-making, implementation and evaluation that can be applied to disinvestment.		

Table 33. Principles for a program of decision-making for resource allocation

BOUNDARIES	
Context	Specify the context where decisions will apply. These might include, but are not restricted to, 1) acute, subacute, rehabilitation, community or mental health services; health promotion and education programs; or residential aged care at 2) region, local network, institution, department, ward or committee. [49, 50, 151]
Scope	Specify the type of decisions and topics to be addressed. These might include, but are not restricted to, policy, management or clinical decisions to address capital works, plant and equipment; human resources; organisational systems and processes; guidelines and protocols; procurement or commissioning of TCPs, models of care or health programs and services. [144, 152]
Timeframes	Specify timeframes for decision-making programs (eg long-term ongoing or defined limited application such as 5 years), implementation of decisions and delivery of outcomes. [3, 10, 49, 53, 59, 147, 153-155]
ETHICS	
Justice	Maximise outcomes; direct resources for the greatest utility or benefit for the most people, the 'greatest good for the greatest number'. [51, 136, 156-161]
Fairness	Act impartially; not discriminating on the basis of race, nationality, colour, language, religion, gender, marital status, sexual orientation, social status, political or other opinion, capacity to pay, location of residence, ownership of property, the need for treatment arising out of past behaviour, or age (except where age may affect the outcome). [44, 51, 53, 69, 71, 72, 104, 159-165]
Equity	Horizontal equity: Offer treatment to all patients that meet the relevant criteria, or to none; 'treating like cases alike' or 'equal access for equal clinical need.' The decision should be made for all patients in a group with similar clinical need and not for individuals. Vertical equity: Provide unequal but equitable treatment for people with unequal health needs by giving priority to groups with greater need, for example disadvantage due to social determinants of health. [26, 49, 52, 62, 71, 104, 149, 158-162, 164-168]
Access	Ensure consumers or communities are able to use appropriate services determined by five dimensions of accessibility (approachability, acceptability, availability and accommodation, affordability, appropriateness) and five abilities of populations (ability to perceive, seek, reach, pay and engage). [26, 52, 69, 159, 162-164, 169]
Legality	Act within the law. Ensure decisions are made by those who are legally accountable for the resources and not made by external groups such as pharmaceutical companies, research bodies, or others with vested interests. [104, 153, 162]
Honesty	Be truthful. Do not lie or hide things. [153, 164]
Clinical obligations	Guarantee that removal, reduction or replacement of services or TCPs do not compromise clinical ethical obligations, such as beneficence, or other professional standards. [156]
Patient autonomy	Empower and encourage patients to make informed decisions about their treatment. Safeguard patient choice and informed consent. [156, 159, 170]
Privacy	Ensure patient confidentiality at all times. [156]
GOVERNANCE	
Transparency	Make all elements clear and visible eg who makes decisions, how decisions are made, reasons for decisions, how they are documented, how they will be implemented and evaluated. Seek declarations of conflict of interest and address them openly. Implement single system ie no parallel system where those who lobby could get undue priority. Record departures from process and subject them to scrutiny. [5, 7-11, 13, 14, 44, 48, 49, 51, 53, 62, 69, 71, 81, 103, 147, 149, 153, 155, 158, 162-165, 167, 170-172]
Accountability	Ensure decisions are only made by those who have the authority to do so. Make the lines of authority and responsibility clear and be prepared to acknowledge if errors or complications occur and be accountable for correcting them. [11, 14, 49, 53, 54, 103, 104, 158, 163]
Authority	Ensure decision-makers have the knowledge and capability to make the decisions, the control and power to enact them, and the ability to move resources within and between programs, services, facilities, etc as appropriate. [26, 51, 53, 54]
Enforcement	Implement mechanisms to ensure firstly that all principles are adhered to and secondly that decisions are enacted as planned. [51, 53, 135, 149, 159, 160, 163, 172-174]
Sound management	Establish sound organisational, performance management and resource management structures to ensure due process is followed and implementation of decisions is achieved. Include appropriate corporate expertise from areas such as Finance, Human Resources, Contracting, Communications, Procurement, etc. [3, 10, 13, 26, 53, 59, 62, 104, 153]
Quality improvement	Embed opportunities for ongoing reflection on the processes and outcomes of administration of the framework and take the appropriate actions to increase effectiveness, satisfaction and other measures relevant to the stated objectives. [26, 171, 175]

STRUCTURE	
Systematic approach	Establish systems that are planned, methodical, purposeful and coherent and do not rely on ad hoc, impromptu or improvised mechanisms for decision-making and change. [3, 5, 13, 49, 53, 59, 70, 151, 163, 176, 177]
Integration	Incorporate decision-making systems and processes for resource allocation into existing infrastructure and implement system-wide at each level ie region, local network, institution, department, ward or committee. [3, 8, 11, 49, 53, 54, 59, 100, 104, 133, 147, 162, 171, 178]
Alignment	Align decision-making systems and processes with the institutional mandate, priorities, strategic goals and objectives. Integrate operational aspects within relevant business plans. [3, 11, 49, 59, 62, 147, 155, 177, 179]
Monitoring and Evaluation	Assess compliance with, and effectiveness of, the administration of the program to enable improvement in the systems and processes. Assess outcomes of decisions introducing, removing, reducing or replacing services or TCPs to inform ongoing use and appropriateness of funding. [26, 62, 147, 149, 161, 163, 167, 171, 175]
Reporting	Report outcomes of monitoring and evaluation to relevant stakeholders in a transparent and timely manner to enable enforcement and quality improvement and inform future decisions. [11, 26, 153, 161, 180]
PROCESS	
Explicit criteria	Develop appropriate and achievable criteria to meet the desired objectives, document them explicitly and adhere to them in the decision-making process. [10, 11, 26, 49, 51, 53, 70, 71, 104, 147, 158-160, 163]
Evidence-informed	Use the best available evidence for each of the specified criteria. This may include published research or research syntheses (eg systematic reviews, health technology assessments and evidence-based guidelines), population health data, health service utilisation data, cost data, health economic analyses or models, consumer and staff perceptions, or other sources. [3, 5, 8, 10, 11, 29, 33, 50, 51, 59, 62, 70, 71, 81, 104, 133, 149, 153, 155, 157, 159, 163, 164, 167, 177, 179, 181-185]
Risk-benefit analysis	Assess the risks and benefits of introducing, continuing, expanding, removing, reducing, restricting or replacing individual services or TCPs. Assess the risks and benefits of implementing a significant change initiative. [158, 162-164, 177, 180]
Consistency	Internal consistency: Ensure that the systems, processes, values and reasoning that underpin the program are consistent. In some cases, standardisation may be beneficial.
	External consistency: Ensure that local programs are consistent with regional programs, regional programs are consistent with national programs, etc.
	Consistency of information: Ensure that all materials used in communication are consistent with each other and with the systems, processes, values and reasoning of the program.
	[7, 69, 71, 104, 158, 160, 162-164, 171, 186]
Appeals process	Establish formal mechanisms, transparent rules and requirements, to review, revise or appeal decisions. Correct errors and address disagreements constructively. [104, 149, 158, 160, 161, 164, 167, 171]
Communication	Document decisions.
	Develop channels of communication, methods and tools to:
	 Convey information to stakeholders so they are aware of processes, requirements, decisions and actions taken.
	Seek input from stakeholders to identify issues and drive decisions.
	 Seek feedback from stakeholders to evaluate the processes and outcomes of making and implementing decisions. Ensure 'ten down' and 'hottom un' mechanisms to convey information and sock input and feedback are available, promoted to stakeholders and user friendly.
	 Distribute information to mass media and social media to educate and inform the community and facilitate public dialogue on healthcare decisions
	 Share information with the international community to avoid duplication of effort by publishing assessments, decisions, project initiatives and research activities.
	[8, 19, 62, 69, 147, 153, 155, 158, 161, 171, 177, 180]
STAKEHOLDER IN	/OLVEMENT
Engagement	Identify all relevant stakeholder groups, internal and external to the program. Examples include, but are not restricted to, government departments, local authorities, health agencies
Engagement	health services, professional associations, representative organisations, advocacy groups, policy makers, managers, health practitioners, researchers, resource personnel (eg systematic reviewers, data analysts, health economists, etc) and representatives of the public. Public participation can involve patients, service users, consumers, community members, citizens, taxpayers, voters, etc. Select an appropriate model, framework or guidance document to follow and use methods and tools for stakeholder engagement relevant to the setting and context.

Empowerment	Ensure that stakeholders have the power to contribute to and influence decisions. Implement mechanisms to minimize the effect of the power differences among actors in healthcare organizations; for example give each stakeholder equal opportunities to participate at different stages of the decision-making [149].
RESOURCES	
Funding	Provide adequate funding to underpin the systems and processes to make, implement and evaluate decisions. [14, 62, 147, 155, 163, 167, 177, 179, 187]
Time	Allow all relevant stakeholders to take sufficient time for participation. [48, 50, 53-55, 153, 188]
Expertise	Ensure appropriate expertise is available to make, implement and evaluate decisions. Relevant expertise includes, but is not restricted to, finding and using information, health technology assessment, health economics, data analysis and interpretation, negotiation and meeting facilitation, project management, change management, health program evaluation and knowledge and experience in the topic under consideration. [3, 8, 10, 12, 30, 49, 50, 54, 59, 60, 82, 83, 147, 155, 163, 177, 179, 185]
Information	Provide adequate and appropriate access to high quality information to underpin decisions including, but not restricted to, research evidence, population health data, local health service data, consumer feedback and economic analyses. [26, 30, 49, 53, 54, 62, 153, 163, 167, 171]
Methods and tools	Assist decision-makers, implementers, evaluators and support personnel to find and use appropriate, valid and reliable methods and tools relevant to program and project activities. [3, 8, 10, 12, 30, 49, 50, 54, 59, 60, 82, 83, 147, 163, 185]
PRECONDITIONS	
Leadership	Appoint and train established and emerging leaders with strengths in negotiation and conciliation, political and cultural awareness and sensitivity. [3, 8, 10, 49, 53, 54, 60-62, 153, 155, 171, 176, 177, 179, 180]
Commitment	Establish the program in a way that allows those who are responsible and accountable, the leaders and champions, the decision-makers and support staff to be fully and openly committed, dedicated and loyal to the principles and practices within it. [3, 8, 10, 49, 53, 54, 60-62, 153, 171, 176, 180]
Influence	Engage key stakeholders with sufficient and appropriate influence in relevant areas to facilitate and enable rigorous decision-making and effective action. Considerations might include, but are not restricted to, level of seniority, authority, credibility amongst peers, representation on relevant committees, extent of internal and external networks, etc. [3, 26, 149, 155, 177, 179, 188-191]
Support	Provide support to those involved by endorsing and promoting decisions, trouble-shooting and problem solving, addressing personal and professional needs, etc. [3, 6, 8, 26, 54, 62, 69, 82, 103, 151, 153, 155, 157, 170, 173, 177, 180, 192-196]
Readiness for change	Assess readiness for change at all the relevant levels prior to establishing the program and prior to implementing the decisions taken. Use a valid and reliable instrument. [3, 54, 62, 136, 179, 180]
Favourable environment	Consider factors within the internal and external environments that may influence the establishment, delivery and outcomes of the program and what the impacts might be. Examples include, but are not restricted to, setting and context, politics, economic climate, power dynamics and other relationships, priorities, values and culture. [10, 52, 62, 104, 151, 163, 171]
RESEARCH	
Consider the role of	and opportunities for research in new systems and processes; theories, frameworks and models; methods and tools.

Table 34. Examples of activities and settings for disinvestment within decision-making infrastructure

Activity	Example	Routine	Reactive	Proactive	Priority Setting
Meeting external requirements	 Addressing legislative, regulatory and accreditation requirements, national and professional standards, etc 	✓	✓		
	 Responding to product alerts and recalls 		✓		
Setting budgets	 Determining sources of income and items of expenditure 	✓			✓
	 Introducing new items to funding lists. Examples include, but are not limited to, national health schemes, insurance benefits schedules, institutional lists of permitted TCPs, formularies. 	~	~	~	~
	 Commissioning health services and programs 	✓	~	✓	✓
Spending money	 Procuring capital works, plant and equipment 	✓	~	✓	✓
	 Purchasing clinical consumables 	✓	~	✓	✓
	 Assessing grant and funding applications 	✓	✓		
	 Allocating people, time, access to facilities, etc 	✓	✓	✓	✓
Allocating non-monetary resources	 Developing guidance documents, promotional information or educational materials that indirectly allocate resources. Examples include, but are not limited to, peak body recommendations, clinical guidelines, protocols, standard operating procedures, decision support systems, posters, presentations. 	~	~	~	~
Making strategic and	 Developing goals and strategies for Strategic Plans 	✓			✓
operational decisions	 Developing outcomes measures and targets for Business Plans 	✓			✓
Using evidence to initiate	 Updating existing evidence, undertaking Health Technology Reassessment, etc 	✓	✓	✓	
and/or inform decisions	• Accessing and utilising research evidence, population health data, local health service data, consumer and staff feedback	✓	✓	✓	✓
Evaluating outcomes of	 Monitoring, evaluating and reporting of all newly introduced TCPs to see if they perform as expected, post marketing surveillance 	~			
previous decisions and	 Monitoring, evaluating and reporting of purposive or random samples of decisions 	✓	✓	✓	
projects	 Monitoring, evaluating and reporting of purposive or random samples of projects 	✓	✓	✓	

Table 35. Examples of systematic prompts and triggers to initiate disinvestment decisions

Reproduced with permission from SHARE Paper 10 [45]

Approve introduction or continuation of TCPs for limited time only and require review of desired outcomes, costs, etc before re-approval is granted at end of time period

Approve new guidelines and protocols for limited time only and require review of evidence, costs, etc and appropriate revision before re-approval is granted at end of time period

Include steps that consider disinvestment of existing practices in manuals for guideline and protocol development

Include steps that consider disinvestment of existing practices in checklists for a range of organisational decisions

Add consideration of disinvestment to templates for meeting agendas where appropriate

Mandate consideration of disinvestment in procurement processes: include in requision documents and require sign off by relevant body overseeing disinvestment at appropriate level

Systematically ascertain evidence from research, data or stakeholder feedback, send directly to decision-makers and seek and/or require response

Incorporate flags and/or question use of low value TCPs in clinical decision support systems

Build questions about potential disinvestment into business case templates and application forms for grants, changes to formulary, introduction of new TCPs, etc

Introduce requirements for consideration of disinvestment into documents governing scope of decisions such as position descriptions and committee Terms of Reference

Add prompts to consider disinvestment to data reports, scorecards, dashboards, etc

Add prompts to consider disinvestment in project management templates and training programs for project management, change management, quality improvement processes, etc

Build disinvestment into strategic planning processes

Build disinvestment KPIs into business plans or performance plans

Consider 'one for one' swaps where a new TCP can only be introduced if an old one is removed

Table 36. Examples of potential barriers to disinvestment

Common to all aspects of disinvestment	Identification of disinvestment opportunities	Implementation
 Lack of common terminology, theories, tested frameworks and 	 Health Technology Reassessment (HTR) not conducted routinely 	 Inadequate project timelines
models, proven methods and tools	Public and private funding focused on HTA rather than HTR	 Lack of funding for implementation
 The word 'disinvestment' generates negativity and mistrust 	 Insufficient 'unequivocal' evidence to disinvest 	 Lack of skills in project management
• Divergent understanding of the concept of disinvestment between	 Lack of mechanisms to identify disinvestment targets 	 Lack of skills in change management
researchers and health service decision-makers	 Difficulties in producing, accessing & interpreting economic data 	 Loss of patient choice
 Lack of guidance and/or successful examples to follow 	 Willingness to use lower quality evidence to maintain status quo 	 Loss of perceived entitlement to treatment
 Lack of resources particularly time, funds and skills 	Prioritisation and decision-making	 Loss of clinical autonomy
 Lack of any of the elements of the framework 	 Lack of knowledge of available tools 	 Clinician reluctance to remove practices they perceive as integral
 Resistance to change 	 Unfamiliarity with economic evaluations 	to their professional practice and identity
Establishment and delivery of program	 Disagreement with assumptions in economic evaluations 	 Loss of perceived benefit of intervention being removed
 Lack of communication between agencies 	 Difficulties estimating marginal costs 	 Perceived criticism of practice and/or practitioners
 Autonomy of agencies resulting in multiple different systems 	 Reluctance to disinvest if there are sunk costs in existing 	 Perception that management priority is only to save money
 Wastage of resources by duplication of effort, particularly in HTA 	technology and supporting capital infrastructure	 Lack of incentives, presence of disincentives
 Lack of resources to support policy mechanisms 	 Reluctance to expend effort in disinvestment if benefits not clear 	 Lack of data to substantiate need
 Lack of appropriate data collection systems 	 Gains from disinvestment are less readily measured and may not 	 Gains from disinvestment less readily measured and may not
 Cost of appropriate data collection systems 	happen but losses from disinvestment are immediate	happen, but losses from disinvestment are immediate
 Lack of political, clinical, or administrative will to achieve change 	 Strength of vested interests and lobby groups 	 Complexity of practice change if disinvestment limited to certain
Difficulty establishing systems and processes to assess choices and	Lack of negotiating skills making it difficult to resist opposition	groups or for certain indications
reallocate resources across and between programs. Easier when	 Conflicting priorities between decision-makers 	 Lack of coordination between projects resulting in gaps and
done within programs but this has limited effectiveness.	 Conflicting priorities between local, regional and national levels 	duplication
 Difficulty establishing systems and processes between competing 	 Reluctance to disinvest due to heterogeneity of outcomes and/or 	 Stakeholder fatigue and disillusionment with constant change
sectors or paradigms eg cure versus prevention, acute versus	if there is potential for benefit in some subgroups or individuals	Monitoring and evaluation
community care, drug therapy versus counselling	 Controversy associated with removal of an effective TCP in favour 	Pouting and evaluation Poutingly collected data not valid or reliable, often out of data
 Lack of coordination and integration of systems and processes 	of a more cost-effective alternative and/or where there is lack of	Routinely-collected data not valid of reliable, often out-of-date
 Short-termism in government policy 	evidence of effect but general perception that it works	Cost of obtaining appropriate data
 Conflicting priorities – at individual levels, and/or between levels 	 Sensitivity of disinvestment target eg children, cancer, end of life 	 Lock of post market surveillance
 System inertia 	Lack of decision-making processes	 Lack of post-final ket sulveniance Lack of methods to guantify cavings
 Longstanding structures, institutional practices and organisational 	Lack of integration with other decision-making processes	Lack of methods to quality savings Distruct of reasons for monitoring and evaluation
relationships	 Requirement for prospective data collection or further research to 	
 Poor understanding of organisational practices and relationships 	provide enough information for decision	Reinvestment
 Lack of established triggers to initiate disinvestment discussions 	 Difficulty making choices and reallocating resources across and 	Lack of methods for reallocating resources released
 Scarcity of strategic plans that include disinvestment 	between programs. Easier when done within programs but this	 Lack of examples of successful relives intent Some cost covings may not be realised on length of stay reduced
 Lack of incentives, presence of disincentives 	has limited effectiveness.	 Some cost savings may not be realised eg length of stay reduced but bads immediately filled with other patients of greater acuity
 Fee for service models reward quantity not quality 	 Difficulty making choices between competing sectors or 	but beds inimediately filled with other patients of greater acuity
	paradigms eg cure versus prevention, acute versus community	Research
Stakeholder engagement	care, drug therapy versus counselling	 Assumptions that current practice is effective
 Lack of stakeholder commitment 	 Decision-makers not held in sufficiently high regard for decisions 	 Ethical objections to randomising patients to control groups
 Stakeholder inertia 	to be respected and enforced	 Resistance to enrolling patients in trials due to belief in
 Difficulty identifying and engaging multiple diverse stakeholders 	 Perceived influence of power imbalances and hidden agendas 	intervention
 Resistance to, or lack of understanding of consumer participation 	 Political challenges 	 Difficulty getting funding to research existing practices

Table 37. Key messages and recommendationsReproduced with permission from SHARE Paper 11 [197]

Disinvestment in general	Source*
Understanding of systems, processes and influencing factors at the local health service level are important for successful disinvestment.	А
Single definitions for disinvestment and health technologies, are needed with agreement between researchers, policy makers and health service decision-makers [45, 146]. We propose the following definitions.	С
 Disinvestment is removal, reduction or restriction of any aspect of the health system for any reason. Removal indicates complete cessation, reduction is a decrease in current volume or delivery sites, and restriction is narrowing of current indications or eligible populations. This is a broad definition, in essence the conceptual opposite of investment. It is an outcome of, rather than a reason for, a resource allocation decision. It is not burdened with the explanations and caveats of current research definitions. This could apply equally to products, devices and equipment; clinical practices and procedures; health services and programs; information technology and corporate systems. 	
 Health technologies are products, devices and equipment used to deliver health care (eg prostheses, implantable devices, vaccines, pharmaceuticals, surgical instruments, telehealth, interactive IT and diagnostic tools). This is a narrow definition which reflects the common use by decision-makers and consumers in the local health care setting. Clinical practices, support systems, and organisational and managerial systems are not considered to be health technologies in this context. 	
 Health technologies and clinical practices (TCPs) are therapeutic, diagnostic and preventative interventions (eg use of products, devices and equipment PLUS medical, surgical, nursing, allied health and population health activities). This is a pragmatic definition that reflects the scope of most resource allocation decisions related to delivery of health care in the local setting. 	
 Health programs and services are agencies, facilities, institutions and the components within them that deliver acute health care, rehabilitation or population health practices such as health promotion and education. 	
Avoid the term 'disinvestment', it is viewed negatively and perceived as 'cost-cutting'. [2, 3, 45, 146]	А
Do not to aim 'to disinvest' [27, 146]	А
 TCPs, services and programs that harm patients, diminish health outcomes, impair health care delivery, increase costs unnecessarily or result in organisational waste should be removed, reduced or restricted to address these adverse outcomes. 	
If there are opportunities to replace TCPs, services and programs that are safe, effective and cost-effective with others that offer greater advantage no explanation is needed other than the expected benefit.	
If budgets are cut or funding is required for high priority activities it is worth remembering that health service staff place a high value on transparency and are disillusioned by attempts to disguise cost reduction methods.	
Do not develop 'disinvestment' as a health improvement strategy or research domain [27, 146].	А
Expand existing healthcare improvement paradigms and research domains (eg EBP, health technology assessment, guideline development, implementation science, knowledge translation, quality improvement, system redesign, health economics, etc) to address the need for theories, frameworks, methods and tools for [2, 3, 14, 15, 27, 43, 45, 146]:	
 systematic and proactive identification of harmful, ineffective and inefficient TCPs, services and programs 	
 implementation of interventions to remove, reduce or restrict TCPs, services and programs 	
 evaluation of the process, impact and outcomes of these changes 	
 measurement of savings if possible 	
 reallocation of resources if appropriate 	
The principles for a rigorous, evidence-based approach to decision-making for disinvestment in the context of all resource allocation decisions are incorporated into the Framework for an organisation- wide approach to disinvestment in the local healthcare setting (Figure 5)	A

Disin	vestment in the local health service setting	
Decis group	Decisions to proceed with a project to implement change are often made without consideration of research evidence and local data and are not well-defined in terms of the intervention, practitioner group, patient population, indications, etc.	
Clinic	ians are frequently asked to undertake projects in their area of clinical expertise but they lack knowledge and skills in project management, implementation and evaluation.	
Clinic	ians are usually required to conduct a project in addition to their normal duties but without additional time or resources.	
Healt	h service staff are well aware of their limitations and those of their colleagues in undertaking projects and they welcome advice and support.	
There	e are many decision-making settings and processes within health services	
There	e are many components in the research allocation process in addition to decision-making that need to be addressed	
Insuff	ficient resources and skills in decision-making, implementation and evaluation	
Staff	need support	
Decis syste	ion-making for resource allocation at the local level is not homogenous. Contrary to some assumptions in previous studies, there are multiple layers of decision-making with different actors, criteria, ms and processes. [14]	D
There ident	e is a need for proactive methods to access and utilise high quality synthesised evidence in the research literature, routinely-collected local health service data and sources of consumer information to ify and drive disinvestment initiatives [2, 19, 45]	A
Intro	duce a framework for an organisation-wide approach to disinvestment underpinned by evidence-based principles [45]	Α
Focus	Focus on optimising health care and using resource effectively rather than cost-cutting	
Imple restri	ement systematic, transparent, evidence-based methods that integrate with, or build upon, existing decision-making systems and processes to identify TCPs that should be removed, reduced or cted. [2, 45]	D
Consi drugs	der settings for decisions about both monetary (eg capital procurement and clinical purchasing) and non-monetary (eg development and authorisation of guidelines and protocols that stipulate use of or equipment, recommend diagnostic tests, specify referral mechanisms etc) resources as opportunities to identify TCPs that should be removed, reduced or restricted. [2, 3, 27, 45]	D
If see	king opportunities to save money by removing, reducing or restricting TCPs, use a systematic transparent process rather than ad hoc nominations from individuals. [27, 146]	Α
Ensur effect and e	re that proposals are fully developed before making decisions to proceed including consideration of research evidence and local data to determine the nature and scope of the problem and the most tive solution; clarification of the intervention and scope of the project in terms of practitioner group, patient population, indications, etc; and assessment of feasibility, risk and cost of implementation evaluation. [15]	D
Integ rathe	rate activities to remove, reduce or restrict TCPs within the language and methods and tools of familiar health service improvement paradigms such as EBP, quality improvement and system redesign r than the construct of 'disinvestment'.[14, 45, 146]	A
Inclue	nclude appropriate stakeholder consultation in making, implementing and evaluating decisions to disinvest. [19, 45]	
Deve	lop mechanisms to receive and act upon consumer or community-initiated feedback on resource allocation decisions. [19]	D
*Key		
А	Based on findings from literature reviews, and local and/or expert respondents, and outcomes of SHARE investigations	
В	Based on findings from literature reviews, and local and/or expert respondents (SHARE investigations incomplete due to local barriers or reduced timelines)	
С	Based on findings from literature reviews alone [45, 146] (not investigated in SHARE projects)	
D	Based on findings of SHARE investigations alone (not found in other literature)	
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