



MONASH University

**Speculative service design:
A provocation for a possible future for the
emergency department waiting room**

Troy Geoffrey McGee

Bachelor of Industrial Design with Honours (Monash University)

A thesis submitted for the degree of *Doctor of Philosophy* at

Monash University in 2020

Monash Art, Design & Architecture

For Aaron.

Copyright notice

© Troy McGee (2020)

I certify that I have made all reasonable efforts to secure copyright permissions for third-party content included in this thesis and have not knowingly added copyright content to my work without the owner's permission.

Acknowledgement of country

The author wishes to acknowledge and pay respect to the unceded sovereignty of the Woi wurrung and Boon wurrung people of the eastern Kulin Nations, on whose land and waters this study was conducted. The author also wishes to acknowledge First Nations connection to health and wellbeing, as well as material and creative practice which has existed on these lands for more than 60,000 years.

The author pays respects to Kulin Ancestors and Elders past, present and emerging. The author is grateful for their enduring presence and knowledge, and cultural wisdoms that may teach us in guiding our shared futures.

Human Research Ethics

Cabrini Human Research Ethics Committee

Project Title: "Designing future Emergency Departments: Communication systems, spaces and devices"

Project ID: CHREC 01-18-09-17

Monash University Human Research Ethics Committee (MUHREC)

Project Title: "Designing future Emergency Departments: Communication systems, spaces and devices"

Project ID: 10739

Monash University Human Research Ethics Committee (MUHREC)

Project Title: Exhibition-In-A-Box Workshops

Project ID: 25622

Abstract

The emergency department (ED) is arguably the most operationally complex clinical setting of the modern hospital, but perhaps the least well understood. A central and persistent element of the ED experience is the phenomenon of waiting, which precedes, accompanies and follows clinical activity. The act of waiting has a profound impact on overall patient experience, but has received relatively little attention in the literature as to how this experience might be improved or mitigated. This PhD study is concerned with how waiting might be experienced into the future and with the contribution that design research and practice might make to inspiring change for these experiences.

In order to explore how waiting might be experienced in the ED in future, this study engages deeply with the Emergency Department waiting room (EDWR) and its design through published literature, design precedent and also contemporary lived experiences of the EDWR by engaging patients, staff and carers through an observational study, interviews and co-design engagements. In order to explore alternatives, this study then used these insights as points for creative extrapolation, exploring alternative ED experiences through speculative design practice. Recognising that the ED waiting experience is a service experience, this research also generated a novel methodological framework, speculative service design (SSD), which aims to integrate approaches in response to the methodological discrepancies between service design and speculative design. This framework was then practically applied in the study to generate the design outcome and provocation, which acts as a toolkit, a place and a method for provoking discussion about ED futures.

The outcomes of this study led to the development of a speculative service design 'provocation', which takes the form of a suite of design proposals: ranging from comic-style illustrations, visualisations and plastic prototypes that aim to make tangible one possible future of the ED, in order to inspire and scaffold conversations about the attributes of preferable ED futures. This provocation in its multiple modes of dissemination were then shared with patients and carers with lived experiences of the ED, in order to collate their reflections on such preferable attributes of ED futures.

This study makes a significant and timely contribution to contemporary approaches to ED design, by advocating the value of speculative thinking through design practice; where these approaches might be applied to benefit the design of new healthcare facilities and environments. Designers, architects, clinicians or healthcare administrators may apply the findings of this study partially or entirely when building, designing, or making decisions about the integration of technology in new EDWR's or ED 'front-of-house' systems.

Keywords: emergency department futures, emergency department waiting room, speculative service design

Declaration

This thesis is an original work of my research and 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.

Troy McGee

October 2020

Publications during enrolment

McGee, Troy. 2020. "Speculative service design: An investigation into the emergency department waiting room of the future." Poster submitted for presentation at DRS2020: SYNERGY, Brisbane, Australia.

McGee, Troy, Daphne Flynn, Rowan Page and Selby Coxon. 2020. "The emergency department waiting room: Towards a speculative service design framework." Paper accepted for presentation at ServDes2020: Tensions, Paradoxes and Plurality, Melbourne, Australia.

McGee, Troy, Daphne Flynn, Rowan Page and Selby Coxon. 2020. "Emergency department futures: A design investigation into emergency department waiting rooms." Poster accepted for presentation at ServDes2020: Tensions, Paradoxes and Plurality, Melbourne, Australia.

McGee, Troy, Daphne Flynn, Selby Coxon, Keith Joe and Arthur de Bono. 2019. "A co-design investigation into emergency department waiting rooms." Paper published in proceedings of REAL/MATERIAL/ETHEREAL, 2nd Annual Design Research Conference, 3 & 4 October 2019, Monash University, Melbourne, Australia.

McGee, Troy, Daphne Flynn, Selby Coxon, Keith Joe and Arthur de Bono. 2018. "A co-design investigation into emergency department waiting rooms." Paper presented at Design4Health 2018 Conference, Sheffield, UK, 4–6 September 2018. Abstract published in proceedings of 5th European International Conference on Design4Health, Sheffield, UK. Sheffield: Sheffield Hallam University.

McGee, Troy, Daphne Flynn, Selby Coxon, Keith Joe and Arthur de Bono. 2018. "Three speculative visions for the future of the emergency department front end operations." Poster presented at Cabrini Research Week, Melbourne, Australia, 8–12 October 2018.

McGee, Troy, Daphne Flynn, Selby Coxon and Keith Joe. 2017. "Designing for emergency departments: A literature review." Paper presented at Design for Health Conference, Melbourne, Australia, 4–7 December 2017.

Flynn, Daphne, Tina Dinh, Kate McEntree, Rowan Page and **Troy McGee.** 2017. "Designers and hospitals: Considerations from an ongoing collaboration." Paper presented at Design for Health Conference, Melbourne, Australia, 4–7 December 2017.

Acknowledgments

I used to daydream of writing the acknowledgements page. It seemed a way of affirming that one day this project might really be complete. In no particular order, I would like to thank:

My supervisors, Professor Daphne Flynn, Associate Professor Selby Coxon, Dr Keith Joe and Dr Rowan Page, for their shared interest in healthcare and futures. I appreciate your attention, time, support and humour – I wouldn't have made it this far without you. I would also like to acknowledge the support of Professor Arthur de Bono as a supervisor. Although he retired and departed the supervision team before this study was finished, his input in the formative stages of the project was invaluable. This research was supported by an Australian Government Research Training Program (RTP) Scholarship.

The Faculty of Art, Design and Architecture at Monash University – the many lecturers, administrators and others who have contributed to my design education. The opportunity and privilege of undertaking higher education is one that I will cherish for the rest of my life.

The patients, staff and carers at Cabrini ED who graciously offered their time, thoughts, expertise and feelings to this study.

My PhD friends and colleagues, both past and present – your support, insight and reflections are greatly appreciated.

To my colleagues and friends at Monash Residential Services and Campus Community Division – the work we did together kept me grounded in the 'real world' and often provided a much needed distraction from the stress of PhD study.

My family – I thank them for their love, support and encouraging words in spite of distance.

Research Collaborators

Arthur de Bono, Amy Killen, Bronte Kerley, Eden Potter, Ilya Fridman, Lisa Fu, Luke Valenza, Nyein Aung and Richard Morfuni

Thesis Preparation

Accredited professional editor Mary-Jo O'Rourke AE provided copyediting and proofreading services according to the national university-endorsed 'Guidelines for thesis editing' ([Institute of Professional Editors 2019](#)).

Table of contents

Copyright notice	iii
Acknowledgement of country	iii
Human research ethics	iii
Abstract	iv
Publications during enrolment	vi
Acknowledgments	vii
Table of contents	viii
List of figures	xi
List of tables	xiii
Some definitions	xiv
Who are the stakeholders in this research?	xvi

Preface

Preface	2
---------	---

01 – Introduction

1.0 Introduction	6
1.1 Diagnosing the problem: What's going on with all the waiting?	7
1.1.1 ED care models	7
1.1.2 Increased demand at Australian ED's	12
1.1.3 Australia's ageing population	12
1.1.4 Growing cost of healthcare	12
1.1.5 Climate change and the ED	13
1.1.6 The opportunity for design	13
1.2 Research structure and approach to writing	15
1.2.2 Defining the scope and significance of the research	16
1.3 Findings and contribution to knowledge	18
1.4 Exegesis Structure	19

02 – The emergency department of the future? A review of the literature.

2.0 Introduction to the review	24
2.1 General Overview of the Literature	24
2.2 Contemporary Emergency Department waiting room design	26
2.2.1 The Waiting room as an 'assemblage'	28
2.2.2 The Servicescape of the waiting room	29
2.3 The Emergency Department waiting room: 1894 until today.	30
2.4 What's next? The emergency department waiting room of the future.	33
2.4.1 Mechanical minds: Technology in the emergency department	35
2.6 The Case for Speculative Design in the Emergency Department	38
2.7 Knowledge Gap	44
2.8 Chapter conclusion and research questions	45

03 – The research method

3.0 Introduction to the methodology	48
3.1 Epistemological stance of the SSD Framework	48
3.2 Materialising our imagination: towards the Speculative Service Design (SSD) framework	50
3.3 Discovery: looking around	52
3.3.1 Say, Do, Feel	53
3.4 Prototype: Making Service Experiences	54

3.4.1 The "What If" Question	56
3.5 Deploying hypothetical service experiences	58
3.5.1 Design fiction publications	59
3.5.2 Touchpoints: Objects from the future	60
3.5.3 The 'Exhibition-in-a-box'	61
3.6 Chapter conclusion	64

04 – A co-design investigation into emergency department waiting experiences

4.0 Introduction to the investigation and place within the exegesis	76
4.1 Aims of the Investigation	78
4.2 The method: Triangulating of the data and approach to synthesis	79
4.3 Study One: Observing the Emergency Department waiting room	80
4.3.1 Aims	80
4.3.2 Method	80
4.3.3 Artefact analysis	80
4.3.4 Limitations	81
4.4 Study Two: Empathy Interviews	82
4.4.1 Aims	82
4.4.2 Method	82
4.4.3 Limitations	83
4.5. Study Three: Co-Design 'Sprints' with Emergency Department staff	84
4.5.1 Aims	84
4.5.2 Method	84
4.5.3 Workshop #1: Prototyping the Emergency Department waiting room	86
4.5.4 Workshop #2: Mapping the patient journey	86
4.5.5 Limitations	86
4.6. The Results	89
4.6.1 The Emergency Department patient journey	92
4.6.2 Defusing intense emotion	96
4.6.3 Safety in the Waiting room	101
4.6.4 Privacy in the EDWR	104
4.6.5 The Role of Technology in the Emergency Department	108
4.7 Summary of research findings and the opportunity for design	115
4.8 Chapter Conclusion	117

05 – Crafting the speculation: The design experiments

5.1 In Summary: The direction for design	128
5.1.1 Analogous waiting experiences	130
5.2 Early learnings through design practice	132
5.2.1 ASKLEPIOS: The AI for the Emergency Department of the future	135
5.2.2 Speculative Service Design blueprint	137
5.3 Speculative Touchpoints and hypothetical artefacts	143
5.3.1 Pre-Hospital Touchpoints	143
5.3.2 Registration and triage into the ED	145
5.3.3 Waiting room chair	145
5.4 Waiting Room environment development	152
5.4.1 Waiting room signage	152
5.5 Learning through iteration: Discarded pieces of the design practice	155
5.6 Limitations of the design practice: Too busy speculating?	157
5.7 Chapter conclusion	159

06 – A speculative vision for the future for the Emergency Department waiting room

6.0 Introduction to the outcome	170
6.1 Asklepios: The digital AI for the emergency department	171
6.2 Speculative service blueprint: Asklepios and an alternative future for the waiting room	176
6.2.1 Health incident	178
6.2.2 Arrival	178
6.2.3 Registration and triage	178
6.2.4 Waiting room and waiting experience	180
6.2.5 Disposition	180
6.3 Articulations of the design practice	182
6.3.1 Designed Objects and images	183
6.3.2 Design Fictions and Clearview Emergency Department	192
6.3.3 'Exhibition-in-a-box'	197
6.4 Chapter conclusion	200

07 – Design, health, futures and the Emergency Department waiting room.

7.0 Introduction	212
7.1 Scoping Alternative Futures for the Emergency Department	213
7.1.1: Aims of the evaluative study	213
7.1.2: Methods of the evaluative study	214
7.2 The Results: A PEST analysis	218
7.2.1 Political lens	219
7.2.2 Economic lens: In the margins	221
7.2.3 Social lens: The 'atomised' society	222
7.2.4 Technological lens: Technoethics and the ED	223
7.3 Where do you stand on ED futures?	225
7.4 Chapter conclusion	228

08 – Concluding remarks

8.0 Introduction	240
8.1: Exegesis in review	242
8.2: Research questions answered and contributions to knowledge	244
8.2.1 Future waiting user experience(s) finding contribution	245
8.2.2 Methodological contribution to design research and practice in the ED	246
8.3 Limitations of the research	247
8.4 Future work	248
8.5 Chapter and exegesis conclusion	249

Bibliography

Appendices

a – Sample of interview and co-design workshop coded transcripts	266
b – Images of co-design workshops undertaken with Cabrini ED staff	274

List of figures

Figure 0.1:	Stakeholder map of some of the actors involved in the delivery of emergency medicine	xvi
Figure 1.1:	A service blueprint of the current Emergency Department waiting room experience	8
Figure 1.2:	Attendances at Public Victorian Emergency Departments between January – March 2017.	11
Figure 1.3:	The structure of a design research project. Redrawn by author from (Findeli, 2010).	15
Figure 1.4:	Understanding the wait in the ED as a 'series of waits'.	17
Figure 2.1:	Communication in a typical Emergency Department.	29
Figure 2.2:	House of Relief on Hudson and Jay Streets. General Office and Out Patient Department (1894).	31
Figure 2.3:	Waiting area and outpatient inquiries at the Royal Melbourne hospital. Image by (Fowler, 1945)	31
Figure 2.4:	Perth Children's Hospital Emergency Department. Image by (Gostelow 2019).	32
Figure 2.5:	Perth Children's Hospital Emergency Department. Triage waiting room. Image by (Gostelow 2019).	32
Figure 2.6:	Image of Cabrini Emergency Department waiting room, 2017.	33
Figure 2.7:	'Dunne & Raby: A/B, A Manifesto, 2009. Redrawn by author from (Dunne & Raby, 2009)	38
Figure 2.8:	'BetterCare' (2019). Commissioned by DotEveryone, by Superflux.	39
Figure 2.9:	'Alternative Unknowns Method' (2016). Workshop images from Extrapolation Factory	40
Figure 2.10:	Screenshots from video of "ED2080" by Huddy Healthcare Solutions, (Huddy, 2016).	41
Figure 3.1:	Model of project-grounded research. Redrawn from (Findeli 2010).	49
Figure 3.2:	Speculative Service Design: the methodological framework applied in this study.	50
Figure 3.3:	First arc of the Speculative Service Design framework	52
Figure 3.4:	Methods that study what people say, do and make. From (Sanders & Stappers, 2012. p.67)	53
Figure 3.5:	Middle arc of the Speculative Service Design framework	54
Figure 3.6:	Futures cone. Redrawn from (Montgomery and Woebken, 2016, p43)	55
Figure 3.7:	'What-If' comic series by Marvel Comics	57
Figure 3.8:	Final arc of the Speculative Service Design framework	59
Figure 3.9:	Tools for unpacking future scenarios	62
Figure 3.10:	'Boite en valise' or 'suitcase box' by Marcel Duchamp (1935-41)	63
Figure 4.1:	The first arc of the SSD framework.	76
Figure 4.2:	Image of Cabrini ED, August 2018.	77
Figure 4.3:	The data collection framework	78
Figure 4.4:	Scanned images of notes and sketches made in the EDWR in the observational study	81
Figure 4.5:	Narrative arc of the empathy interviews used in this study	83
Figure 4.6:	An ED Staff member 'prototyping' new interventions for the EDWR.	84
Figure 4.7:	Sample of the Props used in the Co-Design Workshops	85
Figure 4.8:	Image of the blank EDWR, with the props on hand to enable participants to 'prototype' their version.	86
Figure 4.9:	Images of the 'cards' and 'gameboard' designed for use in workshop #2.	87
Figure 4.10:	The data collection framework	89
Figure 4.11:	A Sample of the props used in the co-design workshops	93
Figure 4.12:	Sample of the props used in the co-design workshops	93
Figure 4.13:	Image from workshop #1.	96
Figure 4.14:	Sample of the objects made by workshop participants.	97
Figure 4.15:	Images designed by ED staff as to the 'worst' EDWR they could imagine.	100
Figure 4.16:	A diagram illustrating how different design interventions might be used to defuse episodes of violence	102
Figure 4.17:	A multifunctional private room within the EDWR, separated with transparent dividers.	105
Figure 4.18:	Images of triage area at Cabrini 2018	108
Figure 4.19:	Images of the EDWR at Cabrini, 2018	109
Figure 4.20:	Images of the EDWR at Cabrini, 2018	110
Figure 4.21:	Images of the EDWR at Cabrini, 2018	111
Figure 4.22:	Images of Emergency Department doctors station. Cabrini, 2018.	112
Figure 4.23:	Images of the ED ward environment Cabrini, 2018.	113
Figure 4.24:	A diagram illustrating a digital interface that patients might interact with.	114
Figure 5.1:	The middle arc of the SSD framework.	128
Figure 5.2:	Mapping waiting Experiences	130
Figure 5.3:	Mapping the features of the hypothetical ASKLEPIOS AI	133
Figure 5.4:	Asklepios system mapping: Interacting with both human and non-human actors	136
Figure 5.5:	A service blueprint of the current Emergency Department waiting room experience	138

Figure 5.6:	Service blueprint ideation and iteration.	141
Figure 5.7:	Image of a low-fidelity storyboard of the service experience.	142
Figure 5.8	Images of a 3D mockup of the EDWR and triage.	142
Figure 5.9:	Asklepios 'app' exploration	143
Figure 5.10:	Exploring patient whiteboard for triage, including patients en-route and patients already in the EDWR.	144
Figure 5.11:	Development of the registration kiosk	144
Figure 5.12:	Paper prototypes of the Asklepios chair	146
Figure 5.13:	3D printed plastic prototypes of the Asklepios chair.	146
Figure 5.14:	Asklepios chair device experimentation and sketch development	147
Figure 5.15:	Asklepios Chair Device experimentation, bodystorming and sketch development	148
Figure 5.16:	Experimentation into a blanket to accompany the Asklepios chair device.	149
Figure 5.17:	3D printed prototype of the Asklepios chair at 1:5 scale.	150
Figure 5.18:	3D printed prototypes of the Asklepios chair at 1:5 and 1:12 scales.	151
Figure 5.19:	3D printed prototypes of the Asklepios chair at 1:5 scale with prototype blanket	151
Figure 5.20:	ED waiting environment form exploration	153
Figure 5.21:	Exploring EDWR layout and atmosphere through sketch and visualisation	154
Figure 5.22:	Prototyping of ED walls use plastic 3D prints and plywood wall.	155
Figure 5.23:	Exploring digital signage, including patient whiteboard for triage.	156
Figure 5.24:	A sample of some of the ideas rejected through speculative design activity.	158
Figure 6.1:	The Asklepios Artificial intelligence system	170
Figure 6.2:	The Speculative service blueprint	172
Figure 6.3:	A Speculative service blueprint, highlighting what is 'now' and an alternative 'next'.	176
Figure 6.4:	Visualisation of Asklepios registration kiosk	177
Figure 6.5	Waiting room illustration	178
Figure 6.6:	A visualisation of the Asklepios chair device.	179
Figure 6.7:	A visualisation of the Asklepios chair device and waiting room.	181
Figure 6.8:	A map of how the design concept and provocation is articulated through three modes of dissemination.	182
Figure 6.9	Multiple views of the Asklepios Chair for the ED waiting room.	183
Figure 6.10:	Interior views of the EDWR and overall layout	184
Figure 6.11:	Detail views of the Asklepios Chair	186
Figure 6.12:	A visualisation of the entry to the ED, triage area and registration kiosk..	187
Figure 6.13:	Interior views of the EDWR and signage	188
Figure 6.14:	Different configurations of EDWR signage	189
Figure 6.15:	EDWR triage signage mockup	189
Figure 6.16:	Plastic prototypes of the Asklepios chair at 1:5 and 1:12 scales	190
Figure 6.17:	Plastic 3-D prototypes of the touchpoints within the service journey	190
Figure 6.18:	Plastic 3-D prototypes of the registration kiosk at 1:12 scale	191
Figure 6.19:	Design fictions presented as a fold-out 'poster-zine'.	193
Figure 6.20:	'Exhibition in a box' external views.	198
Figure 6.21:	'Exhibition in a box' contents	199
Figure 6.22:	'Exhibition in a box' publication and designed interactivity with the plastic prototypes.	199
Figure 7.1:	The last arc of the SSD framework.	212
Figure 7.2:	Images of participants using Exhibition-in-a-box in their own homes	215
Figure 7.3:	An outline of the instructions provided to participants who participated in this study	216
Figure 7.4:	Raw data points of different participants analysing the design concept using the PEST model	218
Figure 7.5:	Consequence Mapping using the 'futures wheel' by a participant in a workshop	220
Figure 7.6:	PEST analysis of participant thoughts and conversations regarding possible ED futures	224
Figure 7.7:	Notes made by some of the workshop participants, regarding their position with respect to ED futures	225
Figure 7.8:	Collating the thoughts of participants and their views on the ED future, using the Polak Game model.	226
Figure 8.1:	Research framework	241
Figure 8.3:	The Speculative Service Design methodological framework.	246

List of tables

Table 3.1:	A table summarising the specific research techniques applied in this study	65
Table 4.1:	Summary of insights for ED waiting area design	115
Table 8.1:	A table of the subsidiary research questions, methods and findings	243

Some definitions

Acknowledging that this exegesis has multiple audiences and that certain terms might carry different meaning in different contexts, this section presents some of the common terms used throughout the exegesis and their associated definitions adopted in this study.

- **Artificial intelligence (AI)** – is the science of making machines intelligent so they can recognise patterns and assist humans to solve specific challenges or sets of challenges ([Google PAIR 2019](#)). In the context of this study, AI is deployed as a program that makes a decision or prediction based through straightforward rule-based systems – such as ‘if rain, then umbrella’. In machine learning, however, the decisions are learned.
- **Asklepios** - is the name of the fictional and speculative AI construct developed within this study that aims to provoke conversation and proactive thinking about the role technology might play in the Emergency Department of the future. The name ‘Asklepios’ is drawn from the name of the Greek god of medicine, and is discussed at length in Chapters 5 and 6 of this exegesis.
- **Assemblage** - Refers to a concept drawn from the philosophy of Gilles Deleuze that describes experiences as an ‘assembly’ of both material (physical objects or environments) and immaterial (events or behaviours) things. Assemblages are discussed in more detail in Chapter 2 of this exegesis.
- **Emergency department (ED)** – is the department within Australian hospitals that deals with the resolution of time-critical medical conditions. In other parts of the world, the ED is also called ‘accident and emergency’, ‘casualty’ or ‘emergency room’. A key feature of the ED is that it is embedded within a hospital and as such it is not a 24/7 health clinic or urgent care centre.
- **Emergency department front-of-house** – refers to the collection of services, processes and systems that are present at the front end of the ED. These processes are:
 - **Arrival** – refers to the process from the moment of health incident to arrival at the front door of the ED. Arrival includes how patients select an ED, how they travel to the hospital and the wayfinding that guides them to the department. Arrival can also include the involvement of various pre-hospital care services: referral from a GP, first aid, police or the ambulance service.
 - **Registration** – involves the registration of patients into the hospital system, a task traditionally completed by hospital clerks.

- **Triage** – is a process practised by specialist nurses to determine the acuity and severity of a patient's illness in order to judge which patients receive medical care first. In Australia, triage nurses apply the Australian Triage Scale (ATS), which ensures that patients are treated in the order of their clinical urgency and allocated to the most appropriate assessment and treatment area ([ACEM 2014](#)).

- **Waiting room** – refers to the room, or set of rooms, that patients are guided to wait in while awaiting treatment or transfer to a cubicle in the department. The waiting room is part of the ED and is not a separate room elsewhere in the hospital such as a family room, cafeteria or foyer area.

- **Machine learning (ML)** – is a subfield of AI that comprises techniques and methods to develop AI. ML takes a data set – often called 'training data' – in order to make predictions or decisions on new data without being explicitly programmed to perform the task ([Google PAIR 2019](#)).

- **Service design** – is a discourse of collaborative and cross-disciplinary design research and practice that deals with the creation, and iteration of, services, processes and systems ([Stickdorn et al. 2018](#)).

- **Speculative design** – is a discourse of design philosophy that explores and critiques probable, plausible, possible and preferable futures ([Dunne and Raby 2013](#)).

- **Speculative service design (SSD)** – is an experimental research approach for collaboratively prototyping, experiencing, deploying and critiquing future service scenarios. SSD is an approach that has been developed in this project and is discussed in detail in Chapter 3 .

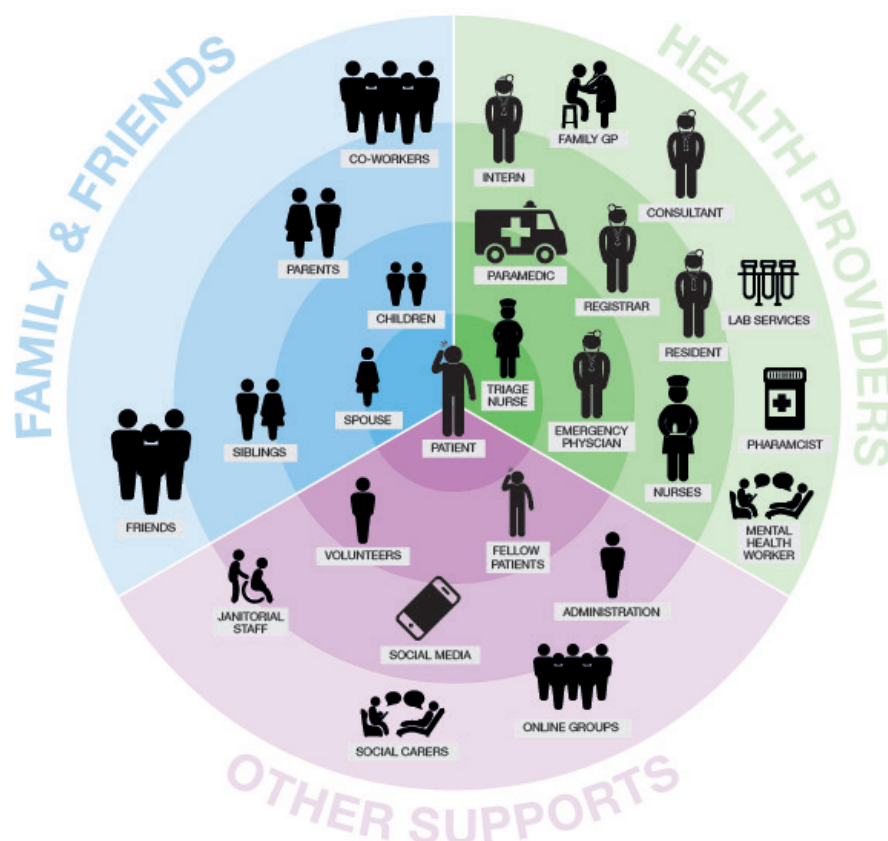


Figure 0.1:
Stakeholder map of some
of the actors involved in
the delivery of emergency
medicine

Who are the stakeholders in this research?

The ED is a specialised department within a hospital that treats acute illnesses and injuries. The delivery of this kind of healthcare is collaborative and involves multiple specialities. Overall healing for patients requires the efforts of many other individuals who do not necessarily have formal medical education. Figure 0.1 presents a brief map of some of the stakeholders who play important roles in patient healing in emergency medicine.

As the ED is a public space, one that many of us will attend one at some point in our lives, we could make the argument that everyone is a stakeholder in this study. So we ask you – dear reader – to reflect on your healthcare journey so far and where you might fit into this story.

This study has been undertaken at Monash University within a research lab called the Design Health Collab within the faculty of Monash Art Design & Architecture (MADA). The Design Health Collab is a design-led research lab that is interested in the future of health and wellbeing, and collaborates with healthcare providers, hospitals and other researchers working within health. Elements of this study have also been conducted in collaboration with Cabrini Hospital, a private metropolitan ED located in Melbourne, Australia.

This study has also operated within a growing community of collaborative design research and practice which exists at the intersection of design and health. Paul Chamberlain and Claire Craig ([Chamberlain and Craig 2017](#)) discuss that while design has always been embedded within healthcare, the last 20 years or so have seen the two discourses more consciously and explicitly collaborate. This growing discourse has led to a number of international initiatives such as the Enhancing the Healing Environment Programme (England), the Mayo Clinic for Innovation (USA), Health Environments and Research Design (HERD, USA), the Toronto Centre for Innovation in Complex Care (Canada), the Human Experience Lab (Singapore), Good Health Design (New Zealand) and Lab4Living (UK). Alongside these initiatives, a growing number of academic conferences (Design4Health, MedicineX), academic journals (Design for Health, HERD), special-interest tracks within major design conferences (Design Research Society Conference, Design and Emotion Conference) and dedicated books ([Bate and Robert 2007](#); [Jones 2013](#); [Pullin 2009](#); [Tsekleves and Cooper 2017](#); [Vaughan 2018](#)) have emerged that demonstrate the richness of this global community. This study sits within this context of growing research and practice around design for health, and makes broad contributions to this growing interdisciplinary discourse.

Preface

Preface

The modernist 'fathers' of design promote its objectivity and confidently assert that design design practices and design thinking can be mobilised to address the many complicated problems facing society. Design of the past has been sold to us as glossy, convenient, easy, accessible, seductive. This is a kind of patriarchal design that is apolitical and void of context; it fortifies the idea that design is from nowhere and by no-one. Rarely do designers share their motivating ideologies or philosophies. This PhD-by-design undertaking does not emerge from 'nothing' and, by way of context and perhaps addressing potential bias, I detail here my own personal narrative around health. This preamble to the study aims to contextualise why I would spend four years of my life on such a project.

In the year 2000, my older brother, Aaron, who had been born with cystic fibrosis (CF), received a second chance at life in receiving a double lung transplant at the Alfred Hospital in Melbourne, Australia. I was six years old at the time and vividly remember leaving our rural town in northern Tasmania to visit him in the 'big smoke' of Melbourne. The donor of his new lungs had given him a second chance at life – which he grasped with both hands. He soon became a nurse, competed in the Australian Transplant Games and championed a not-for-profit for the benefit of other CF patients which still exists to this day. For most of my childhood until the age of 16, I was privileged to live with a healthy and energetic older brother.

In April 2010, just shy of his 30th birthday, my brother passed away from complications associated with the CF disease. I remember his funeral vividly – and not being able to comprehend a future or life ahead without him. Shortly after his funeral, my mother was diagnosed with breast cancer. After surgery, chemotherapy, radiation treatment and time, my mother was declared in remission and lived to breathe another day, although not without significant stress on her overall health. I remember spending the last few months of high school that year attempting to make sense of my world, which had been completely torn asunder.

After my brother passed away, I remember many people around me speaking the mantra 'CF may have won this battle, but it'll never win the war'. Indeed, my observation is that many use the language of war to describe illness. Changes in medication or treatment become retreats or setbacks, lung transplants and chemotherapy become nuclear weapons. In my view, statements like 'it is a battle' or 'it is a struggle' are unfair, as they reinforce the false idea that if treatment fails, the patient didn't 'fight' hard enough. Outcomes are dichotomised into victory and defeat, living or dead – when the goal is usually somewhere in the middle. Often the goal is not necessarily to eradicate the illness, but to help the patient address the thing that is making their life more complex. Ultimately, any metaphor – military or otherwise – is not inherently good or bad; their utility is dependent on how they're used, as metaphors provide an avenue to express our emotions and exert agency over our own conditions.

My experience with the healthcare system so far has been largely on the sidelines, not as an active recipient of care in the 'battle' but, rather, as a supporter on the fringes. I was an innocent civilian and never a soldier on the frontlines. In some ways, this is similar to one of the many through lines that have emerged from within this PhD study – how most of design is still largely on the sidelines when it comes to imagining and materialising healthcare futures.

As a creative professional, I am privileged in that I often have the ability to intervene in the current and future lives of other people. I am painfully aware that wielding particular worldviews – such as my own – can marginalise others and, in sharing my story, I do not intend to exclude other voices from the conversation. Rather, by sharing my personal narrative on which this research is founded, I hope to open up many more stories for others about personal experiences with healthcare, and their hopes for the future. I have been privileged and humbled through this study to be able to experience some of the many stories of emergency medicine and I hope this study proves useful to those in the field who are responsible for providing care into the future, and to current and future patients, who all have a stake in the realisation of urgent care futures.

This exegesis comes at a time of great transition for health, healthcare and the hospital. The COVID-19 crisis has seemingly forever changed the trajectories of technological development in healthcare globally. This acceleration in change is now the new normal, from the rapid deployment of telehealth to digital prototyping of personal protective equipment and physical distancing. As change becomes more rapid, it's important that we engage with these new futures carefully and ethically. The next normal for the ED will be defined by the choices we make today – which technologies we adopt and which we do not. This research provides one answer to some of these questions and helps us examine the attributes of preferable futures for urgent care.

Chapter — 01 Introduction

CHAPTER OVERVIEW —

This chapter introduces the research problem, including its context, stakeholders, definitions of key terms and an outline of the scope and significance of the study. Lastly, the chapter provides an overview of the exegesis structure and summaries of each chapter.

1.0 Introduction

The emergency department (ED) is today an essential feature of modern hospitals. It has evolved from its origins – a hospital receiving room – to a clinic dedicated to the treatment of time-critical medical conditions. While the terms 'emergency department' and 'accident and emergency' are relatively new, the concept of providing urgent medical care is as ancient as pain itself ([Silverberg 1967](#)). From temples to die in, to temples of technology ([Tseklevs and Cooper 2017](#)), we find ourselves thousands of years later with the future direction of the ED – and its role within the contemporary healthcare landscape – winding in new directions still.

Central to the ED experience is the phenomenon of waiting. As an activity that precedes, accompanies and follows clinical action, waiting can have a profound impact on overall experiences for both patients and carers. As we will see throughout this study, the waiting room is fraught with challenges and has received relatively little design attention. How these spaces might be designed in the future in response to these challenges is the question that this study interrogates by exploring the waiting room of the future through speculative design research and practice.

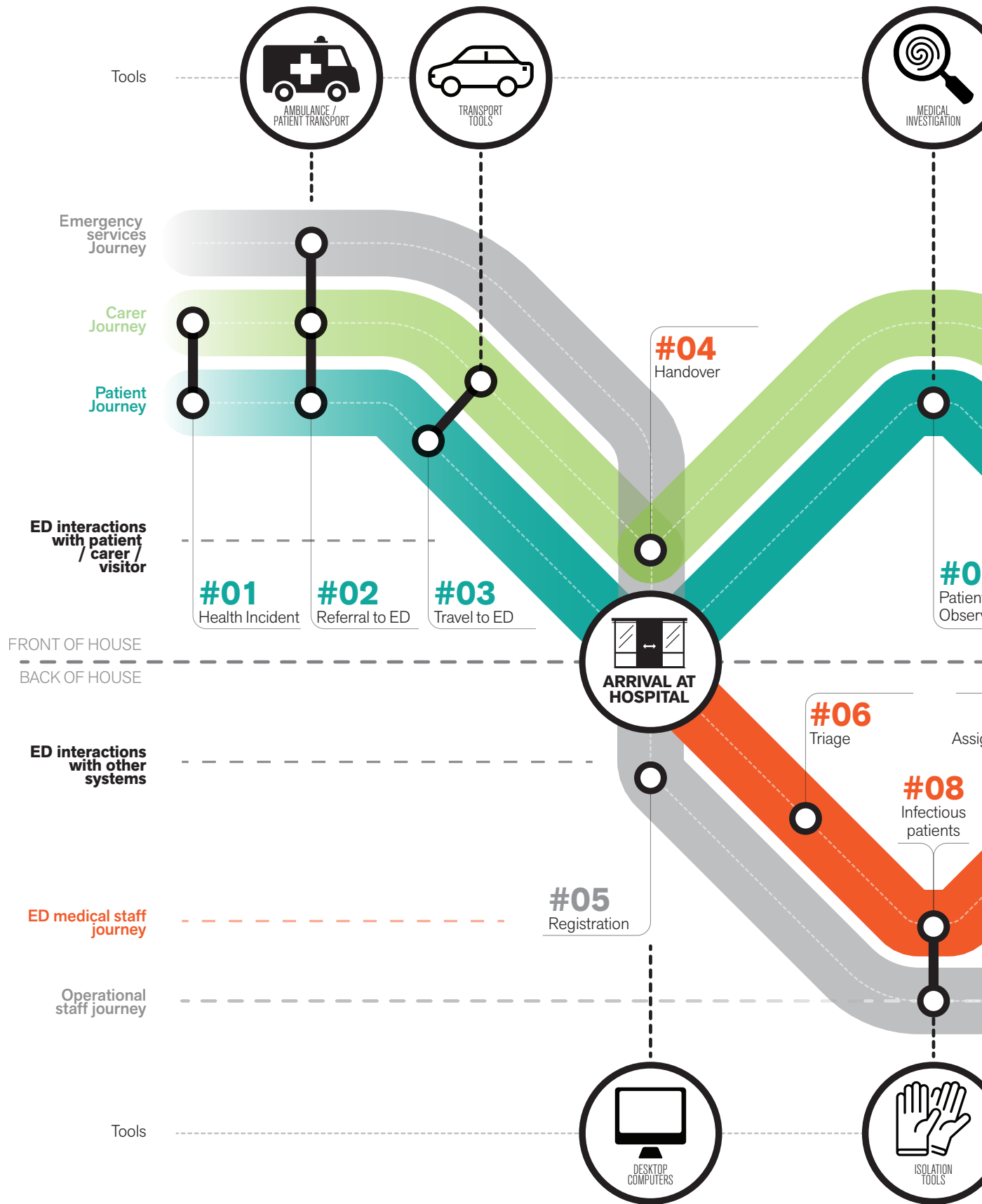
This study makes a contribution through artefacts of design practice which demonstrate the contribution that speculative design research and practice might make to the experience of waiting in the ED and to materialising new healthcare futures. This exegesis describes a journey that unpacks, explores and reflects upon questions of technology and care within the context of the waiting room and the resultant care experience of the future. This study weaves together published literature on ED design with primary research conducted with ED staff, patients and carers, before using these 'signals' as points for creative extrapolation through design experimentation. This study then makes a contribution as a provocational device, a platform of speculation to inform the development of future ED waiting experiences. As a formative and exploratory study, the outcomes of this research build upon current approaches to ED design advocated in literature and present a contribution to emerging design practices informed by service design ([Stickdorn et al. 2018](#)) and speculative design ([Dunne and Raby 2013](#)) described in this study as speculative service design (SSD).

1.1 Diagnosing the problem: What's going on with all the waiting?

When demand for emergency care outstrips available supply, more patients have to wait – and wait longer – to receive urgent care. Demand for ED services, and thus waiting times, have been increasing in Australia in recent years due to a raft of interconnected factors that are complex, systemic and wicked ([Buchanan 1992](#)). The consequences to patients of long wait times are both psychological and physiological, with many patients reporting increases in anxiety, agitation and feelings of uncertainty during long waits in the ED, and some authors even demonstrate a link between long wait times and more adverse health outcomes ([Garling 2008](#); [Sayah et al. 2014](#)). This section seeks to highlight some of these interconnected challenges that are exacerbating waiting times and provide the background necessary to understand the current ED context in Australia, leading to the identification of the opportunities for design that are explored in the later chapters of this exegesis.

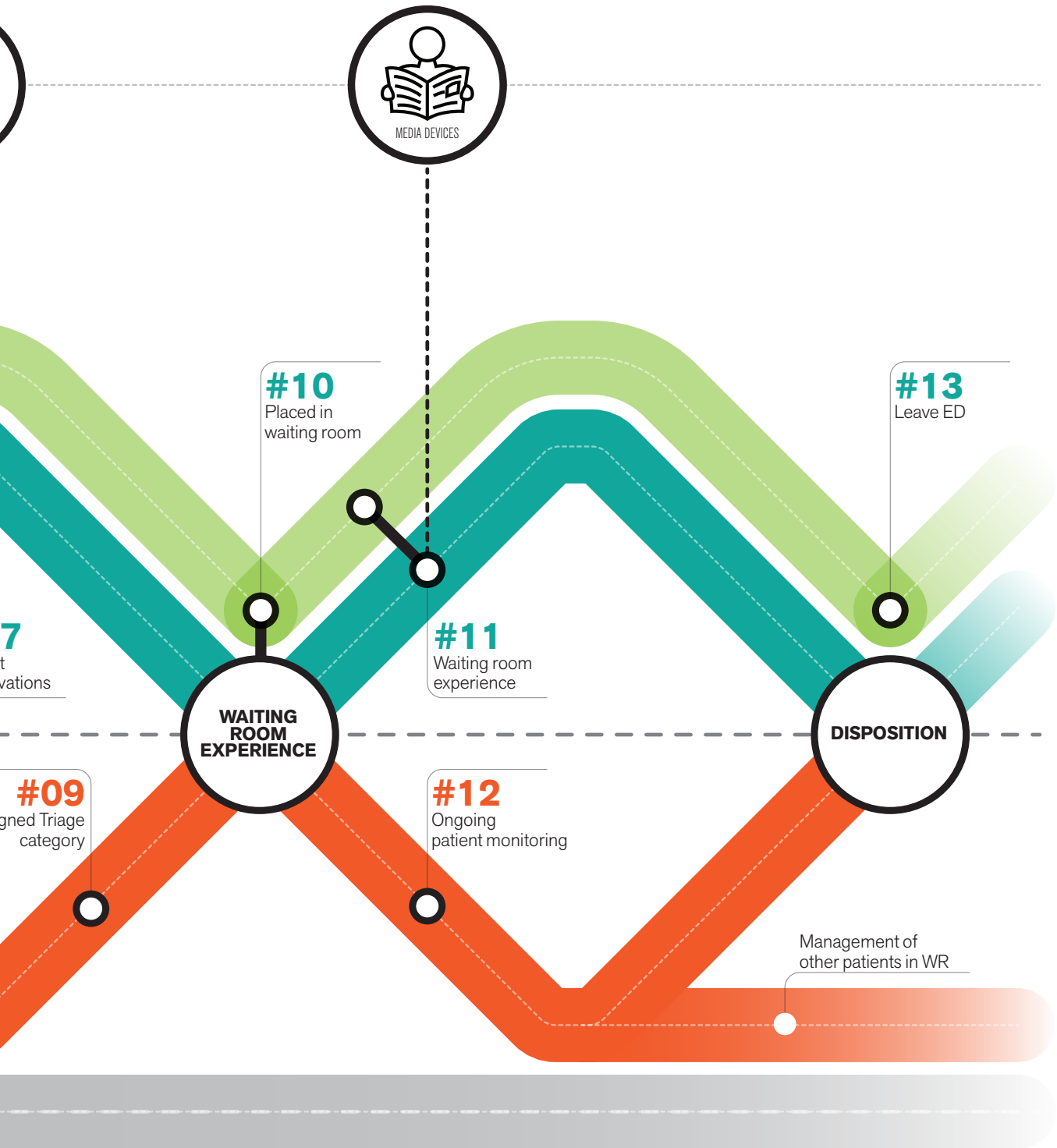
1.1.1 ED care models

A visit to the ED can be a highly unsettling and disruptive life event ([Sayah et al. 2014](#)). Alongside waiting times, the overall waiting experience should also be considered as an important element in overall patient experience and healing. Figure 1.1 provides a visualisation of this journey in the form of a service blueprint that draws together the common touchpoints that a typical patient experiences in the ED. Patients and carers interface with a variety of touchpoints throughout the service journey that are supported by a series of processes and systems that are both visible and invisible to the user.



EMERGENCY DEPARTMENT EXISTING SERVICE B

Figure 1.1:
A service blueprint of the current Emergency
Department waiting room experience



PATIENT WAITING ROOM BLUEPRINT (NOW)

EMERGENCY DEPARTMENT WAITING ROOM EXISTING SERVICE BLUEPRINT (NOW)

#01

Health Incident

Critical patients: Patient sustains a critical injury that requires urgent medical attention. First-aid is provided by responders who contact Emergency Services.

Non-Critical patients: Alternatively, patient sustain an urgent, but non-critical injury that requires medical attention.

Primary care professionals provide a 'letter of referral' to the patient who should then present it to the ED on arrival. This letter usually outlines what actions the primary care professional has taken.

#02

Referral to ED

Critical patients: Paramedics provide medical care and life support to stabilise the patient ready for transport to a local Emergency Department.

Non-Critical patients: Patient visits a primary care health professional (GP, pharmacist, nurse or similar) who refers the patient to an Emergency Department. Primary care professionals provide a 'letter of referral' to the patient who should then present it to the ED on arrival.

#03

Travel to ED

Critical patients travel to the ED via ambulance. Carers may accompany the patient in the ambulance, or meet patients at the ED via another mode of transport.

Non-critical patients or carers may walk, drive, catch public transport or hail a ridesharing service.

#04

Handover

A priority rating is attached to the patient when an ambulance is dispatched. When the paramedics handover care of a patient to ED staff, an ATS category (see #06) is assigned.

#05

Registration

When patients arrive at the hospital, they are registered into the hospital system. This is a process usually undertaken by hospital clerks.

#06

Triage

After patients are registered, patients are assessed by a triage nurse who ascertains the severity and urgency of their condition. Triage is a complex nursing specialisation, and can include taking relevant medical history, the delivery of medication such as pain relief, preliminary observations and emotional support to the patient.

#07

Patient Observations

A triage nurse may collect observations from a patient to inform the delivery of urgent care later, usually by a physician.

#08

Infectious patients

Patients who are identified as potentially infectious by a triage nurse are isolated in a space separate from all other patients. Exactly how this is achieved can differ between hospitals, but usually involves the movement of a patient from the waiting room directly to a cubicle, or other space.

#09

Assigned Triage category

After the patient has been assessed by a triage nurse, the patient receives a 1-5 category rating based on the Australasian Triage Scale (ATS). This rating indicates the length of time that a patient should wait to receive care from a physician.

#10

Placed in waiting room

Once a patient receives a triage rating, they are placed in the waiting room by the triage nurse. How long a patient spends in the waiting room is dependent on the triage rating, but also the availability of a physician to see them, or capacity in the ED to assign that patient a cubicle space.

#11

Waiting room experience

Patients can spend many hours in the waiting room, and the experience of waiting can vary between hospitals. Most waiting areas contain a variety of newspapers, magazines or televisions to entertain patients. Some also include childrens toys, or interactive media displays.

#12

Ongoing patient monitoring

While the patient is in the waiting room, the triage nurse - or waiting-room nurse in larger hospitals - is responsible for the ongoing management of patients before they are seen by a doctor. This can include the ongoing observation of patients, so that patients who have a medical episode, or deteriorate, can receive urgent care.

#13

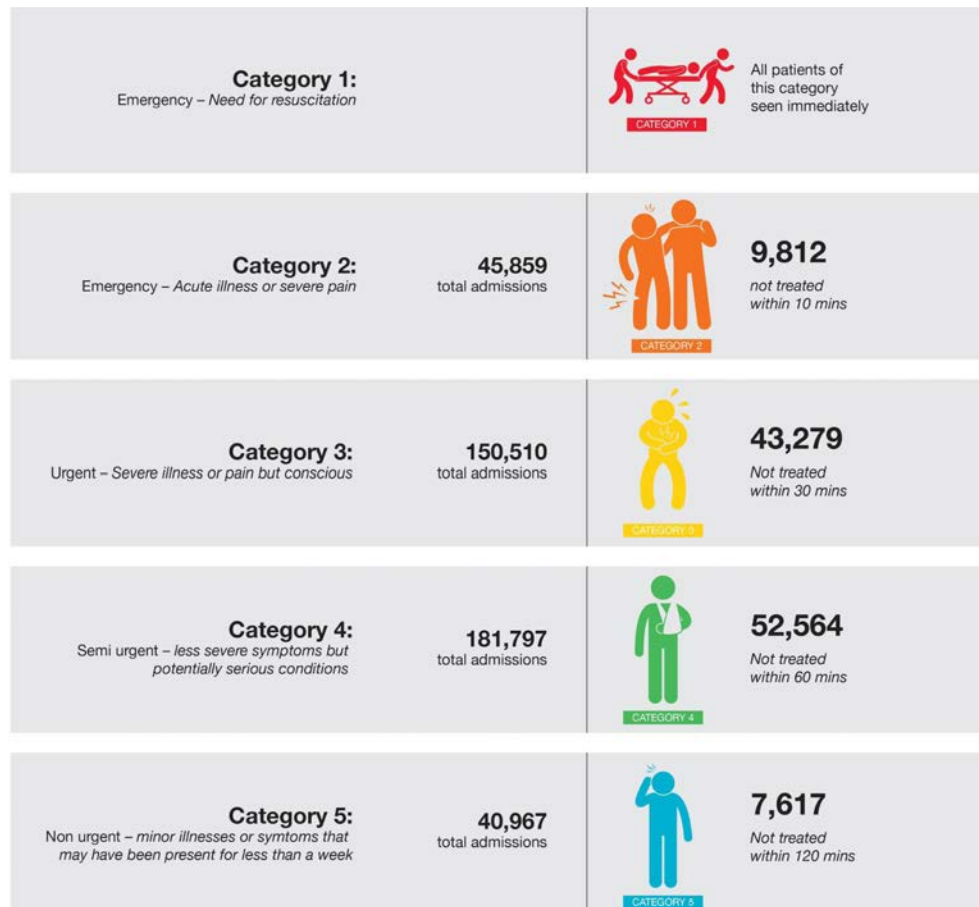
Leave the ED

After patients are treated by a physician, they may be either admitted to a hospital ward for ongoing care, or discharged from the ED with a plan for followup care as required. Patients who are discharged may return home, to support accommodation or a correctional facility.

Figure 1.2:

Attendances at Public Victorian Emergency Departments between January – March 2017.

Data does not include persons who were dead on arrival to the Emergency Department. Data sourced from (Victorian Agency for Health Information 2017).



On a typical day, around 5000 people will present to an ED somewhere in Victoria (VAHI, 2017). Prioritisation for treatment in the ED entails that the critically ill and those with the most intense symptoms are given treatment first, so that patients with acute needs are given more immediate care than others in less urgent need. This process of triage categorises patients on a one-to-five scale, where category one patients are seen immediately and all others must wait. Under current governance policy and targets, a category five patient can wait up to two hours in the waiting room before receiving treatment and 90% of patients should be discharged, transferred or admitted within four hours of their initial presentation (Sullivan et. al 2016), known as the NEAT rule. The reality, however, is that some patients are waiting significantly longer than these targets suggest, as hospitals often do not have the available resources to deal with sudden increases in patient numbers (Carter et al. 2014). Some indicators suggest that only 69% of patients receive treatment within the recommended Australian Triage Scale (ATS) time (VAHI 2020). Figure 1.2 illustrates how many patients from each category are required to wait longer than clinically recommended at public Victorian ED's between January – March 2017.

ED waiting times are often affected by factors outside the hospital (Morley et al. 2018) and, as such, this metric can act as a barometer for overall performance in the healthcare system. This is because ED waiting times are impacted on by changing activity and pressure in other services such as the ambulance service, primary care, community-based care and social care services. For example, patients cannot be admitted quickly from the ED to a hospital ward if hospitals are full due to delays in discharging or transferring patients to other healthcare services.

1.1.2 Increased demand at Australian ED's

Statistics reveal significant changes in Australian demographics and an increased number of ED attendances that cannot be explained by population growth alone ([Burkett et al. 2017](#)). At a national level, between 2011–12 and 2015–16 presentations to EDs increased by 3.8% on average each year ([Australian Institute of Health and Welfare 2016](#)). In contrast, Australia's population grew 1.4–1.6% over the same period.

A number of interconnected factors have been described in the literature as the cause of the increased demand for EDs both in Australia and across the developed world ([Burkett et al. 2017](#)). Changes in demography have sparked changes in the organisation and delivery of healthcare services ([Lowthian et al. 2011](#)), as well as improved health awareness and community expectations of the ED arising from health promotion campaigns ([Lowthian et al. 2011](#); [Burkett et al. 2017](#)).

1.1.3 Australia's ageing population

Part of the increased demand for urgent care in Australia can be attributed to the ageing population. Advancements in treatments and clinical practices mean that most of the population can now expect to live longer than ever before, which has direct implications for the number and type of patients who attend the ED. Given that it is likely our final years will be shared with one or more chronic long-term conditions ([Glasby 2003](#)), an urgent admission to hospital of an elderly person generally means more complex care and more hospital resources ([Glasby 2003](#)). Statistical evidence reveals that on average the individual's greatest expenditure on healthcare happens in the final years of life ([World Health Organization 2011](#)).

Today, around a quarter of patients who attend EDs are aged over 70 ([Australasian Institute of Health and Wellbeing 2016](#)). Older patients tend to present to the ED with more complex comorbidities than younger patients and require more complex treatment. As the number of ageing patients continues to increase in the future, it is likely that more pressure will be placed on the ED as the gateway to the hospital.

1.1.4 Growing cost of healthcare

The cost of providing urgent care is increasing and a sustained period of financial austerity and staffing pressures have exacerbated waiting times in EDs, which are forced to meet this increased demand without an overall increase in resources ([Skinner 2020](#)). The average cost of treating a non-admitted ED presentation is approximately \$561, while an admitted patient costs an average of \$1030 ([Independent Hospital Pricing Authority \(IHPA\) 2020](#)). This cost is rising faster than inflation, at approximately 5.85% year-on-year ([IHPA 2020](#)). The financial cost of treatment is rising alongside the number of patients ([Garling 2008](#)), where sophisticated medical technologies help physicians save more lives but require more resources to operate. Additional finance is required in order to fund the growing expectations of patients and their carers ([Garling 2008](#)).

Some reports also highlight changes within the ED workforce. Until recently, the medical workforce was structured with a few specialists managing very large teams of doctors-in-training and recent graduates. A lack of available senior doctors means that there are insufficient opportunities to train junior doctors, which results in a workforce thinly spread across a strained sector experiencing growing demand ([Brooks, Lapsley and Butt 2003](#); [Markwell and Wainer 2009](#)). Others articulate the challenge of 'role creep', where ED staff must take on extra responsibilities outside their defined positions, restricting their capacity to focus on their core duties ([Skinner 2020](#)). The future will require automation or the introduction of support roles – such as venipuncturists, scribes or advanced practice nurses – to allow specialists to focus at the top of their scope-of-practice and do more with less. As Skinner ([2020](#)) articulates, 'EDs should be specialist-run, not just specialist-led'. This shift towards the automation of systems in the ED is discussed in more detail in Chapter 2 and throughout the design experiments.

1.1.5 Climate change and the ED

The World Health Organization has described climate change as a health emergency ([Carrington 2018](#)) and others have described it as the greatest threat to health in the 21st century ([Watts et al. 2018](#)). The health impacts of climate change on vulnerable communities will be felt most prominently by EDs, which are at the frontlines in dealing with the increasing numbers of disasters such as floods, heatwaves and fires ([Australasian College of Emergency Medicine \(ACEM\) 2019](#)). In Australia, smoke haze from bushfires can exacerbate pre-existing respiratory and cardiovascular conditions, as well as causing unexpected episodes in patients with histories of asthma, emphysema or allergies who are otherwise well. Heatwaves can also lead to increased presentations for conditions such as heatstroke, cardiac events and mental health issues. These events can disproportionately impact on the most vulnerable members of the community, such as the elderly and children, and members of the community who cannot afford to live in insulated homes or afford air conditioning.

For example, the 2019–20 Australian Black Summer bushfire season placed additional stress on EDs. ACEM reported that one Sydney hospital recorded a 30% increase in presentations for cardiac and respiratory illnesses in the first nine days of December 2019 alone ([ACEM 2019](#)). Events like the 2019–20 bushfires will continue to cause a significant rise in the number of overall ED presentations, as well as increasing the complexity of presentations. As ([ACEM 2019](#)) articulate, it is also likely that these type of surge events resulting from climate disasters will become increasingly common.

1.1.6 The opportunity for design

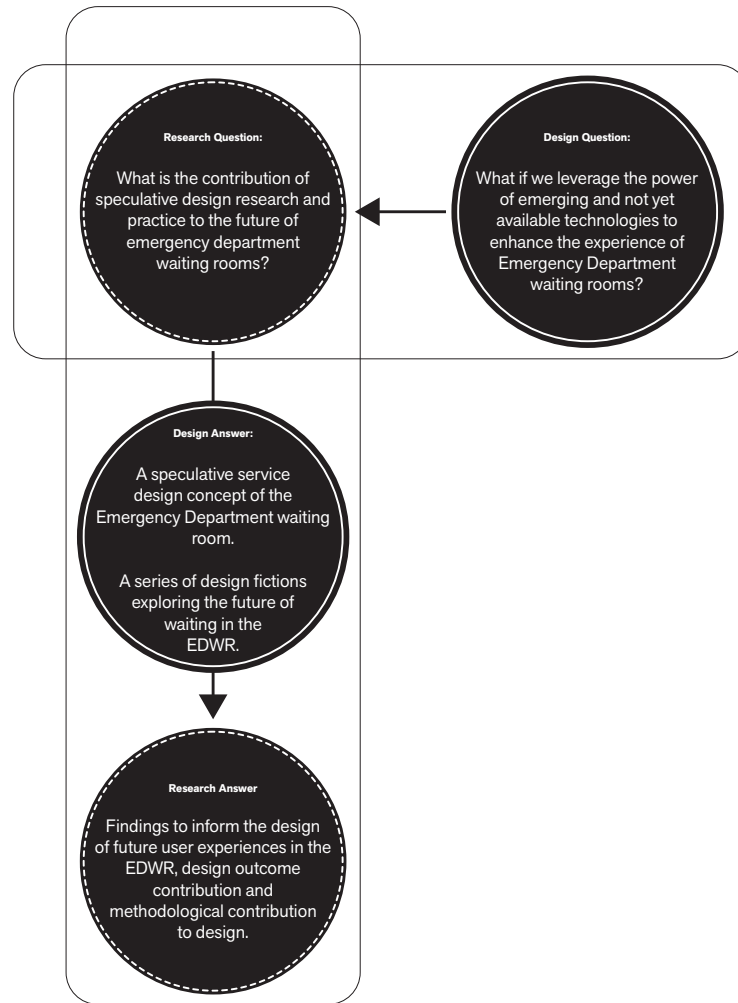
The challenges highlighted in this chapter are not new observations and a broad discourse of academic literature, government reports and media advocates for ED reform. The Walker Inquiry Report ([Walker 2004](#)), the Garling Report ([Garling 2008](#)), the health section of the Australia 2020 Summit Report ([Department of Prime Minister and Cabinet \(Australia\) 2008](#)), the National Health and Hospitals Reform Commission Report ([Bennett 2009](#)), Productivity Commission Reports into the Hospital System ([Productivity Commission 2009](#)) and the Health Workforce ([Productivity](#)

[Commission 2006](#)) all provide as yet unaddressed recommendations for the ED. More recently, reports such as the Productivity Commission's draft Report into Mental Health ([Whitely 2020](#)), the ongoing Interim Report of the Royal Commission into Victoria's Mental Health System ([State of Victoria 2019](#)) and the Interim Report of the Aged Care Royal Commission ([Tracey and Briggs 2019](#)) assert that urgent change is needed. This raises the question that despite a discourse of literature spanning more than a decade, why have all these reports not changed things?

Unfortunately, the reality of addressing these challenges is not so straightforward. These challenges are multifaceted, complex and wicked. The Australian healthcare system is vast and complicated by a raft of interrelated and competing factors. Three tiers of government deliver a hybrid public–private ED care model with countless stakeholders – politicians, public servants, healthcare professionals, pharmaceutical and medical-device companies, health insurers, not-for-profits, charities and consumer groups – many of whom have an interest in preserving some part of the status quo. The meanings of urgent care and caring differ across these professional lines and some may subscribe to different definitions and views of care. Settling these differences in meaning is not simple; the problem becomes ontological, a question of the reality of caring. Part of the reason so many challenges and policy recommendations remain unaddressed is that there is no easy path forward. As designer Peter Jones ([2013](#)) notes, design has yet to take a clear stand on the matter of care. Perhaps, as he speculates, this is because design is still sitting at the periphery of healthcare.

An opportunity for design and for this study is to provide alternatives for the ED – visions of what the future might be like – to help guide and augment strategy towards new futures. Design is well positioned to offer alternatives and significant opportunities for research and development abound as both design and designers begin to take a stance on what it means 'to care'. Focusing on the ED waiting room (EDWR), we will see through this study how we might mobilise design thinking to speculate upon possible service experiences that might lie ahead for the ED, to augment contemporary strategies and inform the development of future EDs and waiting room experiences.

Figure 1.3:
The structure of a
design research project.
Redrawn by author from
(Findeli, 2010).



1.2 Research structure and approach to writing

At the time of writing, there is no prescriptive structure for a speculative PhD study that deals with design practice. Perhaps one reason is the breadth of methods and theoretical contexts that attend the fields of practice that identify design research. While various models for parts of the scholarship emerge from conferences, journals and discussion lists, it is not yet clear how speculative design relates to this field of healthcare (Kerridge 2015, 20).

As a practice-based study, this research adopts a 'project-grounded' approach, as articulated by Alain Findeli (2010). In typical exegetical structure, the text acts as an 'explainer' to situate the creative practice, a design output that is itself part of the knowledge contribution. Within this model of design research, the approach to practice is reframed and the design project is seen as a component of a larger research project, with the design practice acting as an 'experimental ground' within the project. The speculative design practice undertaken in this study acts as such an experimental ground through which future ED experiences can be investigated.

1.2.1 The research aims, objectives and questions.

The broad aim of this study is to establish how we might address the challenge of waiting in Australian EDs. The project explores the waiting room and waiting experience through a review of the literature, co-design engagements with ED stakeholders and then a series of design experiments. Ultimately, this broad aim is translated into a larger research question, asking:

How might speculative design research and practice inspire change for the problems facing the emergency department waiting room of the future?

Drawing upon Findeli's (2010) model of design research, this is supported by the design question:

What if we leverage the power of emerging and not-yet-available technologies to enhance the service delivery and experience of emergency department waiting rooms?

These two questions are supported by a series of three subsidiary questions:

1. What are the emerging and not-yet-foreseen tensions, challenges and problems for the emergency department waiting room experience?
2. What methods can be used to apply speculative design to the service design problems facing emergency department waiting rooms?
3. How can the speculative design research and practice on the emergency department waiting room be communicated to inspire change?

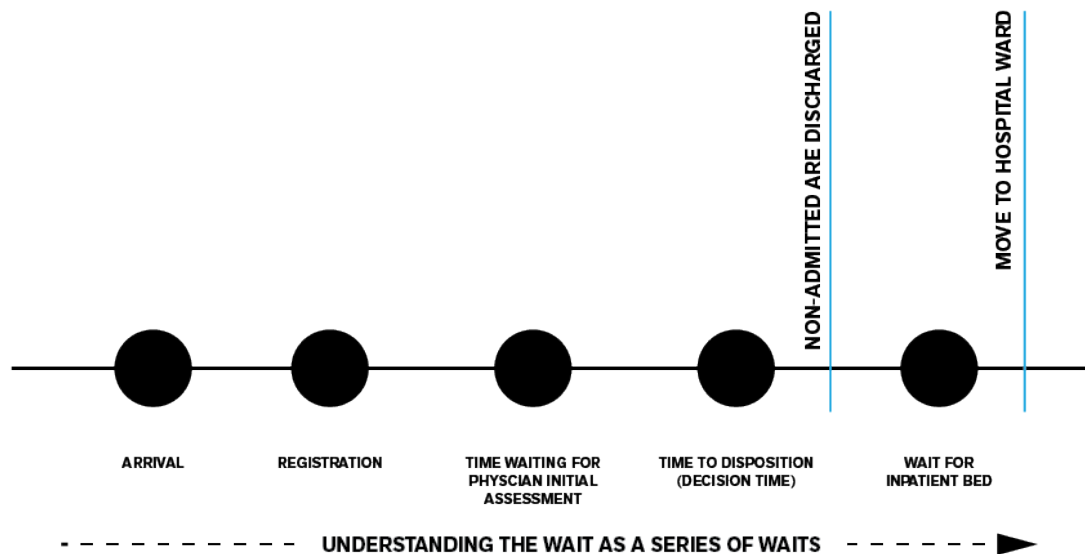
The 'research answers' (Findeli 2010) arising from this study emerge through the 'design answers' generated through acts of design (Figure 1.3). This study contributes to the development of future strategies to improve waiting user experiences for patients, carers and staff.

1.2.2 Defining the scope and significance of the research

This research is focused on the emergency department waiting room (EDWR) and waiting experience. We might think of this focus as not just one waiting period, but a series of 'waits' that fill gaps within the larger service journey (Canadian Institute for Health Information (CIHI) 2012). Patients wait from the time of the health incident to receiving pre-hospital care by an ambulance or other healthcare provider, then wait to transit to the ED, wait to be registered and triaged, and then wait for an initial assessment by a physician. Figure 1.4 depicts this series of waits and underscores that this study is concerned with waiting at the front end of the ED journey. While other waits are present in the ED, this study is concerned with the waits up until the 'time waiting for physician initial assessment'.

Figure 1.4:

Understanding the wait in the ED as a 'series of waits'. This research focuses on the period until 'time waiting for physician initial assessment'.



As set out in this chapter, the delivery of urgent care is a collaborative affair that involves numerous stakeholders and participants. In the waiting room, a number of these stakeholders are present. This study is focused on the primary users of the waiting room (Figure 1.5) and those affected most significantly by waiting times. These are patients, visitors and carers who accompany patients, and ED staff who facilitate care delivery. Staff, in this context, includes both medical (physicians, nurses, pharmacists, social workers, etc.) and service personnel (clerks, orderlies, security etc.) who support urgent care. These three categories represent the key stakeholders and users involved in the waiting room and waiting experience. Other secondary users such as paramedics and police – who are sometimes users of the waiting room – are considered in the study but are not the subject of focus.

Congestion, overcrowding and blocked access in the ED are often described in the literature as a 'whole-of-system' problem, not a problem in the waiting room or front-end operations alone (Morley et al. 2018). 'Fixing' the ED system is beyond the scope of this PhD study. Instead of focusing on the whole ED system, the significance of this work is in its focus on the waiting room and waiting experience, and, instead of fixing the many problems in the ED, it seeks to propose possible futures to provoke discussion about the attributes of preferable ones. Chapter 2 discusses the paucity of attention that waiting room design has received throughout history, which is a gap that this study aims to fill.

1.3 Findings and contribution to knowledge

A primary contribution of this study is the speculative design outcome as a provocational device. The disseminations of the design practice throughout this study represent a contribution to knowledge as to how we might understand the waiting experience of the future and an instrument for further speculative thinking. Seeing the design outcome not as determinations of the future but, rather, as articulations of possible alternatives, they open up discussion about the attributes of a preferable future for the waiting room. The research then interrogates the design outcome and unpacks some of the consequences and implications that might lie ahead for the ED. It presents the design articulations as a vehicle for opening up discussion on individual healthcare experiences – which can then be collated and used to inform current ED design approaches. This brings the voices of potential users upstream in the trajectories of development, at a formative stage when the input of potential end-users can be integrated into the development of new ED facilities.

A secondary contribution of this study is the SSD framework, detailed in Chapter 3, which reconciles some of the methodological discrepancies arising from speculative and service design discourses. While the SSD framework is applied here in the context of healthcare, it is likely this will also resonate in other service sectors. Designers, practitioners and researchers might apply the SSD framework partially or entirely to their work when tasked with proposing futures for complex, multi-stakeholder environments.

This study is significant and timely as it addresses current issues in emergency medicine, particularly around how proliferating technology will change the ways urgent care is delivered and experienced. This study contributes to developing a mature understanding of possible future user experiences in the EDWR. Designers, architects, clinicians and healthcare administrators could apply these findings partially or entirely when building, designing or making decisions about technology in new EDWRs or ED front-of-house systems.

1.4 Exegesis Structure

This exegesis comprises eight chapters. The first, *Chapter One: What's with all the waiting? An introduction*, has investigated the problem of waiting in Australian EDs and unpacked some of the factors that are increasing waits in the ED. Chapter 1 then set out the broad aim and framework for this study.

Chapter Two: Waiting room of the future? A review of the literature provides a critical review of the literature concerning ED design and highlights key gaps in knowledge that are addressed through this study. This chapter also outlines the overall research question that guides subsequent chapters.

Chapter Three: Speculative service design: The research method provides the organisational logic that connects the theory with the design practice in this study. This chapter provides a novel methodological framework — SSD — which is applied within the study in latter chapters.

Chapter Four: A co-design investigation into emergency department waiting rooms describes a series of co-design engagements in collaboration with Cabrini ED, an urban hospital in Melbourne, Australia. As a demonstration of the first part of the methodological framework, these co-design engagements unpacked the waiting room experience through the lenses of lived experiences — from the perspectives of patients, staff and carers. This chapter then concludes with a series of insights and 'signals' that provided the initial inspiration for the creative component of this project.

Chapter Five: Crafting the speculation: The design experiments details the processes of design experimentation and creative extrapolation conducted throughout this study and another practical application of the methodological framework introduced in this study.

Chapter Six: A speculative vision for the future for the emergency department waiting room then presents the results of the design experiments and the speculative design provocation and outcome. This chapter unpacks the design outcome and discusses the three modes of dissemination — design fictions, physical models and the exhibition — and how each acts as a provocational device. This chapter presents them as proposals that invite discussion, reflection and debate as to what the future of waiting in the ED might be like.

While previous chapters present the outcomes of speculative design practice, *Chapter Seven: A critical evaluation of design, health, futures and the emergency department waiting room* discusses the outcome as a provocational device and provides a critical evaluation of the design outcome through sharing of the work with a range of former ED patients and carers via co-design

engagements. It offers a preliminary analysis of the creative work while leaving the door open for future research using the speculative outcome.

Chapter 8 then brings this story to a close, discussing some of the research limitations and highlighting avenues for future research endeavours.

Chapters 4 to 8 are also each prefaced by one of the design fictions generated by this research. These design fictions are discussed in more detail in Chapter 6.

Finally, this exegesis is accompanied by a series of appendices which provide further information in relation to some aspects of the study.

Chapter — 02

The Emergency Department of the future? A review of the literature.

CHAPTER OVERVIEW —

This chapter provides a review of the literature concerning the design of EDs and weaves together contemporary ED design guidelines with a review of design precedents, before making the case for the inclusion of speculative thinking in the ED. Through this review, this chapter highlights key gaps in knowledge that are addressed by this study and outlines the overall research question that directs subsequent chapters.

2.0 Introduction to the review

As discussed in Chapter 1, the ED is an important feature of the contemporary healthcare landscape in Australia but is being strained by a raft of interconnected problems, which are thus exacerbating wait times. Despite a plethora of reports that identify problems and advocate for change, many of these challenges remain unaddressed ([Garling 2008](#); [Iedema et. al, 2008](#); [Skinner 2020](#)). This narrative literature review aims to analyse, summarise and integrate the discourses concerning the intersection of emergency medicine and speculative design, to identify knowledge gaps in order to facilitate strategic planning in the face of uncertainty and challenges. Focusing on the emergency department waiting room (EDWR), the review makes an argument of discovery for the deficiencies that concern EDWR design, before then making an argument of advocacy that the application of speculative thinking to the ED would complement strategic planning for the future. In doing so, this review draws together the salient literature on speculative design discourses and examines how they might be applied to the EDWR, to illuminate new streams for research and design.

The two key arguments made in this review are evidenced by historical design precedent in the EDWR, examples of technology already integrated into ED workflow, the current guidelines that guide dominant design ideologies in the development of new EDWRs and examples of speculative design elsewhere in healthcare, and the potential for this kind of design to assist in unpicking the wicked problems ([Buchanan 1992](#)) currently facing the ED. In light of these arguments, the chapter concludes by hypothesising that a fusion of design approaches would assist in the development of future healthcare services and experiences, a hypothesis which is tested and explored by focusing on the EDWR through design experiments in later chapters. This then sets the scene for Chapter 3, which will detail how this methodological approach might be applied to the design of future EDs.

2.1 General overview of the Literature

The EDWR is a clearly defined feature of contemporary EDs, and waiting is a phenomenon central to this experience and has a profound impact on overall patient experience. Long wait times in the ED have been linked with adverse health outcomes ([Garling 2008](#); [Sayah et al. 2014](#)). Despite the important role of waiting, this review highlights a paucity of work concerned with the design of waiting experiences in the ED. A review of existing ED models suggests that the ED waiting experience has barely changed since the conception of modern hospitals. In Australia, the design of these spaces is guided by two regulatory documents: the *Australasian health facility guidelines – Emergency unit* ([AHIA 2019](#)) and *Australasian College of Emergency Medicine emergency department design guidelines* ([ACEM 2014](#)). These documents both advocate an evidence-based approach to the development of new urgent-care facilities, but lack comprehensive design precedent or guidance on how the EDWR might be designed to alleviate anxiety and prevent agitation among patients waiting.

The ED is a service design challenge; waiting – like urgent care – is not an event but a process that happens over time. Multiple stakeholders co-create care over multiple interactions over time and in doing so are supported by a range of processes and systems that are both visible and invisible to the end-user (Penin 2018, 12). Medical and non-medical disciplines collaborate, both within and outside their own professional silos, providing the service of care delivery to emotional and sick patients. The physical space of the ED frames this service experience and how care is accessed, delivered and experienced.

Both the ACEM (2014) and AHIA (2019) documents focus on providing architects with high-level technical specifications, functional requirements and spatial requirements such as how many square metres are required for certain clinical activities or what devices and infrastructure are required for physician workflow. These documents mention little about the relationship between the physical space and the experience of urgent care. Focusing on the EDWR, this review highlights that the waiting room should not just be considered a physical 'container of stillness' but, rather, an 'assemblage' of 'things' – people, objects and things – that all contribute to the waiting experience (Fadyl et al. 2020). This review then advocates for an exploration as to how ED experiences might be designed to fulfil the needs of patients; in the case of this study, those 'waiting' in pain. Technical specifications that guide the construction of new EDs fail to consider the relationship between the physical environment and the service (care) experience.

Outside of regulatory guidelines, other authors articulate the contested nature of the EDWR. Vatandsoost and Litkouhi (2019) assert that all waiting areas will become obsolete as advances in clinical practice divert patients away from the hospital and technology optimises patient flow, while others highlight that patient numbers will continue to grow (Bell et al. 2019) and still others explain that there is yet to be a consensus in the literature as to the optimal arrangement of services in the EDWR (Wiler et al. 2010).

Recognising that technology is at the forefront of advances in the ED and healthcare right now (Maniya, Jarou and Hughes 2019), this review advocates for the inclusion of speculative thinking in the ED in respect to how these technologies might be utilised in the next generation ED. While speculative thinking is likely to benefit existing design approaches, it is as yet an underexplored aspect of design research and practice. By drawing out examples of how speculative thinking has been applied in other sectors, this review then argues that a grounded speculation on an alternative vision for the ED would likely augment regulatory guidelines such as the ACEM (2014) and AHIA (2019) documents. In doing so, a speculative design outcome could promote dialogue and engagement between ED staff, patients and carers with architects, designers, engineers and health planners such that they could apply their knowledge to improve ED experiences. In order to address this gap, the literature review then concludes by outlining the key research questions to be addressed by this study.

2.2 Contemporary Emergency Department waiting room design

The ED is arguably the most operationally complex clinical setting of the modern hospital but, as some authors discuss, perhaps the least well understood ([Sayah et al. 2014](#)). The design of new EDs in Australia is led by the two documents described above ([ACEM 2014](#); [AHIA 2019](#)). In comparing the two documents, they differ in the level and type of detail provided about ED spaces and common issues discovered by clinical users. In accommodation of this difference, ACEM notes that the two documents should be viewed as 'complementary' ([ACEM 2014, 4](#)) and the AHIA ([2019, 4](#)) document references the policies from the ACEM document. These two documents outline how the ED is a unique design challenge different from elsewhere in healthcare and provide an overview of the technical specifications required by clinical activity to meet the needs of a diverse range of patients who need urgent care.

The EDWR receives attention in these two documents. Both documents recognise that the EDWR is an integrated component of the wider front-of-house services and that flow in and out of the waiting room is contingent on the other processes of triage and registration. ACEM ([2014](#)) articulates that the purpose of an EDWR is as follows:

A waiting room is intended for patients to wait in both before and after triage, for entry to treatment areas, for waiting for transportation post-discharge, or for accompanying persons waiting.

– ([ACEM 2014, 36](#))

ACEM ([2014, 37](#)) describes the functional requirements of the EDWR as portable patient-monitoring equipment, security systems, display systems for information and seating that cannot be used as weapons in the event of an altercation. The document continues to highlight the direct relationship the EDWR has with triage, reception, entrances and the other clinical areas of the ED. The document also briefly describes common pitfalls in EDWR design, such as inadequate wayfinding, inadequate size of the EDWR, oppositional seating and poor public-announcement systems that cannot be heard over the general noise in the ED. The AHIA ([2019](#)) document describes the EDWR as follows:

The main ED entry is the location where ambulant patients present for services and is separate from the ambulance entry.

– ([AHIA 2019, 15](#))

The waiting room should be a pleasant, safe environment where patients, families and carers can be comfortable.

– ([AHIA 2019, 23](#))

The AHIA (2019, 23) document also suggests that in the EDWR 'adequate seating should be provided that allows some separation between groups' and 'consideration should be given to appropriate lighting, noise levels and, distractions e.g. art and multimedia activities'. This claim is supported by the ACEM (2014) document, which highlights that the EDWR should 'Minimise patient agitation' through 'décor including appropriate art works, lighting and seating arrangements'.

Both documents focus on the physical space of the waiting room, but do not discuss how the physical space frames the delivery of the service. Additionally, neither document provides guidance as to what these points mean and exactly how décor might be applied in the EDWR. A brief example of successful design precedent for the EDWR is provided by the ACEM (2014, 68) design guidelines, but no such reference is given by the AHIA (2019) document. Exactly how the EDWR could be designed to mitigate agitation is a question that is not addressed by these two documents.

Although these guiding documents provide useful technical specifications for the design of EDWRs. Where these documents are lacking, however, is in their description of the relationship between the physical space and service delivery, and how that impacts on patient experience in the waiting room. While the ACEM (2014) document provides some photographic evidence, they generally lack comprehensive design precedent and a review of how the EDWR might be designed to alleviate anxiety, prevent agitation and distract patients from their injuries. In light of this gap, this review explores some of the historic and contemporary design precedents that have contributed to EDWR design in Australia and abroad. In doing so, this review situates these two documents as the dominant design ideologies that dictate the contemporary trajectories of EDWR development in Australia.

John Huddy (2016) provides in *Emergency department design: A practical guide to planning for the future* a guide for novice and experienced architects in conceptualising new ED facilities. Huddy (2016, v) states that he has participated in the analysis, planning and design of more than 325 EDs. Pages 199–205 provide an overview of waiting spaces in the ED that is a useful supplement to the technical guidelines provided by the AHIA (2019) and ACEM (2014). Huddy (2016, 202) highlights the multiple challenges in the ED front of house in the waiting room – including violence, visual control and security. Huddy (2016, 203) provides a high-level schematic and arrangement of the different components within the ED front of house and highlights how lines of visibility between the different elements – reception, triage and security – are important for ensuring that ED staff remain in control of the waiting room, articulating how this is important for both reacting to episodes of violence and preventing them.

We might trace these ideologies and approaches to design from the ACEM (2014), AHIA (2019) and Huddy (2016) as grounded within the ideas of Michel Foucault (1963), who in *The birth of the clinic* describes the hospital as being organised as an 'examining apparatus' enabling almost constant observation of the patient. Foucault describes the 'medical gaze', a dehumanising separation of the patient's body (illness, symptoms) from their identity (emotions, social

relationships). In this creation, all extraneous variables – such as the home environment, family, friends and usual activities – are excluded so that the hospital can provide the ideal laboratory setting where the causes of illness can be isolated and the effects of treatment monitored. The EDWR is not a laboratory and should not be designed as such, even if care is being conducted within it. Caring ‘for the whole person’ requires that the separation between body and mind be reconciled, and the concept of a ‘medical gaze’ challenged.

2.2.1 The Waiting room as an ‘assemblage’

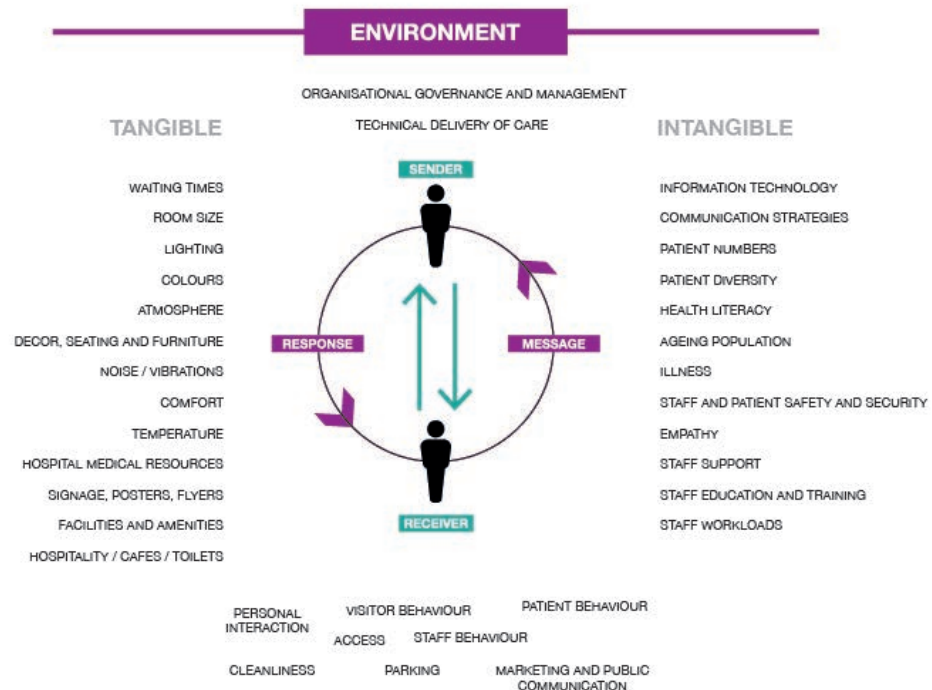
Fadyl et al. (2020) highlight that while the disciplines of spatial design, architecture and geography theorise the role that design can play in shaping waiting experience, there is a scarcity of work that applies design directly to hospital waiting areas. They point to a range of work from sociology (Brown 2012; Fox 1997; Roth 1972) and we might draw together other literature from other fields that highlights the impact that the built environment has on health and healing (see Daykin et al. 2008; Lee et al. 2014; MacAllister et al. 2016; Nanda et al. 2011; Ulrich 1984), but this literature does not provide analysis of the socio-cultural dynamics of the healthcare environment, nor opportunities or platforms for design research and practice.

Fadyl et al. (2020) draw upon the writings of Gilles Deleuze (1988) to describe the phenomenon of waiting in a waiting room. According to Deleuze (1988), life is unfurling at every moment – a plane of ‘becoming’ in continuous iterations. Thus, a Deleuzian interpretation would suggest that waiting is not simply stillness or pause. Waiting is a process that continually participates in becoming; waiting areas are not simple ‘containers’ within which people wait, but the physical space contributes to the becoming that occurs within waiting. Fadyl et al. (2020) then go on to describe the waiting room as an ‘assemblage’, an environment in flux that is made up of a number of heterogeneous elements. These identified elements can include human bodies, digital devices, food, furniture, walls, doors, windows, sounds, smells, weather, events (both outside and within the waiting room) and time of day, week, month or year – elements that are all interacting and changing through space and time.

Fadyl et al. (2020) challenge us to think of the EDWR as a dynamic environment in flux that is made complex due to the interrelationships of ‘things’ – bodies, artefacts, emotions and relationships. What the ACEM and AHIA documents, and other ED guidelines such as those provided by (Huddy 2016), lack is capacity to articulate the dynamic nature of the waiting environment and how it can impact on both user experience and clinical workflow. While a technical specification of the environment is useful to an architect, there is a gap in knowledge as to how to best design the service and overall experience to meet the needs of those ‘waiting in pain’.

Figure 2.1:

A model of the tangible and intangible attributes that impact communication in a typical Emergency Department.



2.2.2 The Servicescape of the waiting room

If the EDWR is an assemblage of 'things' and emotions, then there is a knowledge gap as to what kind of assemblage of things makes for a positive waiting room experience. The dominant design ideology that guides the trajectory of EDWR design in Australia does not parse the dynamic nature of the waiting room space and lacks articulation of how the waiting room frames and supports clinical care. In a systematic review of the literature on experiences for patients and families waiting in healthcare, Rittenmeyer, Huffman and Godfrey (2014) conclude that organisations need to find ways to acknowledge and address the anxiety and stress associated with waiting and the impact these may have on understanding of healthcare information. This is a point that is not yet addressed in the ACEM or AHIA guidelines.

We might also think of the ED experience as a 'servicescape', an assemblage of things that mediates interactions and care over time. Bitner (1992) first coined the term 'servicescape' and developed a conceptual framework to study the impact of the physical environment on service organisations and consumers or employees. Since then, a rich discourse of literature has emerged that examines the topic of servicescapes theoretically and empirically (Fottler et al. 2000; Lin, Leu, Breen and Lin 2008; Newman 2007). Bitner (1992) suggests that the ambient conditions – such as space and function, signs, symbols, artefacts – frame the relationship between environment and user. Bitner argues that the physical environment causes users to respond cognitively, emotionally and physiologically, which alters their behaviours and social interactions with other customers and employees. In drawing upon both a Deleuzian interpretation of the EDWR and servicescape literature, we might conclude that waiting in the ED is framed by systems and things: people, spaces, devices and organisational structures. Figure 2.1 attempts to model these tangible and intangible elements that affect the waiting room and waiting experience. While not a definitive list, this diagram presents some of the factors that can be designed in order to improve the waiting room experience, actionable things that can be addressed by design in order to influence the waiting room.

2.3 The Emergency Department waiting room: 1894 until today.

The lack of design work in the EDWR indicates that the waiting room has not yet received the attention it deserves, given the important role it plays in the provision of urgent medical care. This section of the review explores the historical and contemporary design precedents of EDWRs and highlights key examples of contemporary innovation. This section makes the argument that EDWR design has barely changed since the original inception in the late 19th century, despite other radical changes in the healthcare system and the establishment of emergency medicine as a distinct medical speciality.

While the concept of a hospital is ancient ([Silverberg 1967](#)), early examples of the EDWR can be found in the early modern hospitals of the late 19th century; Figure 2.2 presents such a waiting room from 1894. Known as the House of Relief or Chambers Street Hospital, the facility in Lower Manhattan operated over 1875–1919 and provided accessible care to the poor, affording them 'gratuitous treatment of cases resulting from accident or acute and sudden illness' ([Miller 2013](#)). The many patients who required the services of Chambers Street Hospital would wait in what was then called the outpatient department, where wooden pews were lined up facing large desks and glass barriers where medical staff would work to manage incoming patients.

One of the oldest hospitals in Australia and Melbourne's oldest hospital – the Royal Melbourne Hospital – seems to follow a similar convention as other hospitals of the same era. Figure 2.3 presents an image of the outpatient enquiries waiting area from 1945, depicting the same kind of rowed, wooden seating complemented by desks and people occupying their time with various distractions – newspapers, books and other printed media.

Fast forward to the 21st century and despite the changes elsewhere in society, the EDWR seems to be a feature left behind in time. The waiting areas in Figure 2.2 and 2.3 are strikingly similar to the EDWRs of today – Figures 2.4, 2.5 and 2.6 – where these areas take the form of one large space with chairs ganged throughout. Modern EDWRs have built upon the 'distraction' tools of the past, such as books and magazines, and have now applied other innovations. In Figures 2.4, 2.5 and 2.6, we might note television screens that provide health information and other media. At the Perth Children's Hospital ED (Figure 2.5), we can see how an interactive floor projection might be applied, alongside a more sophisticated environmental design language in terms of colour and material choices. All of these examples of EDWRs are compliant with the suggestions in the ACEM and AHIA documents. Despite changes to how emergency medicine itself is practised, the overall function, structure, layout and configuration of the EDWR have remained much the same for more than 125 years.

Figure 2.2:
House of Relief on Hudson
and Jay Streets. General
Office and Out Patient
Department, 1894.

Image by (Miller 2013)



Figure 2.3:
Waiting area and outpatient
inquiries at the Royal
Melbourne hospital. Image
by (Fowler, 1945)





Figure 2.4: Perth Children's Hospital Emergency Department, ground floor, 12 March 2019. Patient waiting area from Ambulance arrivals, in POD C, including an interactive floor projection (foreground at left). Image by [\(Gostelow 2019\)](#).



Figure 2.5: Perth Children's Hospital Emergency Department. Triage waiting room, showing the counters for receiving new patients the red being the main windows, the white window only used during overflow (busy) times. Image by [\(Gostelow 2019\)](#).

Figure 2.6:
Image of Cabrini
Emergency Department
waiting room, 2017.

Image by author



'Internationally, the ED or 'accident and emergency' as it is sometimes known abroad, has been the subject of some design attention. The work of [PearsonLloyd 2012](#), in collaboration with the Royal College of Art, in a project titled 'A Better A&E' presents an integrated design solution in response to the challenge of violence in the United Kingdom National Health Service (NHS). PearsonLloyd and the Royal College of Art won an award from the Industrial Design Society of America (IDSA) for this work in 2013 [Royal College of Art 2013](#). This project demonstrates the capability of design-led innovation to impact both service delivery and experience in the ED, which is only now starting to be further investigated.

2.4 What's next? The emergency department waiting room of the future.

The role of the waiting room within the ED in the future is contested. Some authors ([Vatandsoost and Litkouhi 2019](#)) assert that all waiting areas will become obsolete as advances in clinical practice divert patients away from the hospital and technology optimises patient flow. Other authors are less optimistic and suggest that as ED patient presentations continue to increase, crowding in the ED will continue to grow ([Bell et al. 2019](#)) and be most prominent in the waiting room. Others again highlight that there is yet to be a consensus in the literature as to the optimal arrangement of services in the ED front of house – including the EDWR ([Wiler et al. 2010](#)).

As demand for ED services continues to outstrip available supply, it seems likely that the existing model of innovating and iterating service delivery incrementally will not work. New models of care will need to be entertained ([Bell et al. 2019](#)) and it seems unlikely that any intervention will completely eliminate the waiting experience. Current guidelines as reviewed in this chapter are inadequate to meet the emerging and unforeseen challenges, and will need to be augmented to address how the physical environment interrelates with service delivery, to help healthcare administrators and architects alike meet these challenges. Going even further, these documents and guidelines need to be enriched with alternative thinking that complements and augments the current, anticipatory management strategies ([Garrett 1999](#)) that dominate healthcare planning. What is missing from these documents is an understanding of what is and what could be for the ED.

When it comes to imagining a future for emergency care and medicine, technology is in the foreground right now. As in many other sectors and industries, new and emerging technologies in the ED are poised to challenge established workflows and entrenched ideologies about how urgent care should be accessed, experienced and delivered. While technology has always been central to the practice of emergency medicine, it seems likely that new and novel technologies will continue to creep into clinical workflow with the purview of enhancing experiences for both patients and clinicians alike. An important question in this trajectory is one of agency: To what extent do clinicians, patients and carers have control over the technologies that impact on their experiences of work, healing or waiting? How much say or input do these end-users have in the implementation of these new tools? How are new ED futures made? Is it by controlling ED leadership, path-dependent decisions based upon previous technological choices from the past, or by some internal technological logic?

Prior to the 1980s, technological scholars claimed that technological change could be an out-of-control history-shaping process ([Winner 1978](#)). In 1975, ([Rushmer 1975](#)) wrote that healthcare delivery had undergone revolutionary changes over 25 years due to advances in

medical technology, information, specialisation, sophistication of medical facilities and costs. This has led to the healthcare system being confronted by serious problems directly related to technological successes and overabundance. To these scholars who have observed such phenomena over a large span of time, technology has seemed to develop autonomously, following an internal technical logic that has profoundly shaped society in ways that were not intended by anyone. More than 45 years later, the commentary by Rushmer (1975) still seems relevant. More recently, many sociologists and historians of technology contest this view as 'technological determinism' and prefer constructivist approaches to the study of technology, emphasising historical and social context, human agency and interpretive flexibility (Hackett, Amsterdamska and Wajcman 2008). Scholars such as Hackett, Amsterdamska and Wajcman (2008) and Jensen (2010) convincingly argue the important role of technology in shaping social groups, historical contexts and varying perceptions as to the meaning and purpose of technology. In so doing, this constructivist scholarship has shown the implausibility of simplistic technological determinisms (Dafoe 2015).

In the ED context, most science and technology studies (STS) scholars would agree that technology has an influence upon social relations (Mackenzie and Wajcman 1999) and thus how urgent care and waiting are experienced, but as Dafoe (2015) highlights, questions about the impact of technology are neglected. Important underexplored areas of enquiry include the political impact of technology, the inertia of technological systems, the trajectories of technological development and the historical transformations associated with technological innovations. The questions of agency raised in this section are not yet answered and, in the context of the ED, there is a need to explore these questions as they relate to the waiting room and care experience. The potential impact of distributed digital technologies on the waiting experience for patients and carers is significant, but as yet underexplored.

2.4.1 Mechanical minds: Technology in the emergency department

Maniya, Jarou and Hughes (2019) present a thought experience as to how the field of emergency medicine will evolve in the next 50 years – examining how technological disruption might impact on the ED experience. In the future they articulate, the ED is portrayed as accessible and leisurely, where digital and automated systems support and replace humans. Automation and other technological innovations – such as artificial intelligence (AI), remote patient monitoring and telemedicine – have increased access to care and allowed earlier detection of life-threatening dispositions.

Huddy (2016) highlights that it would have been 'unthinkable' in the early 1990s that every ED would have its own CT scanner. As we look forward and as time passes, the capabilities afforded by these technologies are likely to increase alongside the potential benefits to patients, physicians and the public through more efficient and accurate delivery of urgent care. It seems

that Maniya, Jarou and Hughes (2019) are likely correct in suggesting that emerging and novel technologies are going to reconceptualise the ED of the future. In particular, the mechanical minds of AI and machine learning (ML) are well-positioned to offer innovations in both clinical practice and patient experience, perhaps slowly at first, but at a growing pace with time. As the last section has highlighted, however, there is a need to reflect upon the role of technology in the waiting experience, who benefits from this technology and who is marginalised.

While fictitious, the speculation provided by Maniya, Jarou and Hughes (2019) highlights how technology might disrupt the ED of the future. This speculation is supported by other literature which articulates how AI and ML might be applied for the benefit of staff and patients. This includes the prediction of ED attendance on any given day (Duwalage et al. 2020), active monitoring of patient vitals (Monkaresi, Calvo and Yan 2013), accurate early warnings in the case of cardiovascular instability, sepsis or deterioration (Convertino et al. 2013), reduction in false alarms (Plesigner et al. 2015), rapid screening at triage (Levin et al. 2018) and preliminary diagnosis of imaging and blood test results, and assisted ultrasound and medical imaging analysis (Stewart, Sprivulis and Dwivedi 2018). Other examples of active patient monitoring which might be applied in the EDWR include the detection of patient heart rate through a webcam with no patient contact (Monkaresi, Calvo and Yan 2013). The potential for this kind of technology opens up significant opportunities for ED workflow, with obvious benefits to ED staff and patient care.

The adoption of AI and ML in the ED is not without barriers. Gutenstein (2019) suggests that the 'black boxes' of technology in the future will not appear like 'wise owls' on the shoulders of emergency physicians, but be built component by component. Current knowledge of the field must be transcribed and translated into machine applications. Stewart, Sprivulis and Dwivedi (2018) state that the trust that clinicians and patients alike will place in the 'black box' that is AI and ML will take time to develop. They advocate that despite impressive results and possibilities, AI is not yet capable of the same high-level rational reasoning as humans. The authors warn against personifying the algorithms within this intelligence to feel that they truly understand the tasks they are performing. They continue to highlight that there is not yet consensus as to how to integrate AI systems into clinical environments and that the first implementations of AI in the ED will be as clinical decision-support tools, rather than replacements for clinicians. How ED staff might be represented by technology, or how patients and carers might interact with it, are questions that are only now being asked. While AI and ML are well-positioned to offer efficiencies in practice in the ED, design research and practice are needed in order to ascertain how this technology might be applied.

Examples of such AI and ML technologies are already appearing in the ED. An interactive chatbot accessible by smartphone and PC called botMD is an AI assistant available for staff in some North American EDs that assists with hospital administration, drug formulation, protocols and other information as prescribed by the hospital (botMD 2019). Munzer et al. (2019) point out that the emerging technologies of augmented reality (AR), virtual reality (VR) and mixed reality (MR) have significant – but as yet underexplored – potential for the practice of emergency medicine. They highlight this potential under the umbrella themes of user-environment interfaces, telemedicine,

prehospital care, and medical education and training. As this and other technologies advance, more studies will be needed to evaluate the different modalities – and also the impacts – that these technologies might have on urgent care.

Berker et al. (2005) present theories as to the domestication of technology – where technology transitions from an outrageous novelty to a mundane aspect of everyday life. They describe how domestication has traditionally referred to the taming of a wild animal and link this metaphor to the 'taming' of new technologies. Novel, 'strange' and 'wild' technologies need to be 'house trained', integrated into the daily routines and structures of their users. Greenhalgh et al. (2013) articulate how the technologies we use and make are not neutral objects, but embodiments of ourselves and our cultural values. Where a disconnect between the technology and these cultural values emerges, this impacts on the individual's relationship with the world. Thus, technologies can be empowering or disempowering. As Chamberlain and Craig (2017b) underscore, illness experiences – such as waiting for care in an ED – are diverse and unique, and do not lend themselves to simple or standardised technological solutions.

In healthcare, robotics, automated systems and AI are gradually shaping novel techno-social realities. Day by day, this technology is becoming tamed and domesticated as it becomes part of everyday urgent-care practice. Technology alone, however, will not fix the woes that currently face the ED and we should not consider it a 'black box' to cure all ills. Indeed, technology must be integrated to complement existing and emerging models of care. The challenge – and what is not yet well understood – is how the integration of technology into the EDWR will impact on end-users (patients, carers and staff) and how it might affect how emergency care is accessed, received and delivered. The need for this understanding is pertinent in the waiting room, where technology is well-placed to support those awaiting care.

In James Auger's (2012, 30) PhD dissertation, he draws upon speculative design discourse as a vehicle for exploration of technological development and its subsequent domestication in everyday life. Through his study, Auger uses speculative thinking to explore how robots might be domesticated and become part of everyday life. These methods might be used and then applied to other sectors – like the ED – and other forms of emergent technology.

[a]

affirmative
problem solving
design as process
provides answers
in the service of industry
for how the world is
science fiction
futures
fictional functions
change the world to suit us
narratives of production
anti-art
research for design
applications
design for production
fun
concept design
consumer
user
training
makes us buy
innovation
ergonomics

[b]

critical
problem finding
design as medium
asks questions
in the service of society
for how the world could be
social fiction
parallel worlds
functional fictions
change us to suit the world
narratives of consumption
applied art
research through design
implications
design for debate
satire
conceptual design
citizen
person
education
makes us think
provocation
rhetoric

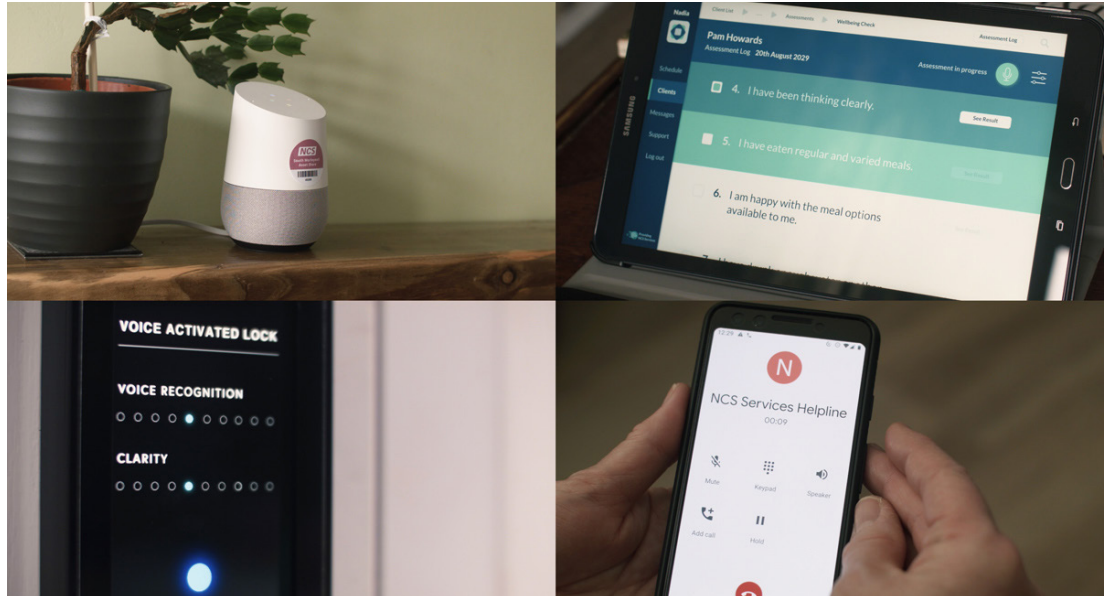
Figure 2.7:

'Dunne & Raby: A/B, A
Manifesto, 2009.
Redrawn by author from
(Dunne and Raby, 2009)

2.6 The Case for Speculative Design in the Emergency Department

Outside the domain of healthcare, designers have long been entering professional engagements where they can apply speculative design thinking and practice for the benefit of the organisations they serve, with clients like Microsoft, Sony, Samsung and Nokia, and many exhibiting work in chic galleries like MoMA New York, the National Museum of China and the V&A in London. There is an opportunity to deploy these now well-established approaches in healthcare, where this thinking might be used to the benefit of patients, carers and staff, instead of identifying new market opportunities. Unlike mainstream, consultative commercial design practice where design is applied as a method in pursuit of a solution to a problem to make things 'better' for end-users, speculative design is concerned with unpacking the nuanced consequences and implications of future scenarios. Studios like Superflux demonstrate how design might be mobilised to navigate the complexities of technology, politics, culture and environment, to imagine new ways of 'seeing, being, and acting' (SuperFlux 2020). Through this work, designers build upon the work of authors like Anthony Dunne and Fiona Raby, who aim to extend the field of design to new forms of engagement (Dunne and Raby 2013). Figure 2.7 depicts the A/B manifesto by Dunne and Raby (2009), who seek to juxtapose design as it is usually understood with a kind of design that might be used as a 'catalyst' for reconceptualising our relationship with the world (Dunne and Raby 2013, vi).

Figure 2.8:
'BetterCare' (2020b).
Commissioned by
DotEveryone, by Superflux.



BetterCare by SuperFlux (Figure 2.8) presents a hypothetical, speculative vision of how technology might support the UK's ailing social care system. Through a combination of digital and physical artefacts, the project draws together these elements to present a short film that explores the consequences of technology in people's lives. As Superflux (2020b) articulate:

Far from portraying a glossy utopia where machines seamlessly assume responsibility for gaps in social care, our film '2025: A Better Care Future' portrays a more realistic – maybe even mundane – 'frictionful' near future in which technology itself doesn't quite work and needs human support. The new government-funded national care system is supposed to help everyone, but it's also broken in parts – not just on a technological but also a bureaucratic level. Given the opportunity, though, people band together to overcome tech issues, finding human solutions in the face of these failings.

Throughout the film, recipients of the technology struggle with malfunctioning parts of the service and develop strategies to overcome them. While fictitious, elements of this work highlight key challenges that will need to be overcome in order to implement technological interventions that enhance user experiences. The impact of this speculative approach is not in a concept that is economically viable or market-ready, but a tool for unpacking the complexities of use ahead of time so that negative user experiences can be mitigated. As a provocational device, conversations that are elicited by this work can enrich, support and augment contemporary approaches to innovation in social care.

This example demonstrates how speculative thinking can be used for the benefit of people and communities through the interrogation of new futures, but its application as a serious tool to complement current strategy and design approaches is still quite new. Other examples of professional speculative design engagements include the work of the Extrapolation Factory, which aims to 'challenge the notion that professional futurists are the only ones who can – or should – be thinking about long-term, large-scale futures' (Montgomery and Woebken 2016, 1).



Figure 2.9:
'Alternative Unknowns
Method' (2016). Workshop
images from Extrapolation
Factory

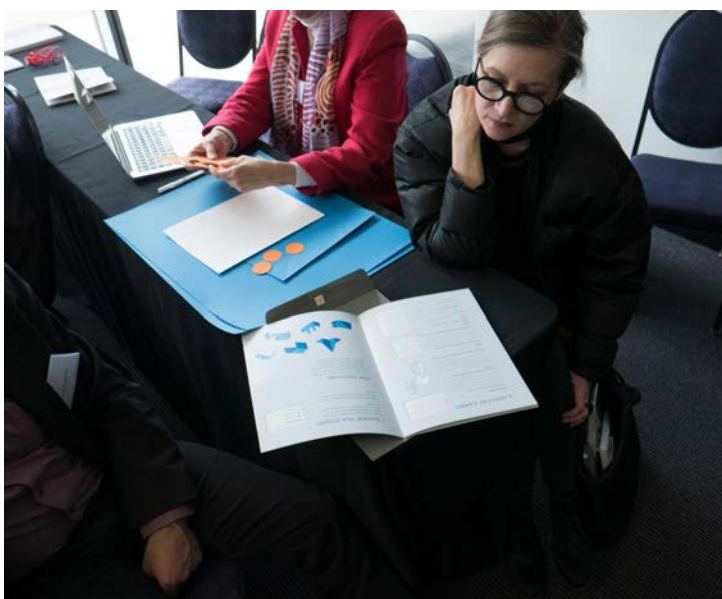


Figure 2.10:

Screenshots from video
of "ED2080" by Huddy
Healthcare Solutions,
(Huddy, 2016).

Full video visible at https://youtu.be/_piUTuztQUE

Copyright Huddy
HealthCare Solutions

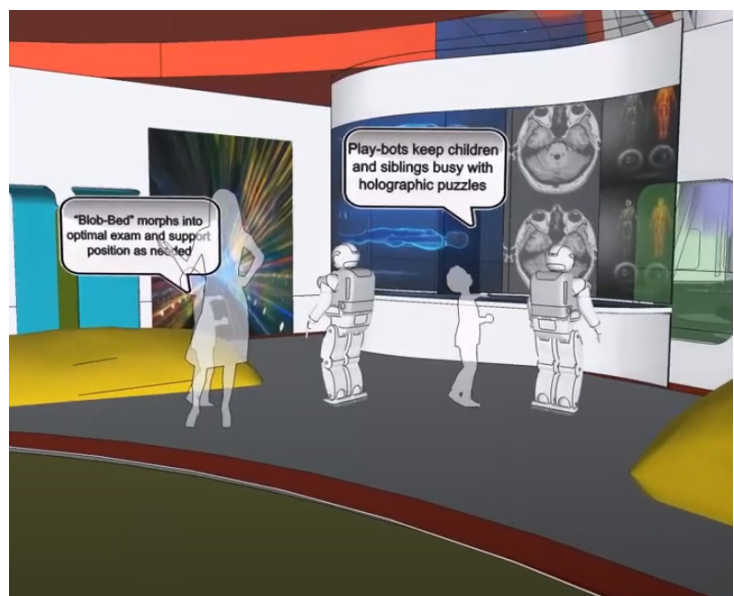


Figure 2.9 presents images from a type of workshop facilitated by the Extrapolation Factory at the Infrastructure Space LafargeHolcim forum. In this workshop, the Extrapolation Factory deployed a test of their 'alternative unknowns method', named as such for examining the various ways a scenario can unfold. Through this workshop, participants examine, conceptualise and prototype system-oriented designs in response to socio-technological challenges. According to the Extrapolation Factory, this is in response to the absence of methods concerned with prototyping speculative service scenarios and systems (Extrapolation Factory 2016). Through the application of this approach, participants prototype speculative large-scale, system-wide alternative futures. Through an application of this methodology, the Extrapolation Factory is able to explore how large-scale social systems might unfold and how alternatives impact on different users and stakeholders. In its work, the Extrapolation Factory has worked with collaborators like NYC Emergency Management to 'focus on critical issues that impact the city' (Extrapolation Factory 2016).

Part of the challenge in exposing the ED to speculative methods lies in the collection of the processes and touchpoints that make up the experience. Waiting experienced in an ED is a service experience; multiple stakeholders over multiple interactions facilitate care and waiting over time. Unlike the work of Dunne and Raby (2013), which is centred around objects and artefacts, the work of the Extrapolation Factory demonstrates a shift in speculative discourse to be concerned with not just products, but the service systems they operate within. The potential for speculative thinking to impact on the ED lies not just in speculation on future urgent-care devices, but in reimagining new models and systems of both 'caring' and, in the case of this study, 'waiting'.

Huddy (2016) provides a speculative vision of an ED from the year '2080'. In this distant future (Figure 2.10), Huddy (2016) speculates on with technology like 'hovercraft ambulances' (p. 277), 'hoverbeds' (p. 280), 'rejuvenation zone smart pods' (p. 281) and other interventions as to how they might impact on the ED experience. By providing a concept of not-yet-possible technological innovations through images, Huddy (2016) encourages thought as to how these interventions might manifest in 'real' EDs. Huddy (2016) reflects upon the work as 'whimsical' (p. 272), but a kind of starting point for imagining what important features should be incorporated into an ED design. The technology he depicts is radical and outside our understanding of what is scientifically possible and would perhaps be better suited to an episode of *The Jetsons*, a point Huddy himself recognises (p. 276). As Dunne and Raby (2013) highlight, if speculative thinking is to be of real use, then it must exist within our current understanding of what is possible, even if that possibility is only at the fringes of current thought. If a speculative vision of the ED is to be of any real benefit to developing new strategy or approaches, then it must be grounded within real, contemporary lived experiences and tensions.

Huddy (2016) articulates that envisioning the future is the first step in the design process of a new ED, before identifying the physical design elements that support the vision. Huddy's (2016) conceptual work is useful as a starting point, but does not respond directly to the raft of challenges facing the modern ED. As we have seen in this review, there is a paucity of work concerned with the

design of ED waiting areas. Further still, there is a gap in how speculative thinking might be applied to the ED. A more grounded speculation on an alternative vision for the ED would likely augment and support contemporary design ideology and regulatory guidelines such as the AHIA (2019) and ACEM (2014) documents discussed in Section 2.2 of this chapter. As Garrett (1999) discusses, the goal in futures thinking in healthcare is not to fix problems, but to look far into how the future might be in order to elucidate the long-term consequences of current strategies and highlight opportunities for contemporary change.

2.7 Knowledge Gap

It's difficult to see the picture when you're inside the frame.
— Eugene Kleiner

As patients numbers and waiting times increase in the ED, these challenges will need to be addressed simultaneously with our learning. The lack of historical developmental precedent means that the ED will need to explore and entertain ideas that have not been tested or implemented before. The development and iteration of these new care systems and care experiences in this context will require strong vision and strategy. The technical specifications ACEM (2014) and AHIA (2017) that guide ED design need to be augmented to support alternative models of care and how care might be coordinated across a broad range of human and technological actors. Focusing on the waiting room as an important component of the overall ED, this narrative literature review might be summarised by the following knowledge gap propositions:

1. The design of past and present EDWRs is inadequate to cope with the contemporary and emerging challenges that are facing the field of emergency medicine. This is evidenced by the scarcity of attention that the waiting room has received, despite the important role that waiting plays in the ED. As more patients present to the ED, more patients will need to wait, and wait longer, to receive urgent care. This is evidenced by the array of reports, inquiries and broader literature that describes the current ED system as unsustainable and in need of change. This implies that new models of care will need to be explored, tested and eventually implemented towards a new paradigm of urgent care.
2. The implementation of emerging and not-yet-available technology in the ED is likely to have a profound impact on how care is delivered and experienced, and novel and divergent thinking will be required to explore how this impact will manifest for patient, carer and staff experiences. Alongside the implementation of this technology, new models of care will need to be explored and the current ED design guidelines (ACEM 2014; AHIA 2019) augmented to support designers, physicians and administrators to respond to the complexities facing the sector. In order to address the weaknesses in these current guidelines, this study recognises the need for not just new ED design guidelines, but new mindsets for design when approaching the ED as a design challenge.

3. Speculative design research and practice are well placed to provide this mindset and offer the divergent thinking required to augment design guidelines in support of new models of care. Speculative thinking might be employed in this context as a method of elucidating long-term consequences of current approaches, a powerful complement to policy formulation, strategy and planning. As yet, however, only a small amount of speculative thinking has been applied to the ED and almost none to the waiting room and waiting experiences. This presents an opportunity to address this underexplored aspect of design practice in the ED.

In conclusion, both design and designers have significant contributions to make to the conception and imagination of future ED service experiences. Such contributions of speculative thinking to ED experiences would likely be of significant benefit to those designing new EDs and enrich existing regulatory design documentation that currently underpins the trajectories of new EDs. In the context of this study and the EDWR, where it has already been identified that there is a lack of design research work, how speculative design might be applied in this unique service sector is not yet understood. There is a gap in knowledge and an opportunity for research that might be addressed through designerly activity.

2.8 Chapter conclusion and research questions

This chapter has reviewed the salient literature concerning the design of ED waiting areas and has identified a series of knowledge gaps. Subsequently, an overarching research question, a design question and three subsidiary questions have been identified. The broad question to be answered through this study is:

How might speculative design research and practice inspire change for the problems facing the emergency department waiting room of the future?

This is supported by the specific design question:

What if we leverage the power of emerging and not-yet-available technologies to enhance the service delivery and experience of emergency department waiting rooms?

These overarching research question and design question are supported by three subsidiary questions that focus on pertinent parts of the study:

1. What are the emerging and not-yet-foreseen tensions, challenges and problems for the emergency department waiting room experience?
2. What methods can be used to apply speculative design to the service design problems facing emergency department waiting rooms?
3. How can the speculative design research and practice on the emergency department waiting room be communicated to inspire change?

These questions are addressed throughout the following chapters, where the study seeks to address the knowledge gaps outlined in Section 2.7 and utilise the subsidiary questions as modes of further examination on particular aspects of this study. In overview, subsidiary question #1 is discussed in Chapter 4, #2 in in Chapters 5 and 6, and #3 in Chapter 7.

Chapter — 03 The research method

CHAPTER OVERVIEW —

Previous chapters have described the nature and scope of the research challenge. This chapter discusses the novel methodological approach applied in this study – speculative service design – that draws upon discourses from both speculative design and service design. This chapter outlines this methodology and sets the scene for later chapters.

3.0 Introduction to the methodology

As Fredric Jameson famously remarked, it is now easier for us to imagine the end of the world than an alternative to capitalism. Yet alternatives are exactly what we need. We need to dream new dreams for the twenty-first century as those of the twentieth century rapidly fade. But what role can design play?

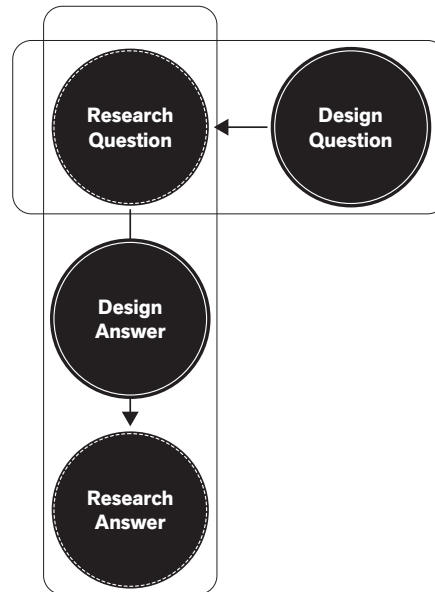
— *Speculative Everything*, Dunne and Raby, 2013.

Building upon the literature and knowledge gaps established in the previous chapter, this chapter describes a description of the design methods that have been adopted in this study to encourage more imaginative thinking about possible ED futures. The chapter begins by presenting the epistemological stance of this research and how it has governed the direction of the project and the theoretical perspectives assumed within the study. It continues by framing the project as an investigation into futures within the context of the ED front of house and presents the creative research as less concerned with design outputs (what gets designed, built or tested) than with outcomes (future, people-centred aspirations) for longer term impact aimed at opening up new possibilities for the waiting room. To achieve this, the project draws upon a number of different research approaches derived from speculative design and service design research and practice and, in recognising some of the divergences between the two, attempts to resolve these tensions within a unifying methodological framework called speculative service design (SSD). This chapter operates in direct response to subsidiary research question #2: *What methods can be used to apply speculative design to the service design problems facing emergency department waiting rooms?*

3.1 Epistemological stance of the SSD Framework

This study assumes a constructivist design research position. As an exploratory endeavour, it draws upon the ideas of grounded theory as articulated by Charmaz (2006), where data is collected to construct theories 'grounded' in the data itself (Charmaz 2006, 2). This methodology then applies this concept to design practice, through what Findeli (2010) calls 'project-grounded research', as per Figure 3.1. In the context of this research, the design investigation is part of a larger investigation into ED futures. Within this model of project-grounded research, there is a need to 'transform [a] design question into a research question' (Findeli 2010), with an understanding of the role that the design project serves as that of an experiment, an experiment in service of answering the larger research question. Rather than a series of speculative concepts that might otherwise appear from the ether, the speculations generated through this study are grounded within data gathered through co-design engagements. In turn, this has then created a space in which the contribution of speculative design to ED waiting areas can be investigated.

Figure 3.1:
Model of project-grounded
research. Redrawn from
(Findeli 2010).



Alain Findeli's definition of design research, adopted here, is described as thus;

'A systematic search for the acquisition of knowledge related to general human ecology considered from a designerly way of thinking, i.e. a project oriented perspective'

— (Findeli 2010, 294).

Within this definition, Findeli articulates the importance of the 'project oriented perspective' of the designer. Findeli draws a distinction - visualised in figure 3.1 - between the design project (the design question and answer) and the larger research project (the research question and answer). According to Findeli, it is important that the design project is not 'confound[ed] or reduc[ed] in a (design) research project with or to a design project.' This model and definition of design research enables design projects to have a wider contribution to the fields in which they are situated; in the case of this study - emergency medicine.

This systematic, yet flexible, approach provides a foundation upon which the design practice can unfold. This epistemological stance builds arguments through acts of designing; knowledge that draws upon postmodern arguments that new understanding is not necessarily just 'written' or 'spoken', but embedded within the artifacts of design. Barthes (1977) notes that meaning here is layered, and drawn from 'innumerable centres of culture', rather than one individual experience. In the case of this study, new knowledge is layered and drawn from both literature and primary research, and articulated through the research outcomes - both material and immaterial - where the exegesis is in dialogue with the speculative design outcomes. This kind of knowledge generation - through written word and creative output - is facilitated by the SSD framework proposed in this chapter.

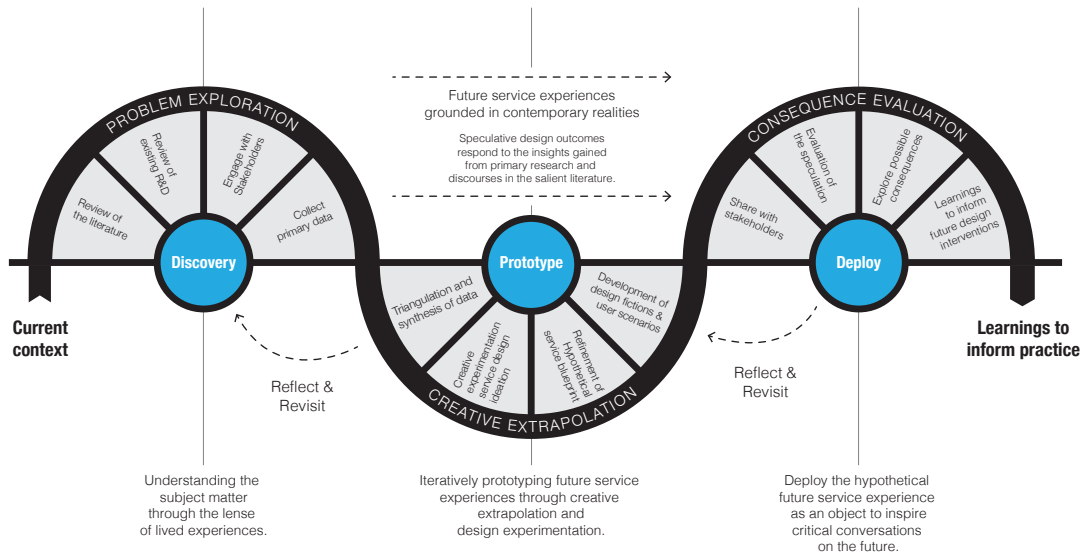


Figure 3.2: Speculative service design: the methodological framework applied in this study. This framework/ methodology is used for imagining, prototyping, deploying and reflecting upon future service experiences

3.2 Materialising our imagination: towards the Speculative Service Design (SSD) framework

As discussed in Chapter 2, the ED is a service experience faced with a wicked problem. Focusing on the EDWR, where there is already a paucity of design work, how speculative design might be applied in this unique service sector is as yet an underexplored area of design research and practice. In order to address this gap, this chapter presents a novel methodological framework that draws upon both service design and speculative design approaches to design for the EDWR. SSD (Figure 3.2) is an experimental research methodology for collaboratively speculating upon future service scenarios. This methodological approach is iterative and cyclic, and is broken into the stages of 'discovery', 'prototype' and 'deploy' – drawing upon the approaches from both speculative and service design discourses. This framework does not intend to be as reductive as to suggest futuring is a three-step process, but instead asks users of the framework to extrapolate upon the current state of the world and explore consequences that might become apparent when interrogating a future concept. While this framework might borrow practical methods from commercial design practice, it detaches them from direct market imperatives. The goal is not to 'optimise' a service for increased profit or make things 'better' for end-users, but to interrogate the impact that a future might have on the world at large. This creates a new space for service design where speculative thinking can be used to proactively investigate future service experiences.

In drawing together the design discourses of service design and speculative design, this framework aims to resolve some of the methodological discrepancies, detailed below, between the two fields while reaffirming the maturity of design as a cultural agent to enrich other sectors beyond enhanced market value. This framework sets the scene for later chapters in this study, where the SSD framework is directly applied and brought together with design practice to be used to imagine alternatives for the ED. While this study focuses on the contribution of speculative thinking to the EDWR in relation to the SSD framework on healthcare, a secondary contribution lies in this

framework, where it is likely to have resonance further afield – to service practitioners in other sectors who might apply it partially or entirely when they seek to explore and interrogate future services.

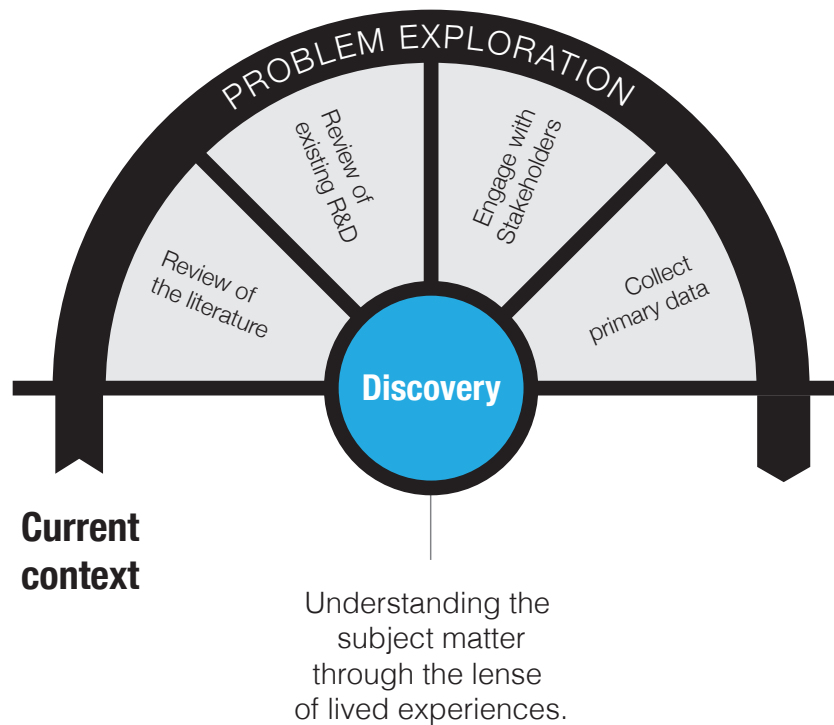
The SSD framework draws on service design thinking, recognising it is a specific branch of knowledge, learning and practice. As a discipline that has emerged from within the wider field of design, service design incorporates a range of different research areas (Stickdorn et al. 2018, 20), but is usually in pursuit of a solution to a problem and is very much grounded in design for the now, drawing upon a heritage of change management, marketing and design discourses concerned with improving the status quo (Shostack 1982, 1984; Stickdorn et al. 2018). Service design has adapted approaches to wrap around the complexity of the corporate environment and multi-silo organisations, with meta-methods of agile workflow and facilitation techniques to ensure that designers can preserve creative processes in corporate environments where such inductive and associative thinking might be marginalised.

In contrast to service design, speculative design and its cousins – critical design, discursive design, subversive design and others – are, as Cameron Tonkinwise argues, 'obsessed' with ambiguity and uncertainty (Tonkinwise as cited in Mitrovic and Šuran 2016, 24). These approaches have historically been designer-led, offering visions of the future through photos, objects, videos, interactions and performances that provoke debate concerning the aspects of the future. While the conversations that emerge from the work are inherently collaborative, the speculative design outcome – centred around an artefact – is not. Rather, it is predominantly a designer's personal extrapolation of current signals and trends. The role of designers as authors (Malpass 2017) rather than facilitators as in service design, in speculative projects enabled this practice to develop without the same 'metamethods' as service design.

From this viewpoint, the methodological discrepancy between service design and speculative design which needs to be bridged is how the two discourses might integrate, with one equipped with structured, user-centred processes to understand a specific service ecosystem and the other based on general principles that each practitioner/designer/researcher adapts to their own way of working. How these two approaches might cooperate on an operational level is a question that this chapter aims to address by combining informed, hypothetical extrapolations of an emerging or not-yet-available technology with a deep consideration of the service ecosystem into which it might be deployed. Through this fusion of design approaches, the experimental research methodology of SSD emerges. Part of the novelty in this framework is in the combination of approaches, where the combination can be used to explore and interrogate future service experiences. We will see how the design outcomes generated through the SSD framework might be used as a 'catalyst' (Dunne and Raby 2013) for collectively redefining our relationship to the realities of the EDWR.

This section unpacks each arc of the SSD framework – how we might explore, extrapolate and evaluate possible service futures – and discusses some of the nuanced differences of this framework from contemporary service and speculative design practice.

Figure 3.3:
First arc of the
Speculative Service
Design framework

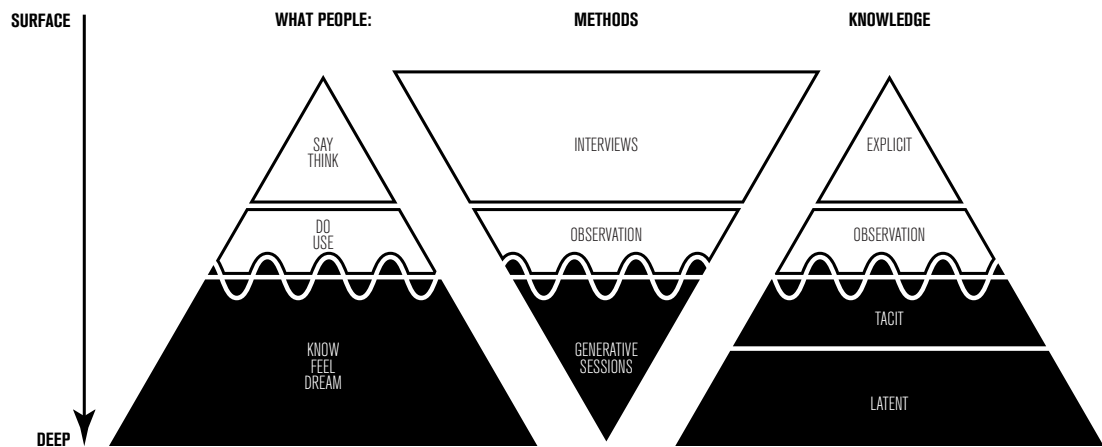


3.3 Discovery: looking around

To look forward, we must first look around – this section is concerned with the first arc of the SSD framework: exploring the problem. This means engaging with the real, lived experiences of the people and communities with which the project is attempting to engage. The goal is to collect data which can inform speculations on the future, ensuring that they are grounded within contemporary realities. Typical 'design thinking' approaches in service design are concerned with searching for insights that drive an 'opportunity for design' (IDEO 2015, 75). Finding and defining a problem are important parts of the design process (Archer 1979). As contended by Dunne and Raby (2013), design is often optimistic in the face of these challenges and, while it can attempt to solve problems, it might have more impact when used as a tool to think about the future. Rather than searching for problems to solve, this part of the framework aims to engage in a process of discovery where the goal is to collect data points in the form of lived experiences that can then be used to inform the creation of alternative service experiences.

This process of discovery should aim to dive deeply with the users, contexts and situations that the project is attempting to engage, with the purview of enhancing the quality of the speculation in later stages of the framework. As Sanders and Stappers (2012) articulate, what people say or think is only surface deep. Other techniques that uncover latent, tacit knowledge are necessary in order to develop the grounding for rich and genuine speculation.

Figure 3.4:
Methods that study what
people say, do and make.
Redrawn by author from
(Sanders and Stappers,
2012, 67)



In this exegesis, Chapter 4 provides an account of the co-design investigation which laid the groundwork for the initial design experiments.

3.3.1 Say, do, feel

Drawing upon the say, do and feel tools (Figure 3.4) and techniques as articulated by (Sanders and Stappers 2012, 66) enable us to grasp a deeper understanding of users and contexts than what is usually available in published literature. Understanding the present situation is vital for understanding what the attributes of a desirable future might be. As (Sanders and Stappers 2012, 55) articulate, the experience of a moment (now) is connected to both the past and future through memories and dreams. It is only through understanding the present– that we can begin to explore notions of the future. This co-design approach, as articulated by (Sanders and Stappers 2012) aims;

to bring the people we serve through design directly into the design process in order to ensure that we can meet their needs and dreams for the future

– (Sanders and Stappers 2012, 14)

In this study, stakeholder representatives were engaged to examine not just their contemporary experiences, but also what they do, feel and dream for the future. These engagements integrated a range of design methods - from interviews, observations and generative co-design sessions - to illuminate opportunities and signals for extrapolation through design experimentation. This process of attempting to understand enriched the creative practice component of the study, by integrating accounts of lived experiences into the design practice. The speculative outcome becomes closer to the everyday as a result, as it is grounded within the textured nuances of real-world, individual experiences.

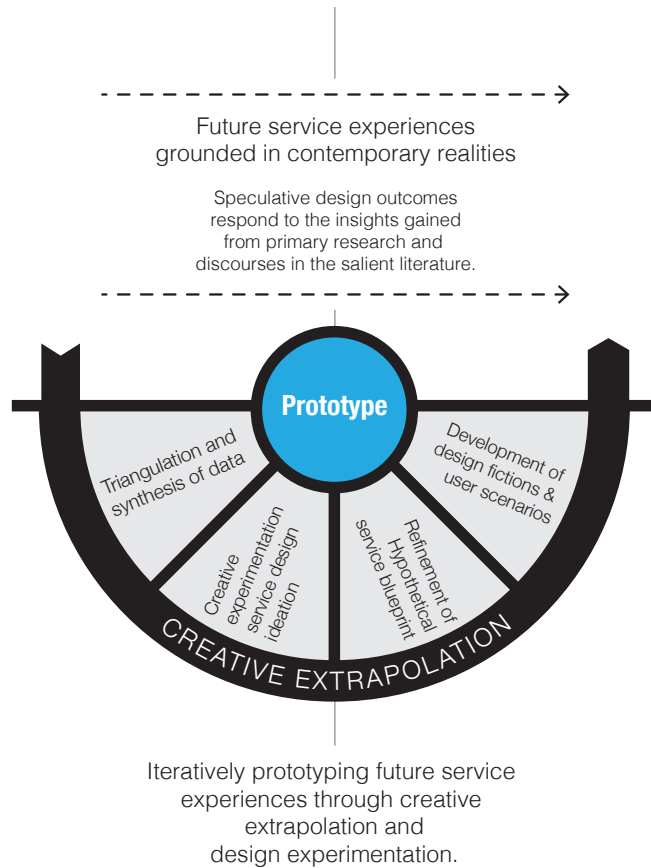


Figure 3.5:
Middle arc of the
Speculative
Service Design
framework

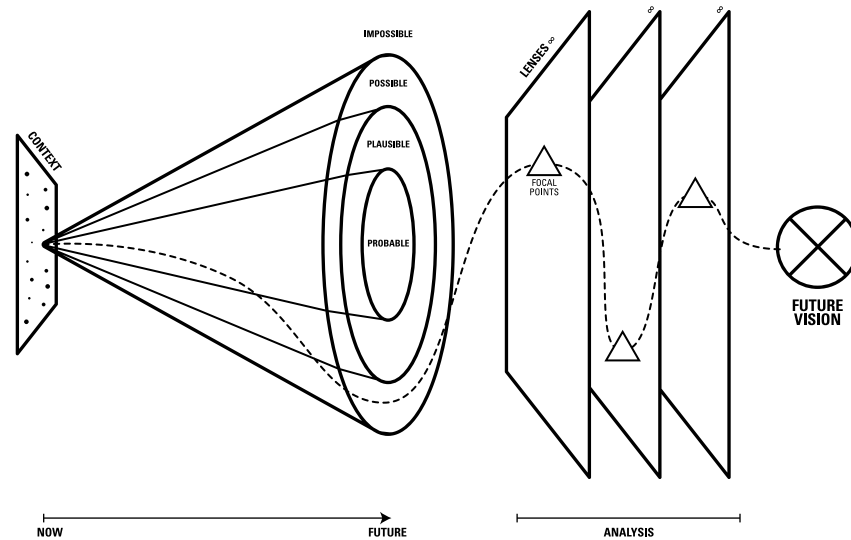
3.4 Prototype: making service experiences

Focused ideation is an important part of the design process and is applied in this framework. This section is concerned with the middle arc of the SSD framework: creative extrapolation. Creative extrapolation upon the present should be grounded in contemporary realities and respond directly to data drawn from a variety of sources generated in the first phase of the SSD framework. By extrapolating on these contemporary signals, we are able to explore a variety of futures that may not be immediately obvious in the world today. Design proposals must be real enough to exist within our current understandings of science and culture, but radical enough that they challenge the status quo. This is in contrast to typical design approaches, which are often in pursuit of a solution to a problem. This deviation away from the problem-solution approach is a key and nuanced difference of this framework and typical service design approaches. For the speculation to be meaningful as a tool to explore future consequences, it is important that it does not converge too quickly upon solving modern pains.

Building upon the Deleuzian philosophy as discussed in Section 2.2.1, the future is much like the present in that it unfolds in multiple directions simultaneously, a 'plane of becoming' in continuous iterations. Futurist thinking also implicitly draws upon this philosophy, often highlighting that future scenarios radiate from the present inside a cone of possibilities (Candy 2010, 33). This 'futures cone' is redrawn here (Figure 3.6) from Montgomery and Woebken (2016), who draw upon the future cones

Figure 3.6:

Figure 3.6: Futures cone. Redrawn from (Montgomery and Woebken, 2016, 43)



model of Dunne and Raby (2013) and Voros (2003). This model can assist in how we think about futures. The widest cone is that of possible futures – all the futures that anyone can possibly imagine. Possible futures transcend current knowledge and practices, but still exist within our current understandings of science, physics and culture. Within this cone is the cone of plausible futures, which are futures that could happen in response to disruption or upheaval. Nested at the centre is the cone of probable futures – where most design operates. It describes what will probably happen without change or disruption and presents the most likely futures based upon the world today. Outside the cones is the realm of fantasy and fiction, which is disconnected from the world in which we live. Fantasy exists in its own world and, while valuable as a source of entertainment, is not useful in relation to attempting to understand the possibilities of the future. This is the space of flux capacitors and space marines.

Overlapping all of these cones – somewhere, and not pictured on the diagram – is the fourth cone of 'preferable' futures. This cone is fluid and harder to pin down than the other three. It changes depending on the individual context of who is trying to look through the cones, how many people are competing to look through it and who is trying to point it in what direction. The contested nature of 'preferable futures' means that it shifts for different stakeholders; resolving these tensions about what is 'preferable' for 'who' is not simple and usually contains elements from all possible, plausible and probable futures.

While we can imagine a plethora of futures by extrapolating upon existing product, service and technological trajectories, it is important to recognise that quantity of ideas about a future does not mean quality ideas. To put it simply, everyone thinks about the future, they just do not do it very well (Candy 2010, 31). Prototyping service futures means that we must move beyond just imagining futures to augmenting and enriching the future concepts in both breadth and depth. In sorting 'good' futures from 'bad' futures, we might approach this evaluative challenge in much the same way as we approach the creative thought process. Starting with a generative phase first and a judgement or sorting phase second, futures should be prototyped generatively, with a view to iterating and refining concepts through design experimentation.

3.4.1 The “what if” question

A useful way to speculate and extrapolate on the current status quo is to ask a ‘what if’ questions, a technique that is sometimes applied in science fiction to explore alternatives to canonical stories. The Marvel Comics What if series (Figure 3.7) is one such example of extrapolation upon an existing continuity. In the first volume of the What if series, readers are greeted by Uatu the Watcher, who explains that there exist a number of alternate realities. In each alternate reality, there is a divergence from what has happened and what could have happened (Marvel comics 1977). These ‘what if’ questions provide a starting point for creative experimentation and investigation, exploring how different characters, stories and scenarios might unfold differently.

This kind of divergent thinking is often also found in science fiction and a multitude of examples are available which demonstrate how this literature has impacted on healthcare and medical technologies. Within this theatre, we find many examples of how science fiction has led the field through the presentation of future concepts of healthcare experiences. While fictitious, scientifically valid concepts from these and other pieces of creative work are derived to innovate medical practice and patient care.

The separation between science fiction and science fact is often fuzzy; concepts that are unrealistic in one decade become part of daily routine only a few years later (Dourish and Bell 2014). In the fields of medicine and health, science fiction has a long history of influencing the trajectories of technological development, such as in genetics, human transplants, robotics and more (Hockstein et al. 2007; Klugman 2001; Petersen et al. 2005). For example, the proto-sci fi novel *Frankenstein; or the modern Prometheus* by Mary Shelley probed organ transplantation well before the technique became medically possible (Wohlmann et al. 2016). More contemporary examples include that of researchers at the University of Utah who developed a robotic prosthetic arm for amputees which they dubbed ‘Luke’ after the artificial arm of Luke Skywalker featured at the conclusion of the Star Wars film *The empire strikes back*. Somrak et al. (2014) describe the Qualcomm Tricorder XPRIZE competition, with a \$10 million prize to the team that recreates the Star Trek medical tricorder, a portable wireless device that monitors and diagnoses the health conditions of patients. Smith (2016) discusses the technoscience of 3D printing as a central element to the Marvel *Iron-Man* movies, which has had a bearing on the development of robotic prosthetic arms.

These examples demonstrate how creative approaches can inspire alternative ways of being, new futures and trajectories that are different from the status quo. Kirby (2010) articulates how popular science fiction films generate real-world technological developments. Kirby highlights how cinematic representation of technology can stimulate a desire in audiences to see it become a reality. The challenge is often in the translation from ‘desire’ to ‘reality’. This can be a call to action for designers and technologists alike.

Figure 3.7:

'What-If' comic series by
(Marvel Comics, 1977)

Left: What if Spider-Man
had joined the Fantastic
Four? (based on The
Amazing Spider-Man
#1). What if, Vol 1 #1.
Marvel Comics. Published
February 1977.

Right: What if Jane Foster
had found the hammer of
Thor? (based on Journey
into Mystery #83). What If?
Vol 1 #10. Marvel Comics.
Published August 1978.



The challenge with science fiction as a tool to help plan for the future is in its tendency to imagine entire worldviews in broad strokes. This worldbuilding makes for entertaining theatre, but is not necessarily useful for understanding the nuanced, grounded experiences that we might actually experience. To be useful as a mode of foresight, there is a need for science fiction to be closer to the 'real' everyday. Science fiction is often of little use when it comes to making rational decisions as to whether or not to invest in the development and deployment of emerging technologies. While science fiction can and has influenced medical practice, it usually only fulfils its primary goal of entertainment. Where science fiction falls short is in its capacity to be grounded within contemporary realities.

Crafting an engaging, meaningful speculation is a balance between the 'real' and 'unreal' (Auger 2013). If it is too 'futuristic', it will appear as a piece of science fiction, piece of 'art' or mere speculation. If it is too close to the present, viewers will expect it to be implementable and ready for commercialisation. Through careful negotiation between these two contradictions, a speculative service future can emerge. This future-focused attitude enables us to imagine problems that are as yet unknown, but still plausible challenges. This ideation is in pursuit of a speculative outcome that aims to raise more questions than the designer can answer. As Barthes (1977) articulates, 'the birth of the reader must be at the cost of the death of the Author'. Whatever debates emerge from the SSD work, they should not be attributed to the designer. They are emergent from the work, conversations by an audience – not the author – on a hypothetical future.

3.5 Deploying hypothetical service experiences

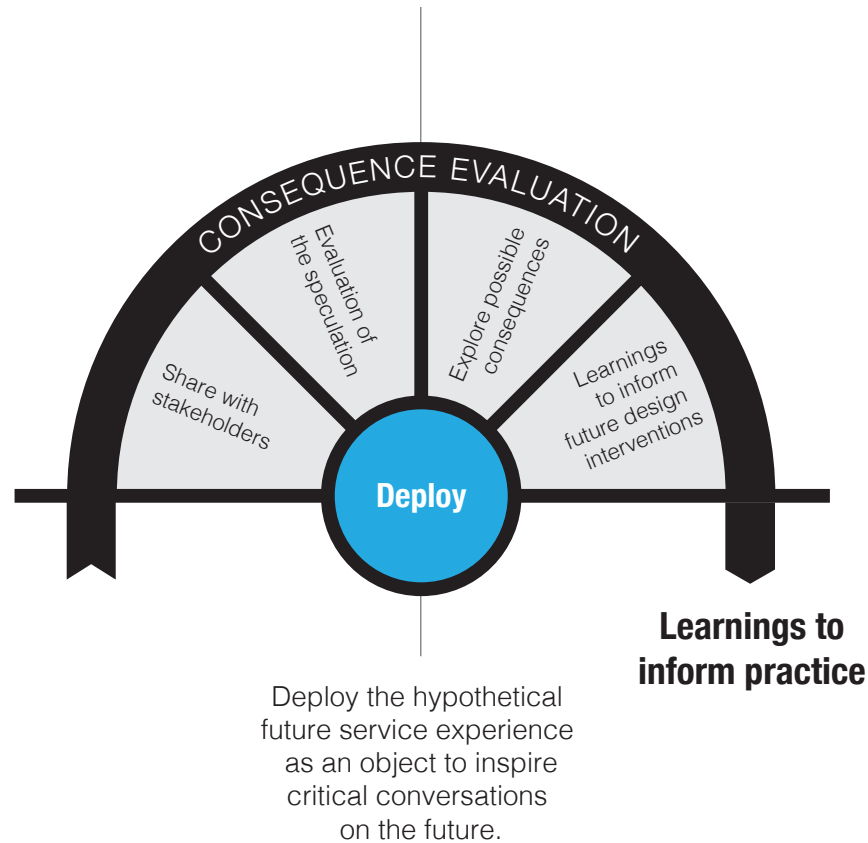
How we communicate and disseminate the hypothetical service futures generated through SSD practice is a key part of their value. This section is concerned with the last arc of the SSD framework: consequence and evaluation. SSD practice does not aim to present implementable service experiences but, rather, to use design as a catalyst for debate (Dunne and Raby 2013) and to imagine alternative realities to what exists today. This kind of design aspires to democratise possible service futures, raise awareness of the consequences of our actions as citizen-consumers and widen participation in discourse. Exhibiting design work in museums and galleries is one approach, but a plethora of other approaches continue to emerge through speculative design discourse that range from workshops and interactive installations to public events in the community. Participatory approaches like these act as a 'theatre for conversation' and enable an audience to be critical of the future while still embracing the possibilities.

Kerridge (2015, 18) articulates that speculative design can and should have multiple outcomes and can take the form of a material object in an exhibition, an image on a website, a caption in a catalogue or even a proposal during a conversation. According to Kerridge (2015), speculative design emerges through mutual alignment with an idea of enabling the public to discuss and perhaps challenge the format of emerging technology. In this study, the outcomes are articulated and disseminated in three modes:

1. A series of five design fiction 'comic zines'. Each edition probes the future of 'waiting' in the ED and contextualises the service blueprint through the lenses of lived experiences. While the stories are fictional, they are grounded in the real-world data collected through the study.
2. A suite of designed objects and images that give form to the touchpoints in the speculative service blueprint. These objects are produced at a variety of scales and dimensions, and make tangible the speculation and the possible impact on user experiences. They act as 'totems' through which future stories and experiences might be explored.
3. An 'exhibition-in-a-box' as a theatre for conversation that draws together all the different articulations of the design practice. In doing so, this exhibition-in-a-box invites debate, discussion and reflection.

Collectively, the accessible nature of the designed outputs — low-fidelity illustrations, prototypes and images — enable the SSD to be engaging beyond just a design audience. They mediate and facilitate the exploration of possibilities and an appreciation of the impact of technology to an interdisciplinary audience, from healthcare professionals to a diverse range of patients and carers. Later chapters (Chapter 5, 6 and 7) will further discuss these articulations of the design practice.

Figure 3.8:
Final arc
of the Speculative
Service Design
framework



3.5.1 Design fiction publications

Design fictions are often attributed to either Bruce Sterling, who uses the phrase in his 2005 book *Shaping things* (Sterling 2005), or Julian Bleecker, who develops the concept in his 2009 'Short essay on design fiction' (Bleecker 2009). In this framework, design fictions are employed as a method of making the speculation tangible and as a platform to explore the implications of a hypothetical future.

Conventional service design tools – such as the service blueprint or journey map – are valuable for providing a high-level, schematic visualisation of the connections between different parts and stakeholders within a service. However, these tools fall short when it comes to exploring and communicating the intended overall experience. Service journey maps do not address the full contextual, emotional and spatial-temporal richness of real-life service experiences. Design fictions – which are by nature focused on storytelling and exploring the possible implications of a design (Malpass 2017) – afford this kind of exploration. The design fictions described in this exegesis explore the benefits, implications, challenges and problems presented by new and emerging technologies, and introduce us to how people might experience the ED of the future. These fictions explore and probe potential service scenarios and provide an important platform for further design research and practice.

A contemporary example of design fictions can be found in the popular television series *Black mirror*, which presents a technological future and proactively considers the broader implications of its use. The show's title is a reference to society's current habit of staring into blackened mobile phone screens, as well as a derivation from a divination method called scrying attributed to Nostradamus, whose cryptic prophecies are commonly quoted in relation to disastrous events (Ariel 2017). Unlike the predictions of Nostradamus, design fictions should not aim to pin down or prescribe a given future, but instead highlight the textured nature of a possible future and how it may unfold differently for different people. Design fictions illuminate the unexpected or unintended implications of contemporary actions (Ahmadpour et al. 2019). Design fictions enable us to experience a glimpse of a possible future service experience through someone else's eyes – through their individual ontology – and help us to begin to develop a shared understanding of what the future might be like.

3.5.2 Touchpoints: objects from the future

Downe (2020) articulates the importance of the 'object' within service design, where the service is the thing that exists around the product. We might refer to the 'products' as touchpoints within the service journey – important moments of interaction which can be choreographed to assist a user in achieving their goals. Bleecker (2009) articulates the importance of objects in conveying meaning in fiction. According to Bleecker, these objects act as 'totems' through which larger stories can be told. These objects act like artefacts from somewhere else, telling stories about alternatives and other worlds. As Montgomery and Woebken (2016) articulate, 'interacting with a future artifact in a contextualised environment engages people on a visceral level, allowing them to consider possible futures in concrete terms beyond the anesthetized and aestheticised futures posited by Hollywood movies and corporate advertising campaigns'.

The design provocation developed through this research is disseminated through a suite of designed objects and forms. Here, product design is applied not as a mode of capitalist venture, but as a medium for speculation within disciplinary frames. The work here is grounded within the epistime of industrial design by referencing basic design principles – proportion, production, manufacture, quality and function. These are ultimately subverted, however, where the utility of the work lies not in its function but in the knowledge the objects represent. Chapter 5 discusses in more detail the creative pursuit which led to the fabrication of these designed objects.

3.5.3 The 'Exhibition-in-a-box'

Chamberlain and Craig (2013) and Chamberlain and Yoxall (2012) highlight how the concept of the exhibition has a long embedded culture in art and design, and has a history as a form of gathering to prompt academic discourse. Venues like the Paris Salon of the Académie des Beaux-Arts dominated in the 17th century as 'theatres for conversation'. Today, the exhibition persists as a medium for the dissemination of creative practice, but also as a conduit through which conversations on the subject matter can be made tangible, challenged and explored.

In the context of this framework and study, the creative work is intended as a provocational device to explore future service experiences. Unlike commercial service design practice, which aims to present solutions to contemporary woes, this framework engenders design outputs that propose questions informed by data to create 'exhibitions' as prompts for conversation on alternative future service experiences. Objects, visualisations, diagrams and imagery in such an 'exhibition' become 'totems' which make a future service experience tangible and provide prompts that scaffold conversation and thinking. The strength of this approach is that the objects and prototypes transcend boundaries of culture, language and age while the objects themselves remain unchanging. The creative work becomes a vehicle for diverse audiences to project their own associations, thoughts, stories, narratives and experiences about alternative future experiences.

The accompanying exhibition to this exegesis draws together the creative work developed in this study that demonstrates an application of this part of the SSD framework and stands in opposition to the traditional mode of a static exhibition in a fixed place and time. Instead of an event in a gallery, this 'exhibition' is condensed into a 'box' which can then be delivered via courier to a range of different audiences or stakeholders. This 'exhibition in a box' concept draws upon the work of Chamberlain and Craig (2013) that distils the essence of an exhibition into a suitcase – which in turn draws upon the concept from Marcel Duchamp (Figure 3.10) to capture the essence of the larger gallery experience but removes the onus on an audience to visit a physical space. This method enables an exhibition to be brought to the participant where it can be engaged with remotely, transcending geographical boundaries. In Chamberlain and Craig's (2013) work, this is done so that the exhibition can be provided to older people who cannot physically attend events or gatherings. In this study, the 'exhibition box' is applied in order to mitigate the challenges imposed by the COVID-19 crisis, such as restrictions on travel and the many thousands of exhibitions cancelled around the globe due to the public health crisis.

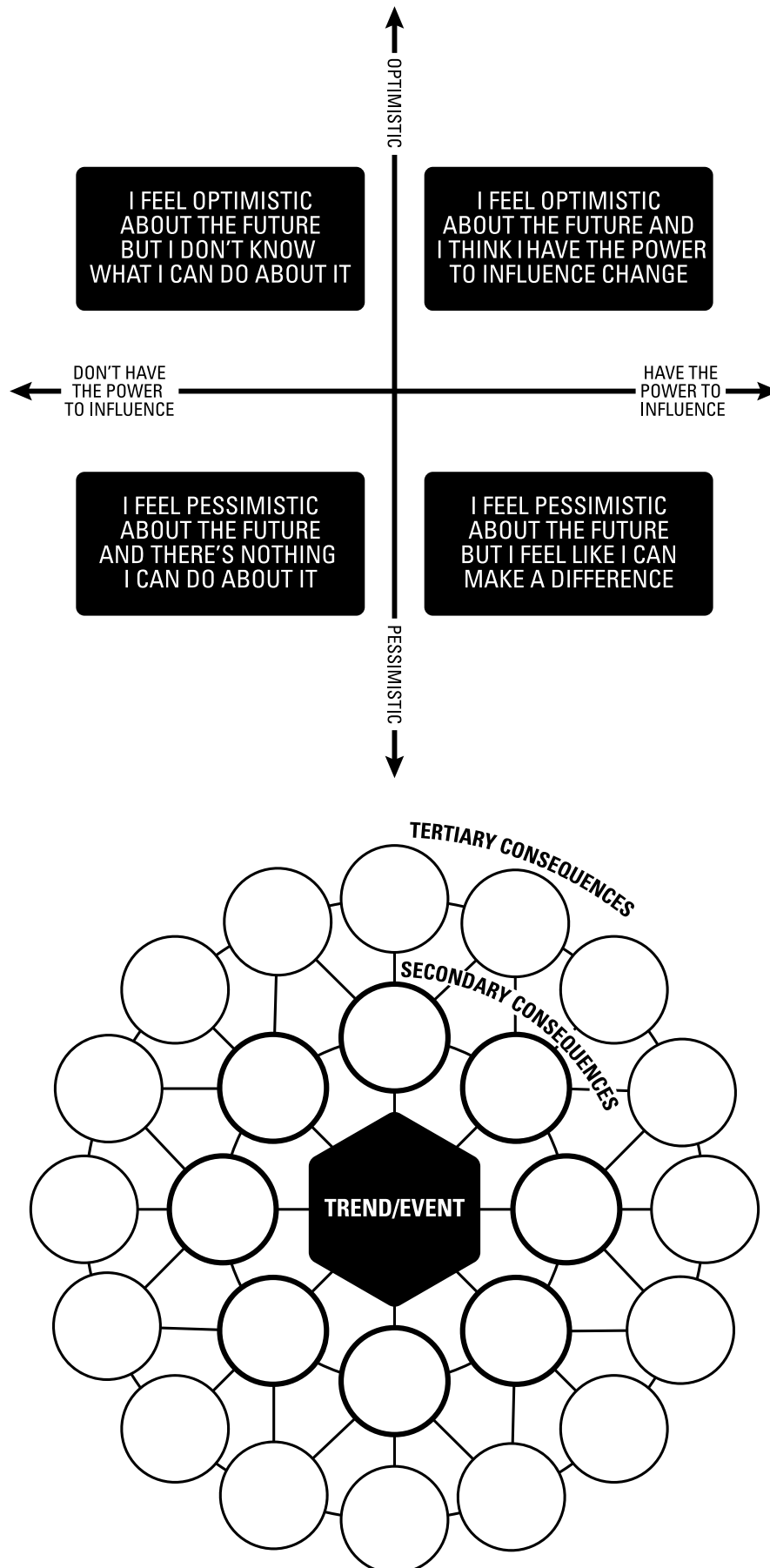


Figure 3.9:
Tools for unpacking future scenarios

Top: The Polak Game, redrawn from (Hayward and Candy, 2017)

Bottom: Futures Wheel, redrawn from (Montgomery and Wuebken, 2016)

Figure 3.10:
'Boite en valise' or 'suitcase
box' by [Marcel Duchamp](#)
(1935-41)

Image from MoMA
[https://www.moma.org/
collection/works/80890](https://www.moma.org/collection/works/80890)



This form of exhibition is also in contrast to that of the static exhibition in museums or galleries. Here, viewers are asked to engage directly with the work, using the artefacts not as static sculptures but as props to be handled and 'played' with. This enables the audience to roleplay, explore and 'test' a service experience using the artefacts within the box as prompts which scaffold conversation and reflection on the future. As Chamberlain and Craig (2017) articulate, the application of speculative (critical) design principles to healthcare through artefacts can be used as physical metaphors to prompt discussion that might inform our understanding of the emotional relationship with the uptake of new healthcare technologies. Emerging – or not-yet-developed – technologies are hard to prototype and test (Ahmadpour et al. 2019), particularly interactive elements in the high stakes context of the ED. At present, our understanding of individual user experiences in this context is fuzzy, which is in part due to the lack of end-user involvement in the development of such technologies (Hanson et al. 2010). This 'exhibition' aims to address this gap by providing a speculative concept as a scaffold for interrogation of the impact that technology might have on future service user experiences.

In this study, participants were invited to reflect directly upon the speculation by engaging with the design outcome in the exhibition-in-a-box concept, which was used as both a method and a vehicle to navigate the ethical and sociocultural issues that arise from ED futures. To facilitate this kind of discussion and reflection, the SSD framework draws upon tools such as the 'Polak game' and the 'futures wheel' (Figure 3.9) to explore our individual position in relation to future experiences. The Polak game by Hayward and Candy (2017) is a 2 x 2 axis that asks participants to map their own position in relation to the future based on how optimistic they are and their perception of their own agency. The futures wheel is a tool for unpicking consequences based upon a trend or event. An initial trend or event

is placed at the centre and primary consequences immediately adjacent. As participants fill the circle, secondary and tertiary consequences of the initial event emerge like spokes on a wheel. This 'thinking with things' draws upon the work of Papert (1980) and on Gaver et al.'s (1999) cultural probes, which use objects to mediate conversations about the richness and complexity of people's lives and illness experiences. The conversations, debates and insights generated by an audience upon this kind of work might then be synthesised into findings that can be used to inform future design interventions. The 'exhibition-in-a-box' that accompanies this study is discussed further in Chapters 5, 6 and 7.

3.6 Chapter conclusion

This chapter has articulated the SSD framework and how it might resolve some of the many methodological challenges presented through the integration of speculative and service design discourses. This now leaves the door open to investigate how this framework might be applied in the context of design research. Table 3.1 shows how each research question within this study relates to each phase of the methodological framework. As we will see in the following chapters, this framework enables the generation of speculative futures to facilitate conversations about the future with service recipients. This contribution to knowledge is significant, due to the finding from the literature of the lack of imagination or change in EDWRs for more than a century. This contribution would not have been possible without understanding and interpreting the methodological tensions between different design discourses and the integration of many research tools.

The SSD research framework described in this chapter provides the theoretical grounding for this study by bridging some of the gaps between service design and speculative design discourses. As design continues to be challenged as a problem-solving, material-oriented suite of professions (Vaughan 2018), this methodological approach demonstrates how a design research framework might be used to complement the anticipatory approaches currently used in healthcare management. Through stages of discovery (understanding the context), prototyping (iteratively crafting service scenarios) and deployment (reflection and analysis), this framework enables grounded speculations to emerge through collaborative conversation and to be informed by the unique worldviews of the people participating in the research. This speculative yet grounded approach to future making that the SSD framework engenders might be applied to a plethora of analogous sectors complicated by multiple stakeholders and challenged by an uncertain future. The novelty and significance of this methodological approach lie in its combination of approaches and the nuanced differences from typical service and speculative design methods. The SSD framework demonstrates how we might mobilise design approaches into new contexts of engagement, such as materialising urgent-care futures. Beyond this application in this study, it is hoped that the framework will prove useful to other practitioner-researchers who need to unpick some of the many problems facing complex service sectors. Designers and researchers could apply this framework partially or entirely.

Table 3.1:

A table summarising the specific research techniques applied in this study

Arc of the methodological framework	Methodological objective in this study	Research technique applied in this study
Discover	<p>Respond to subsidiary research question #1 and #2:</p> <p><i>What are the emerging and not-yet foreseen tensions, challenges and problems for the Emergency Department waiting room experience?</i></p> <p>and:</p> <p><i>What methods can be used to apply speculative design to the service design problems facing Emergency department waiting rooms?</i></p>	<ul style="list-style-type: none"> ▪ Literature review ▪ Co-design engagements with ED stakeholders ▪ Observations ▪ Interviews ▪ Artifact analysis
Prototype	<p>Respond to the design question of:</p> <p><i>What if we leverage the power of emerging and not yet available technologies to enhance the experience of Emergency Department waiting rooms?</i></p>	<ul style="list-style-type: none"> ▪ 'Project-grounded', speculative service concept ideation, iteration and refinement through design experimentation and review by authors and supervision team.
Deploy	<p>Respond to the subsidiary research question #3:</p> <p><i>How can the speculative design research and practice on the Emergency Department waiting room be communicated to inspire change?</i></p> <p>And respond to overall research question:</p> <p><i>How might speculative design research and practice inspire change for the problems facing the emergency department waiting room of the future?</i></p>	<ul style="list-style-type: none"> ▪ A series of Design Fictions ▪ A suite of designed objects and visualisations ▪ Deployment of the 'Exhibition-in-a-box' ▪ Interrogation of the speculative outcome through co-design engagements.

Chapter — 04

A co-design investigation into Emergency Department waiting experiences

CHAPTER OVERVIEW —

This chapter outlines a series of co-design engagements conducted in collaboration with an ED based in Melbourne, Australia. The aims and method of data collection are outlined, before going on to present the key findings arising from the investigation. This data then provides the inspiration and grounding for speculative design experiments, which are described in later chapters.

DESIGN FICTION SUMMARY —

16-year-old Kayde just scored his first goal in his football match, but was knocked over and has now hurt his leg. From what the other players and the coach can tell, it looks like it might be broken. The other players and the coach helps the injured Kayde off the field, and hails a car to take him and his mother to the nearest Emergency Department at Clearview Hospital.

Kayde and his mother arrive at Clearview ED and are now comfortable in the waiting room. However, they've just seen a flurry of activity and 6 different patients arrive by Ambulance accompanied by paramedics. Kayde and his mother have been waiting for almost an hour already, but neither are sure what's going to happen next ...

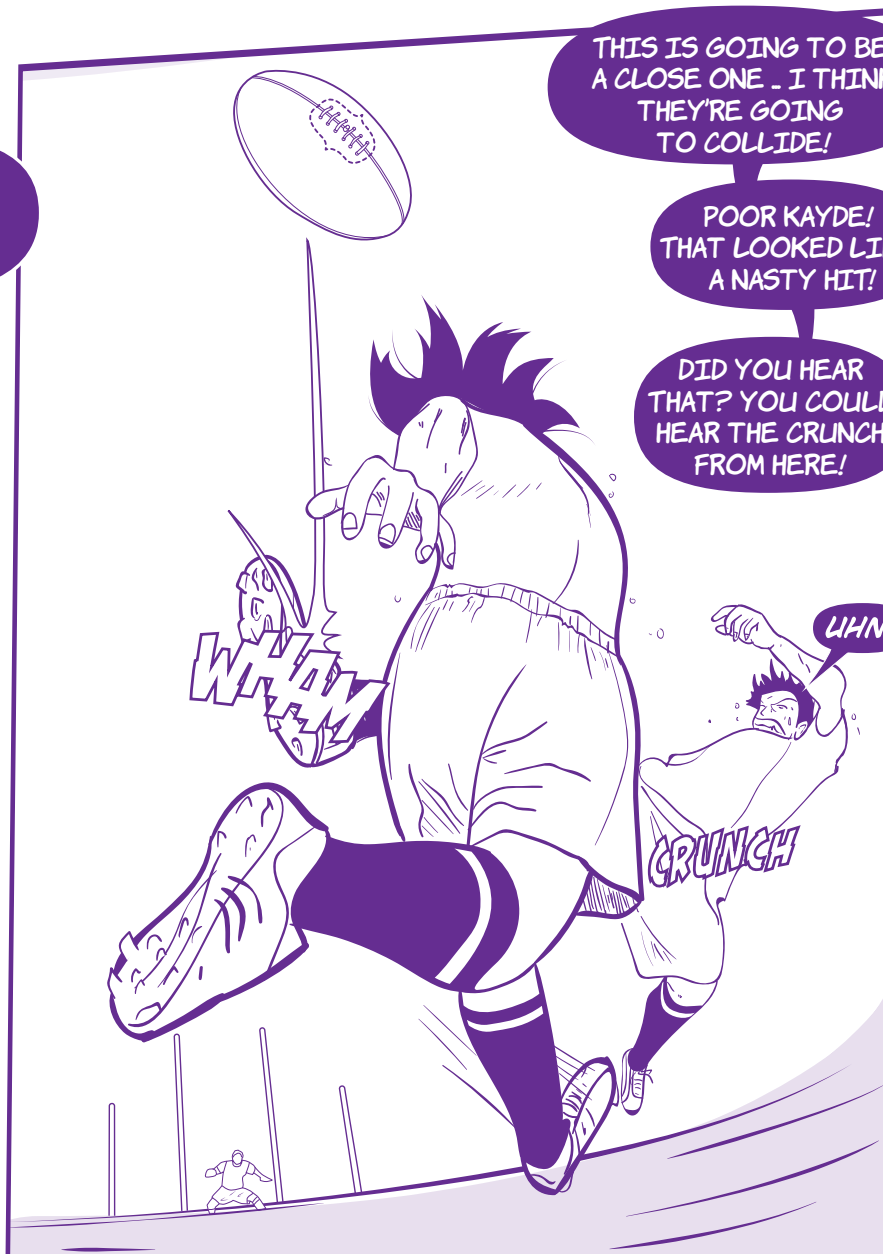
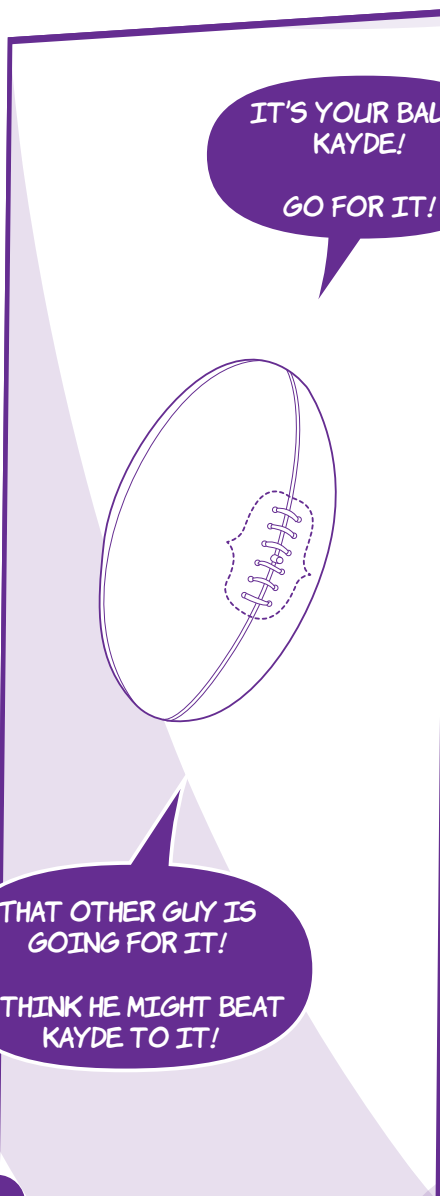
Key Thematic:

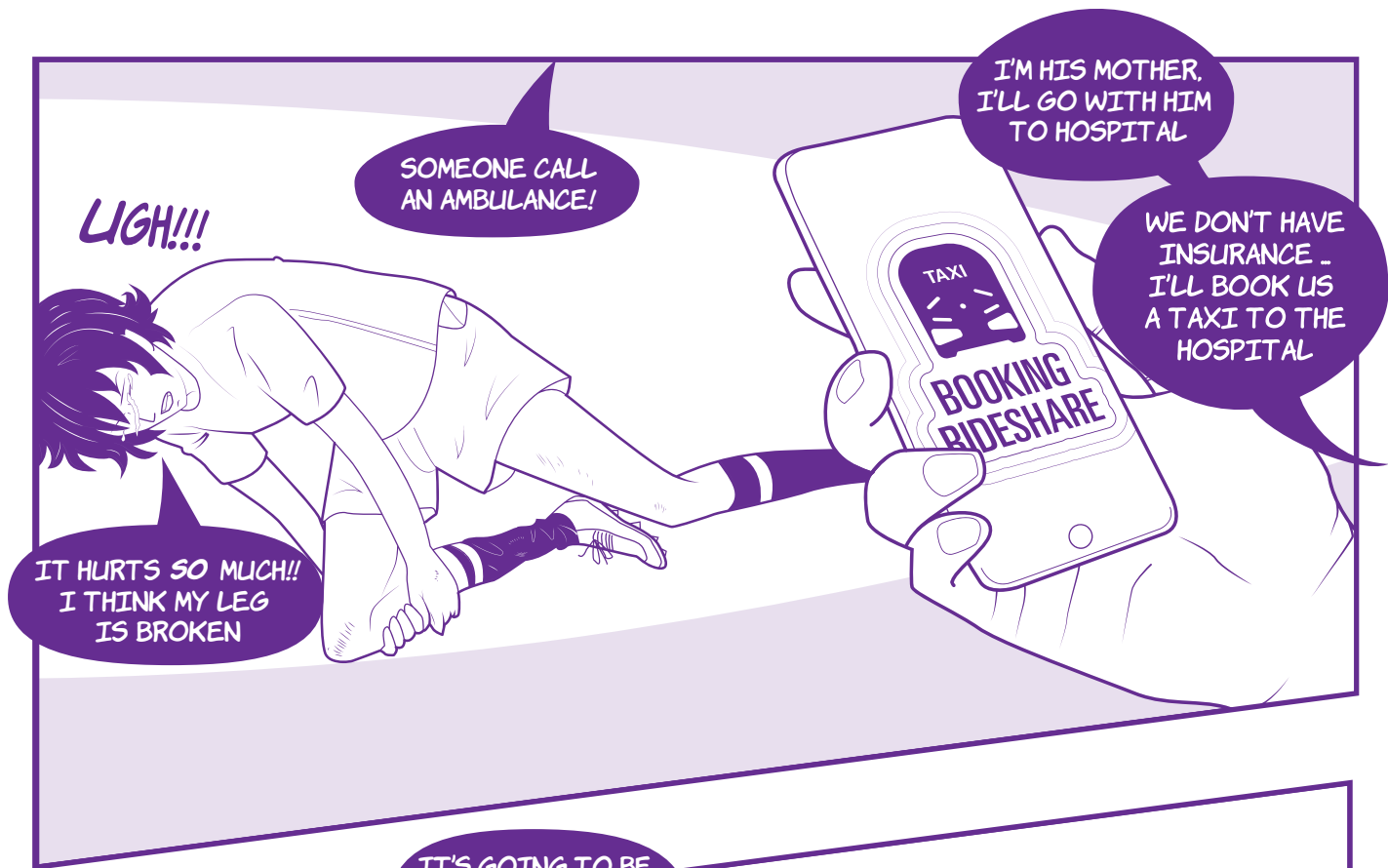
Waiting is not always in your control —

The waiting experience in an ED is not as simple as waiting in other analogous environments. For example, waiting in a queue at an airport is predicated on the ideas that: a) everyone has planned to go to the airport; b) no-one is experiencing physical or psychological pain; and c) the end outcome is clear and certain. The uniqueness of the ED context means that waiting here is not like in any other context; the physical and psychological stakes are higher – even if an AI is 'holding' your hand along the way.

In the first edition in this suite of design fictions, Kayde's journey through the ED presents a situation where waiting is outside of his own control. For Kayde – whose injury is serious enough he requires critical care, but not life-threatening – his waiting experience can be impacted on by a plethora of reasons that are outside his control and the control of the ED. Even with technological interventions like Asklepios, unpredictable factors can dramatically change the overall waiting experience. The feeling of 'not knowing where you are in the system' is reinforced when the comic ends before Kayde has been seen by a physician.

This design fiction also more explicitly explores the pre-hospital touchpoints that make up the ED journey and articulates one alternative future where a patient might be triaged and registered into the ED prior to physical arrival.





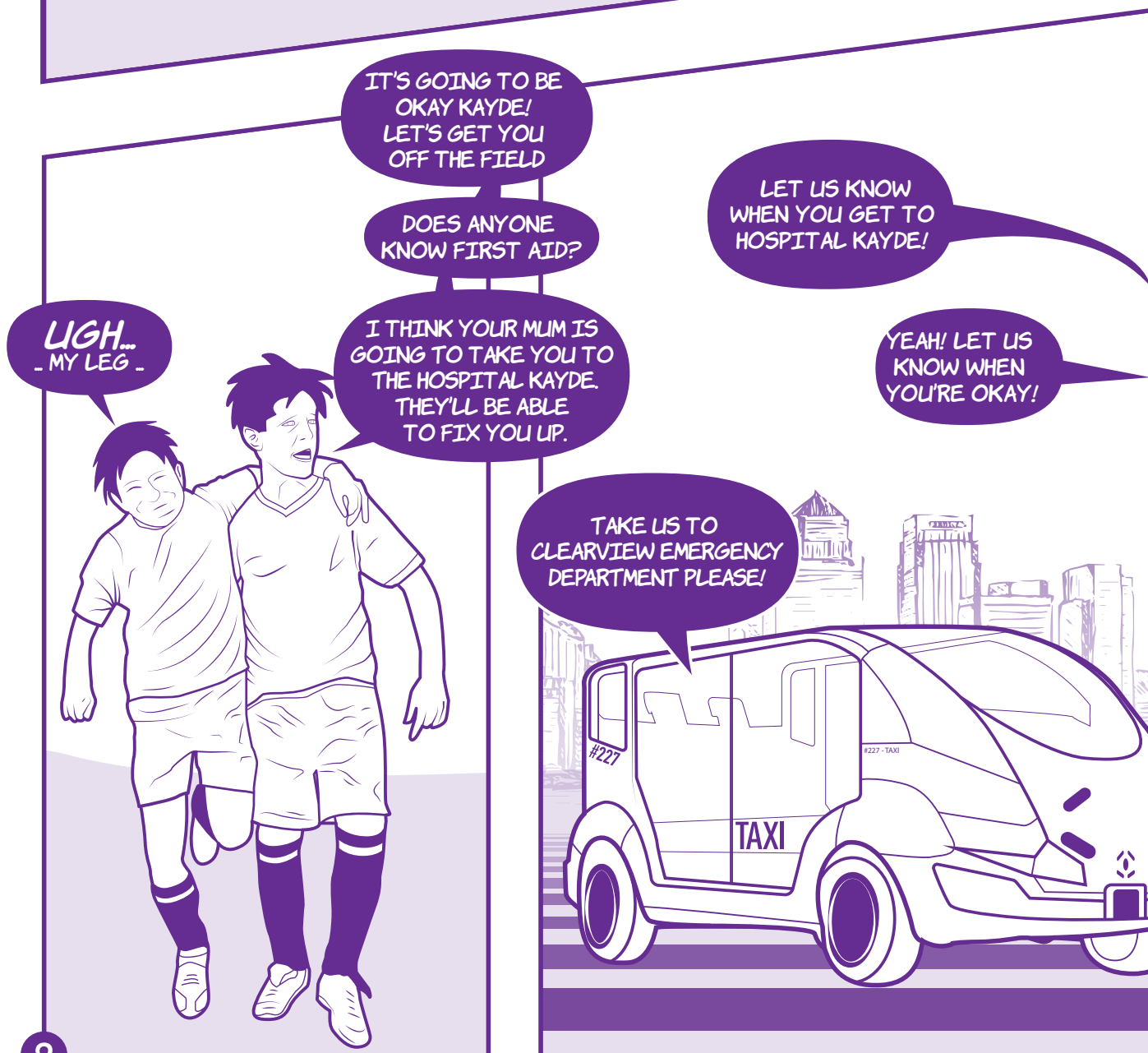
LIGH!!!

SOMEONE CALL
AN AMBULANCE!

I'M HIS MOTHER,
I'LL GO WITH HIM
TO HOSPITAL

WE DON'T HAVE
INSURANCE -
I'LL BOOK US
A TAXI TO THE
HOSPITAL

IT HURTS SO MUCH!!
I THINK MY LEG
IS BROKEN



IT'S GOING TO BE
OKAY KAYDE!
LET'S GET YOU
OFF THE FIELD

DOES ANYONE
KNOW FIRST AID?

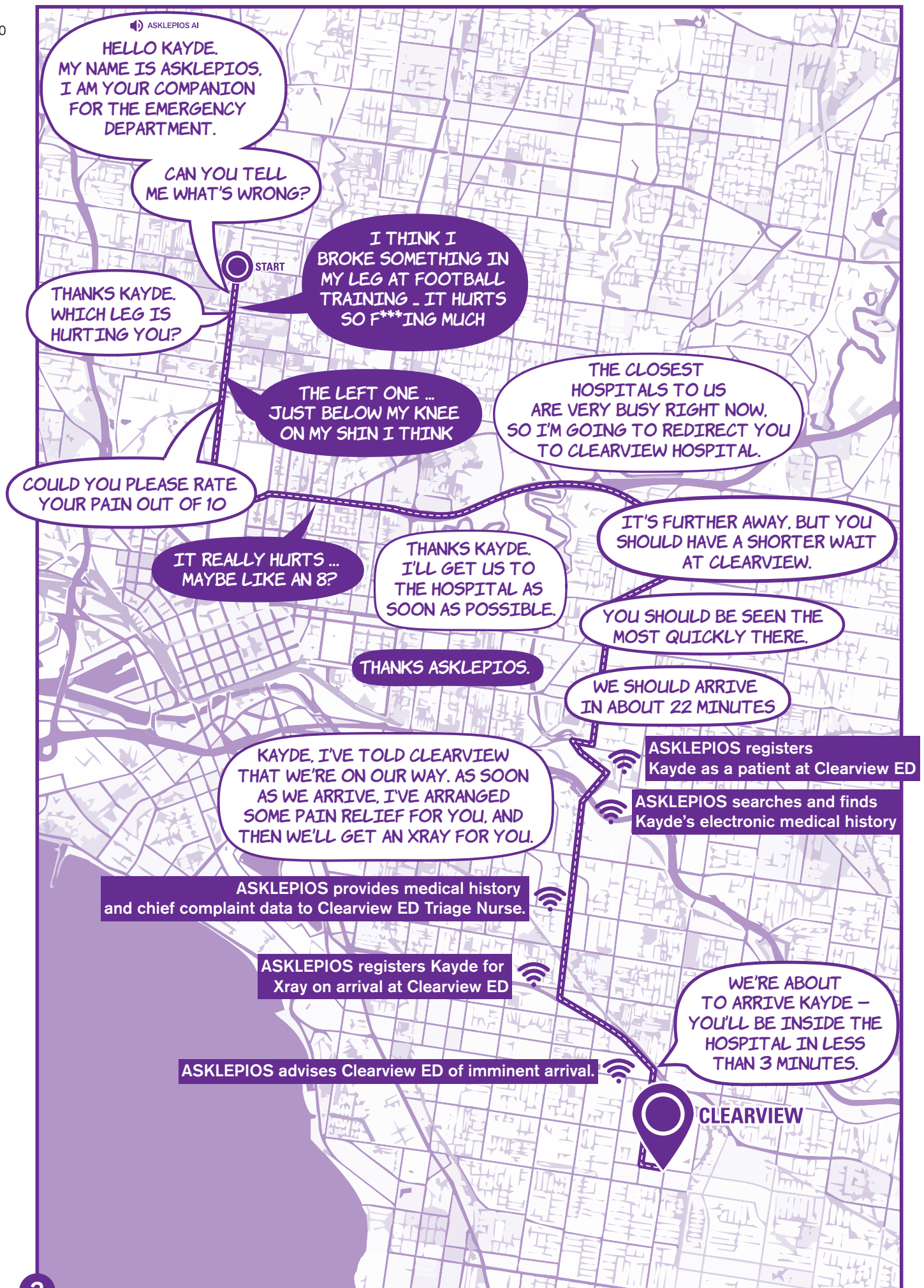
LET US KNOW
WHEN YOU GET TO
HOSPITAL KAYDE!

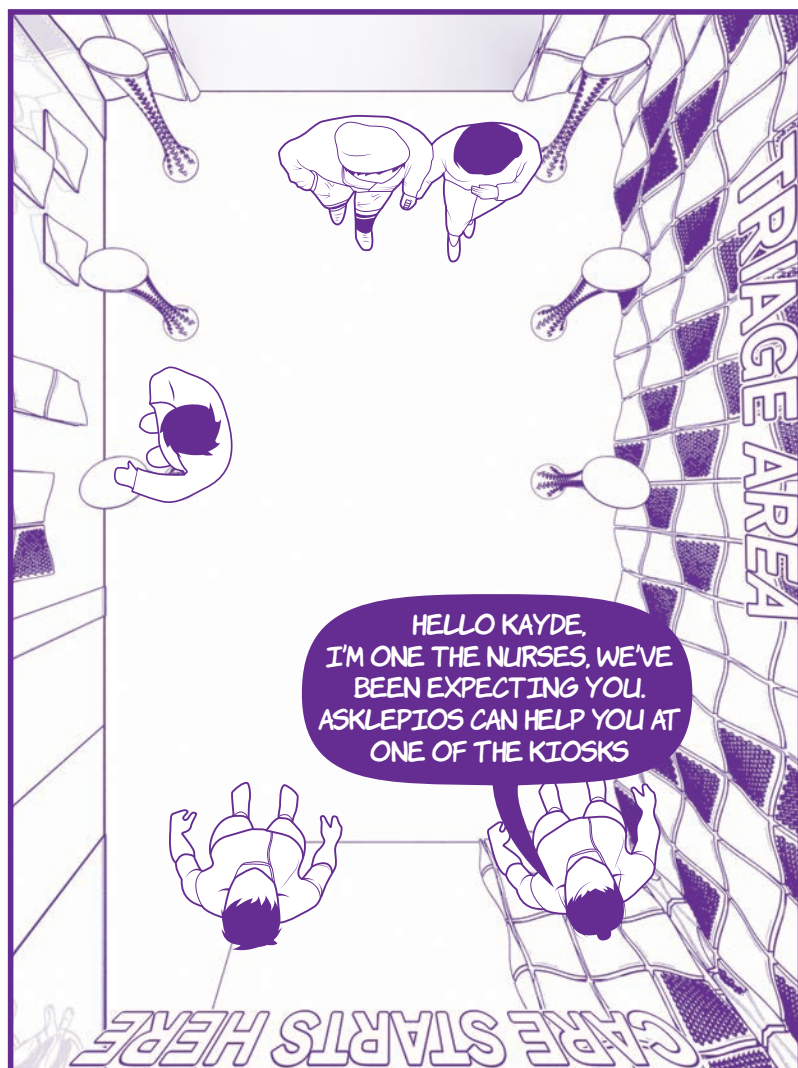
YEAH! LET US
KNOW WHEN
YOU'RE OKAY!

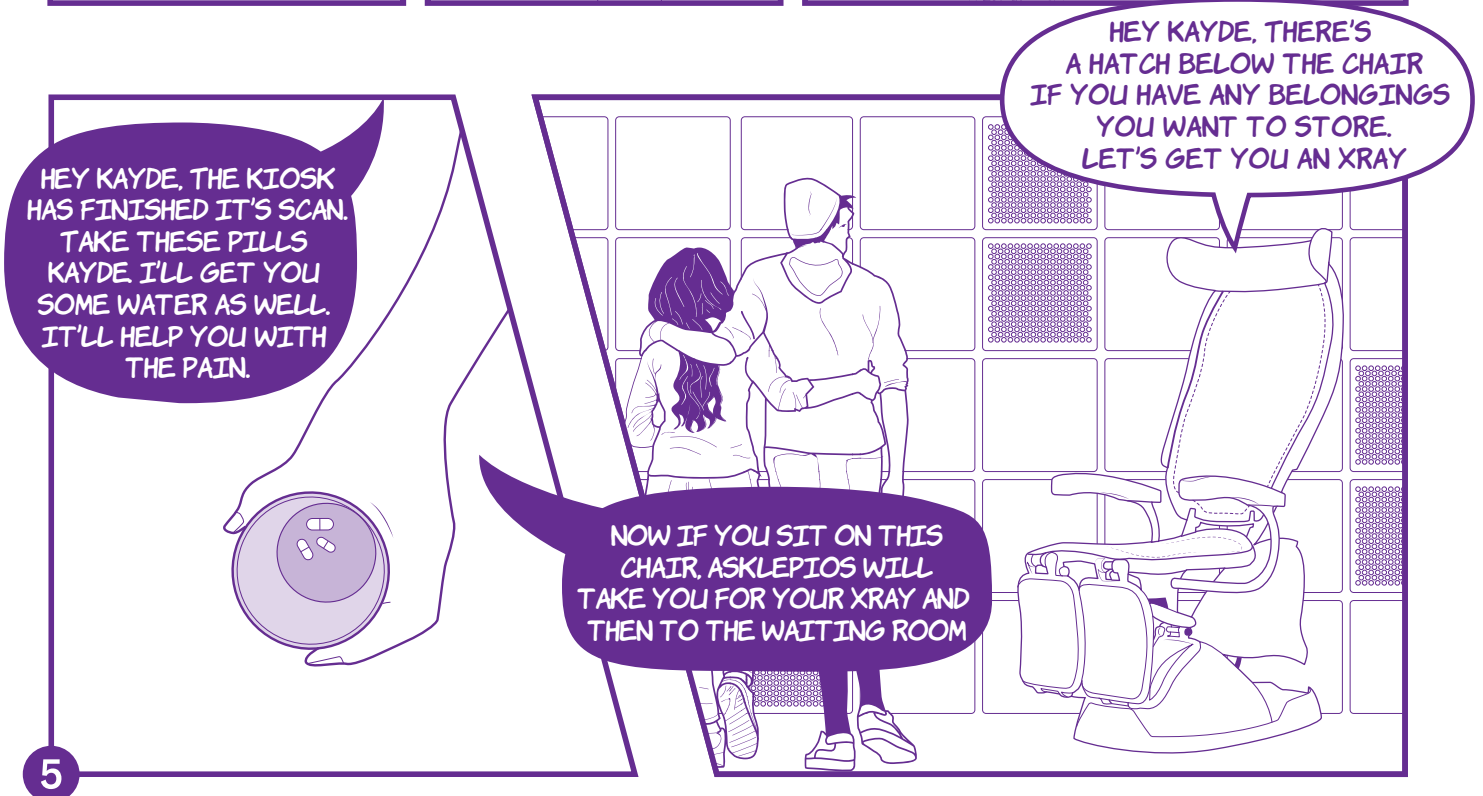
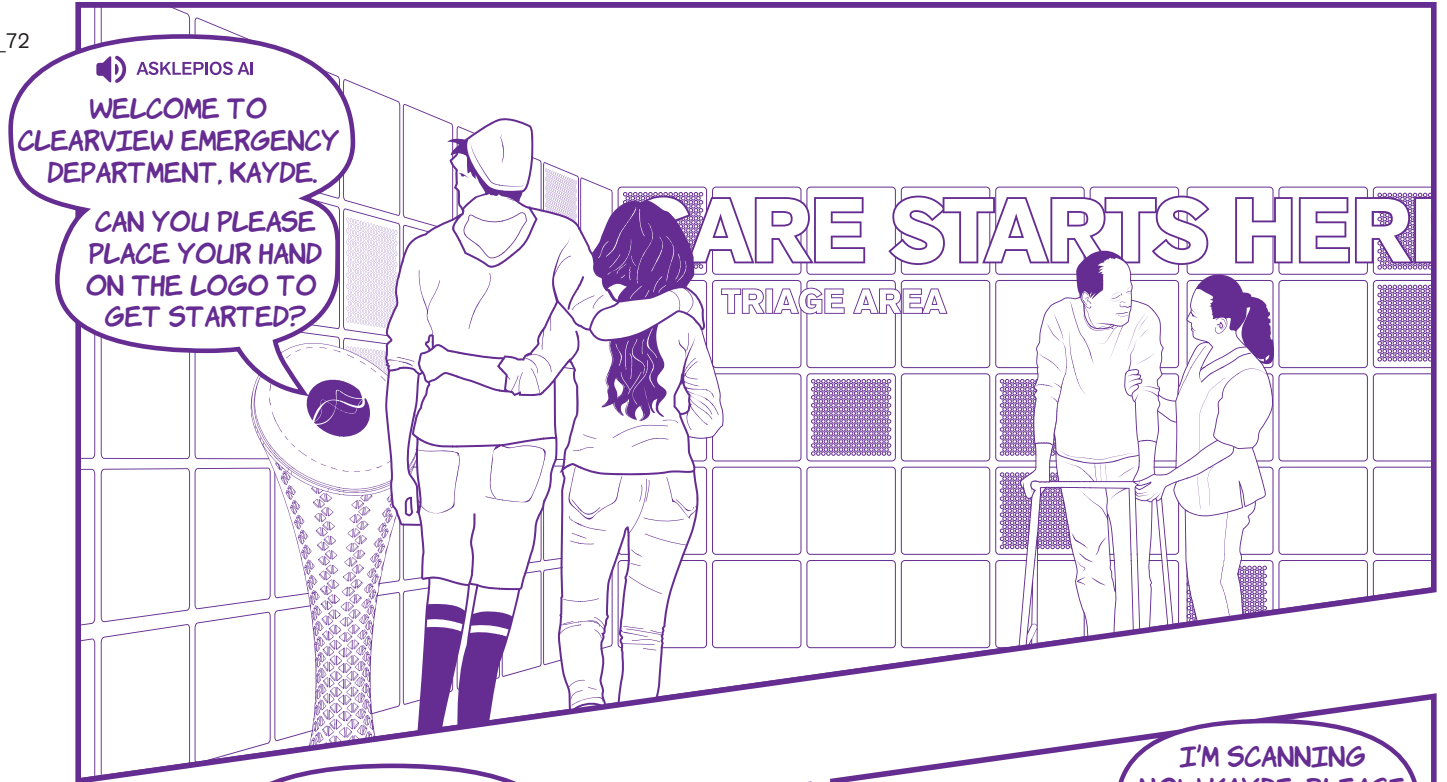
TAKE US TO
CLEARVIEW EMERGENCY
DEPARTMENT PLEASE!

LIGH...
_ MY LEG _

I THINK YOUR MUM IS
GOING TO TAKE YOU TO
THE HOSPITAL KAYDE.
THEY'LL BE ABLE
TO FIX YOU UP.









1hr
LATER



MEANWHILE...

WE DEFINITELY WOULD'VE WON THAT GAME IF KAYDE HADN'T GOT HURT

HAS ANYONE HEARD FROM HIM? IS HE OKAY?

YEAH HE SENT ME AND THE BOYS A PIC

HE'S AT THAT NEW FANCY HOSPITAL - CLEARVIEW I THINK - HE'S GOT A ROBOT ASSISTANT AND EVERYTHING

AT LEAST HE'S OKAY _ GUESS WE'LL SEE HIM SOON

MEANWHILE...

BZZ

000

POLICE, FIRE
OR AMBULANCE?

THANKYOU.
WHAT'S THE LOCATION
OF YOUR EMERGENCY?

AMBULANCE,
THERE'S BEEN A CAR CRASH .
LOOKS LIKE AT LEAST
8 OR 9 PEOPLE HURT.

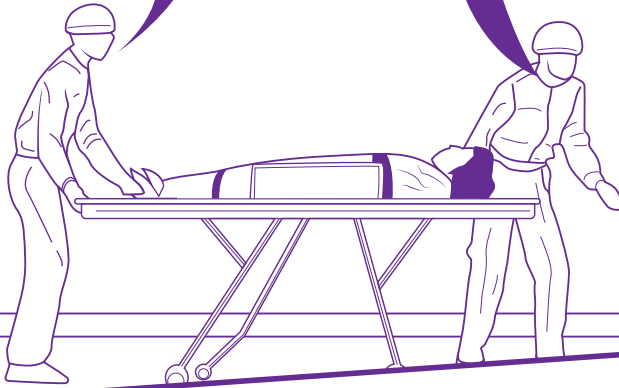


HOW MANY
MORE TO GO?

ANOTHER 4 AMBULANCES
... THIS WAS A NASTY
PILE UP

EMERGENCY AMBULANCE

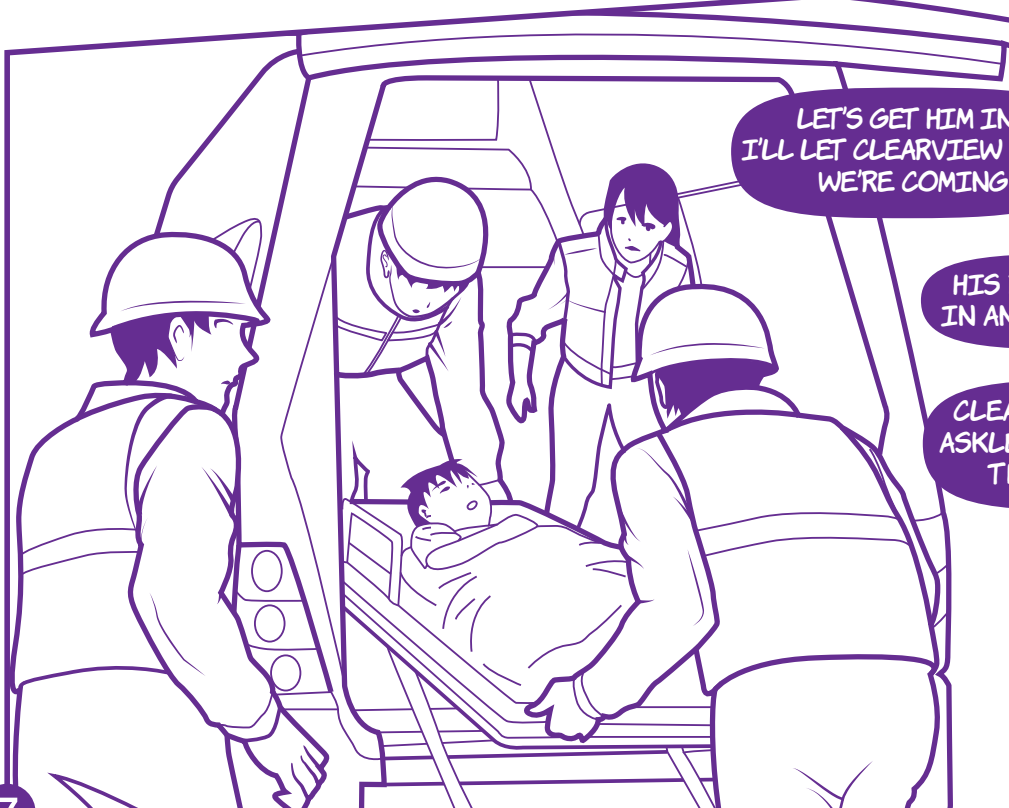
000



LET'S GET HIM IN .
I'LL LET CLEARVIEW KNOW
WE'RE COMING

HIS PARENTS ARE ALSO
IN ANOTHER AMBULANCE.

CLEARVIEW WILL GET
ASKLEPIOS TO CONTACT
THE NEXT OF KIN



ASKLEPIOS AI

KAYDE, I HAVE AN IMPORTANT ALERT FOR YOU.

THERE'S BEEN AN INCIDENT CLOSE TO THE HOSPITAL AND MANY NEW PATIENTS ARE COMING TO THIS ED.

I'M SORRY, BUT YOUR WAIT IS GOING TO BE MUCH LONGER NOW.

I'LL UPDATE YOU WITH AN ESTIMATED WAIT TIME AS SOON AS I CAN.

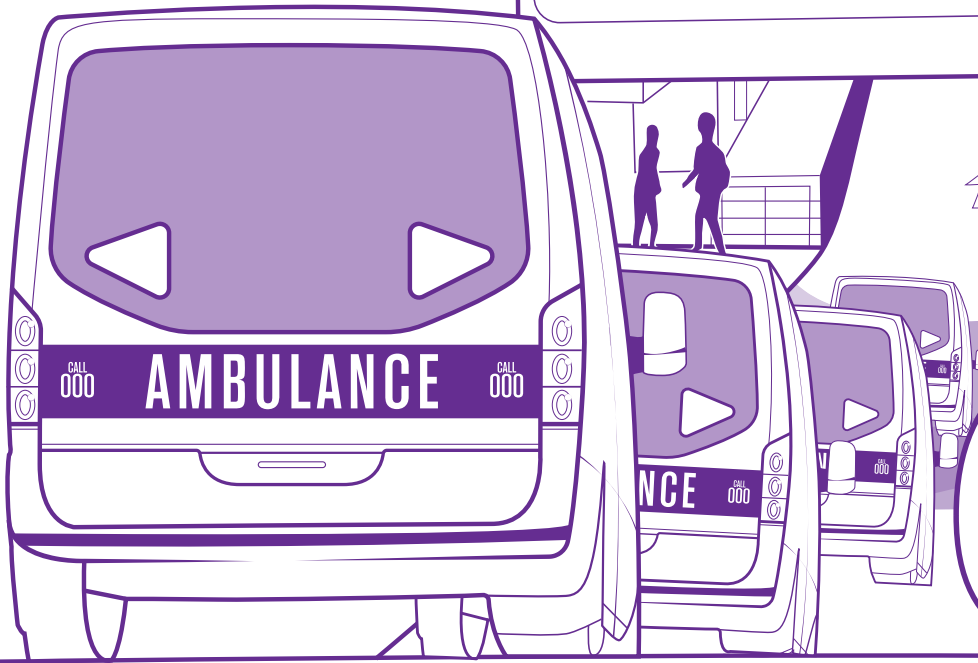
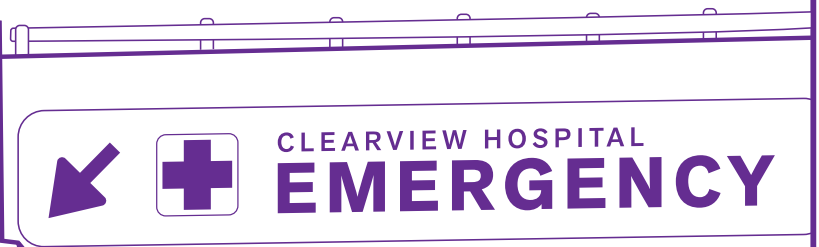


DO YOU KNOW HOW LONG WE WILL BE WAITING ASKLEPIOS?

I'M NOT SURE SORRY, THERE'S LOTS OF AMBULANCES COMING IN.



THEY'RE QUEUED UP OUTSIDE THE HOSPITAL. I'M WORKING WITH OUR DOCTORS TO MAKE SURE ALL THOSE PATIENTS ARE SEEN AS SOON AS POSSIBLE.



I'M NOT GOING ANYWHERE, KAYDE. I'LL BE HERE HOLDING YOUR HAND THE WHOLE TIME YOU'RE IN THIS WAITING ROOM.

I'LL LET YOU KNOW WHEN I KNOW MORE.

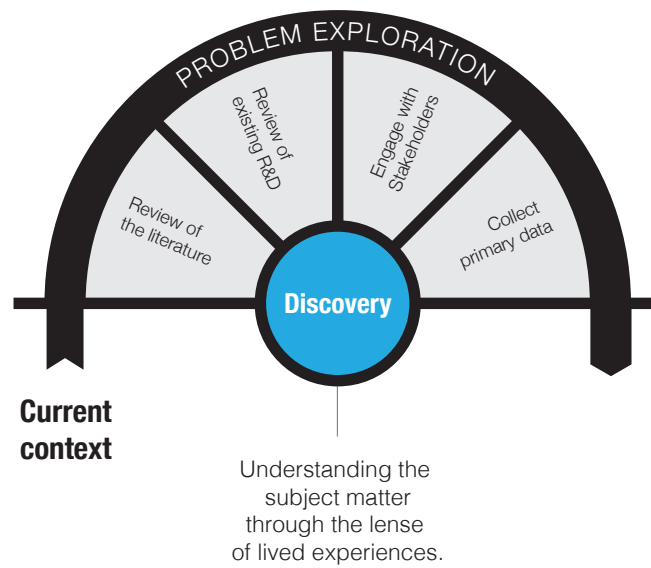


Figure 4.1:
The first arc of
the SSD framework.

4.0 Introduction to the investigation and place within the exegesis

Supposing is good. Finding out is better
— Mark Twain, n.d

Previous chapters have provided the theoretical grounding and precedent for this study. In this chapter, we see how this theory and the SSD framework might be brought together through co-design engagements with ED stakeholders. The insights collected through this investigation are then used to inform the speculative design experimentation described in subsequent chapters. This investigation within the larger study directly responds to the research question: How might speculative design research and practice inspire change for the problems facing the emergency department waiting room of the future? by directly exploring the contemporary challenges in the existing environment through design research. This investigation is comprised of three distinct parts:

1. The first, an observational sub-study, utilises a mix of ethnographic semi-structured observation and fly-on-the-wall observation to both engage and observe patients, carers and staff in the ED. This study also includes a brief analysis of the artefacts currently in the waiting room.
2. Secondly, three interviews are conducted to build upon the observational study. The goal of this study is to collect first-hand, personal accounts of experiences, perceptions and opinions of everyday life in the ED.
3. Thirdly, a series of co-design 'sprints' are held with ED staff to collaboratively envision a future for the EDWR. The aim of this sub-study is to bring the people whom this project aims to serve directly into the design process in order to ensure that their needs and dreams for the future are captured (Sanders and Stappers 2012).

Figure 4.2:
Image of Cabrini ED,
August 2018.

Image by Author.



This chapter discusses the results from these sub-studies collectively in Section 4.6, rather than individually, as all three sub-studies have been conducted to be complementary to each other. All three were conducted at the Cabrini ED over a six-month period in 2018. The associated raw data and transcripts from the interviews and workshops are included in this exegesis (see Appendix a and b).

Cabrini ED (Figure 4.2) is located in Melbourne, Australia. Cabrini is a private metropolitan ED with approximately 24,000 admissions per year and an approximate 50% admission rate. Cabrini ED is attached to a 500-bed hospital which provides an array of both in- and outpatient services. As a private ED, Cabrini provides services to a wide variety of individuals within the south-eastern suburbs of Melbourne and is one of many private hospitals in the city that have emerged in the Australian healthcare landscape alongside the public system.

Informal visits to other ED's in Melbourne were conducted by the researchers, including the Royal Melbourne ED, Boxhill ED, Epworth ED and Monash Medical ED. These visits were arranged through contacts and professional networks developed through the project. While no formal research activities were ever undertaken at these locations, these visits proved useful to confirm many of the similarities between Cabrini ED and other ED's in Melbourne.

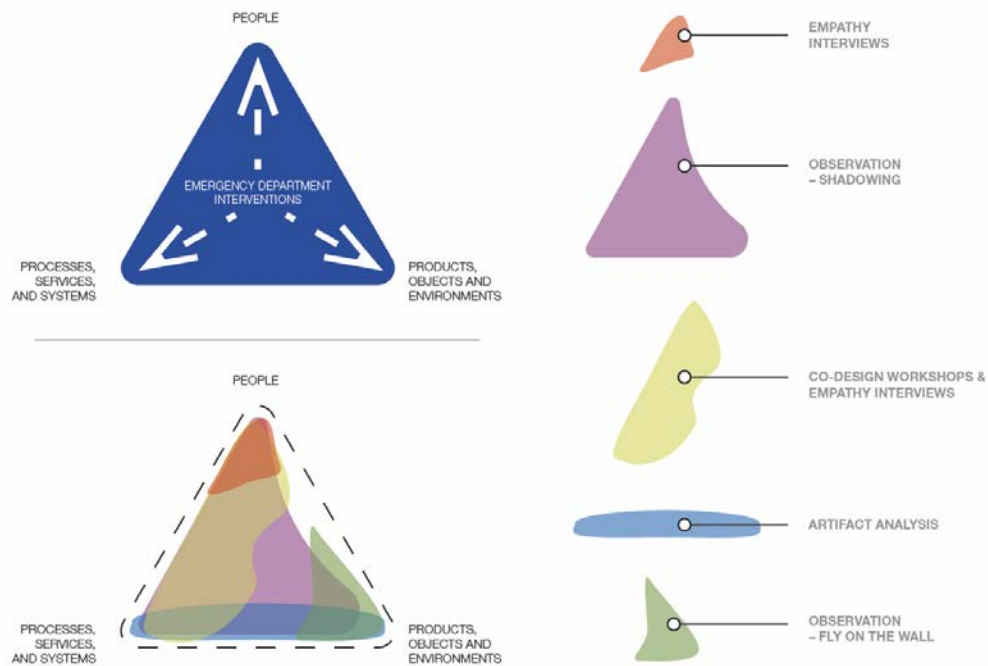


Figure 4.3:
The Data Collection Framework, and how different data collection methods were employed to find convergence and validate findings.

4.1 Aims of the investigation

As identified by the literature in Chapter 2, a raft of interrelated factors make up the 'assemblage' of things that impact on the waiting experience in the ED. In order to explore the lived experiences of those waiting in pain, this chapter aims to engage directly with these people in order to provide a grounding of lived experiences for further speculative design experimentation. In recognition of the fact that how a patient arrives at the hospital and how they are triaged and registered can influence both their waiting time and experience, this investigation explores the patient journey from the moment of health incident to 'time of physician initial assessment' as discussed in Subsection 1.3.1.

4.2 The method: triangulating of the data and approach to synthesis

The uniqueness of the research context – an emotionally charged, busy environment with multiple actors with competing needs and overlapping processes – meant that a variety of data collection approaches have been applied to ‘sense-make’ and manage this complexity. In doing so, the enquiry is delineated into three areas of exploration. This included investigation of: a) people; b) services, systems, processes; and c) the products, objects and artefacts that inhabit an environment. Figure 4.3 presents these sub-topics and highlights how the different sub-studies and data collection methods have overlapped and complemented each other to unearth data points and insights into the EDWR. Synthesis of the data focused on this overlap and was used as a technique to triangulate common themes and ideas. Synthesis of the data aimed to investigate common results across different data collection methods and then triangulate common themes and ideas. This enquiry was designed to ‘shore up’ the epistemological gaps in each method and reinforce the validity of the findings described in Section 4.7.

The sub-studies described in this chapter did not aim for objective data; rather, they embraced subjectivity and aimed to gather and collate insights that could act as inspiration for the ongoing design project. Through each sub-study, data was collected, analysed and then coded through thematic analysis (Attride-Stirling 2001). In study 1, observations were recorded through a series of photographs and supported by notes and sketches made in a notebook. From studies 2 and 3, transcripts were produced from approximately 6 hours of audio recordings of the interviews and workshops (see Appendix a for a sample of coded transcripts). In study 3, a series of photographs were captured of the outputs developed through co-design workshops. This chapter presents these thematically coded results from the sub-studies as fragmentary impressions of raw data collected and clustered thematically. These clusters are used to give general insight and provide the contemporary grounding that has scaffolded and supported the major design project detailed in subsequent chapters.

The following section provides a brief overview of each one of the three sub-studies and briefly unpacks the aims, methods and limitations of each approach.

Ethics approval was granted to this study by the Cabrini Human Research Ethics Committee (CHREC 01-18-09-17).

4.3 Study one: observing the Emergency Department waiting room

4.3.1 Aims

This sub-study entailed 'attentive looking' and a systematic recording of phenomena (Hannington and Martin 2012, 120) in the EDWR. This included the behaviours of people and interactions, but also artefacts, how people engaged with them and their place within the wider environment. The intent of this study was to discover baseline information through immersion in the waiting room and to record data points for use later in creative experimentation. This study was approached with an open mind and an informal structure, and was deliberately semi-structured to allow the study to be responsive to events and developments within the ED. This style of observation acknowledges the importance of the situated, embodied and lived account – rather than that of the detached observer (Akama, Pink and Sumartojo 2018).

Between June and November 2018, approximately 25 hours of observation were conducted at Cabrini ED. This included a mix of fly-on-the-wall observation, where the researchers did not actively engage with patients, staff or carers, and guided observation where the researchers shadowed patients, staff and carers in their duties. Observations were conducted at mixed times of day and night, and approximately 10 patients were shadowed through the ED from the moment they walked in the front door to when they left the department. In most cases this included a discharge from hospital, but in other cases patients were admitted to other departments of the hospital. The researchers did not shadow 'critical' patients – category 1 or 2 – so as to not interfere with the delivery of lifesaving care.

4.3.2 Method

The exploratory nature of this first sub-study revealed a wide, but overall relatively shallow insight into the daily activities of the EDWR experience. For this reason, studies 2 and 3 aimed to deepen the enquiry into the EDWR and further uncover common themes and patterns. Data was recorded primarily in written note form in a notebook (Figure 4.4) and was supported by a series of photographs of artefacts, objects and physical infrastructure. While the researchers engaged with patients through the observational study, no photography was taken of these interactions or encounters in order to respect their experience and allowances within the ethics approval process. The observational study provided the most data on patient experiences in the EDWR, where researchers were able to shadow a number of patients through their journey in the ED.

Figure 4.4:
Scanned images of
notes and sketches
made in the EDWR in the
observational study



4.3.3 Artefact analysis

As part of this study, an analysis of the artefacts present in the EDWR was conducted and documented as a series of images. These photographs are presented in Section 4.7. As part of the observational study, this sub-topic of enquiry aimed to further examine the roles that objects and their qualities – material, aesthetic and interactive – play in the waiting experience. This kind of analysis aimed to provide guided insight into not only EDWR design precedent, but also the patterns of use and material culture of the EDWR ([Hannington and Martin 2012, 14](#)).

4.3.4 Limitations

The primary limitation of this sub-study was due to its breadth and the relatively shallow data it yielded into EDWR experiences. While this kind of study proved essential for the EDWR project, it only provided surface-level insight into the EDWR experience. The use of this study in conjunction with others, however, has addressed this limitation.

The active presence of researchers in the EDWR presents a challenge to generating objective observational data and the capacity of the researchers to connect empathetically with people experiencing episodes of acute ill health. The combination of both fly-on-the-wall and shadowing observations was employed to attempt to minimise potential bias and behavioural influences that might result from the presence of the researchers. This phenomenon is well described in the literature as the Hawthorne effect ([Wickström and Bendix 2000](#)), where the presence of the researcher temporarily changes user behaviour.

4.4 Study two: empathy interviews

4.4.1 Aims

Study 1 provided a series of broad, surface-level insights into the EDWR experience and unveiled a number of data points worthy of further exploration and interrogation. This sub-study aimed to deepen the observational study through one-on-one interviews with EDWR participants. In doing so, it was hoped that inferences made in study 1 could be either validated or rejected before they were explored in more detail in study 3.

As articulated by Kuniavsky (2003, 117), the interview is a fundamental part of understanding the user experience. In doing so, the interview collects first-hand, personal accounts of experiences, opinions, attitudes and perceptions (Hannington 2017, 102). The style of interview described in this study was the 'empathy interview' style as articulated by (Stanford D.school 2013), where the interview focuses on building rapport and connection with the interviewee, focuses on 'human values' and attempts to understand the experience of the interviewee as if the interviewer were that person. As the interviews aimed to complement the observational data, interviews were structured in such a way that encouraged complex responses – as opposed to binary answers – in order to encourage participants to open up about their experiences.

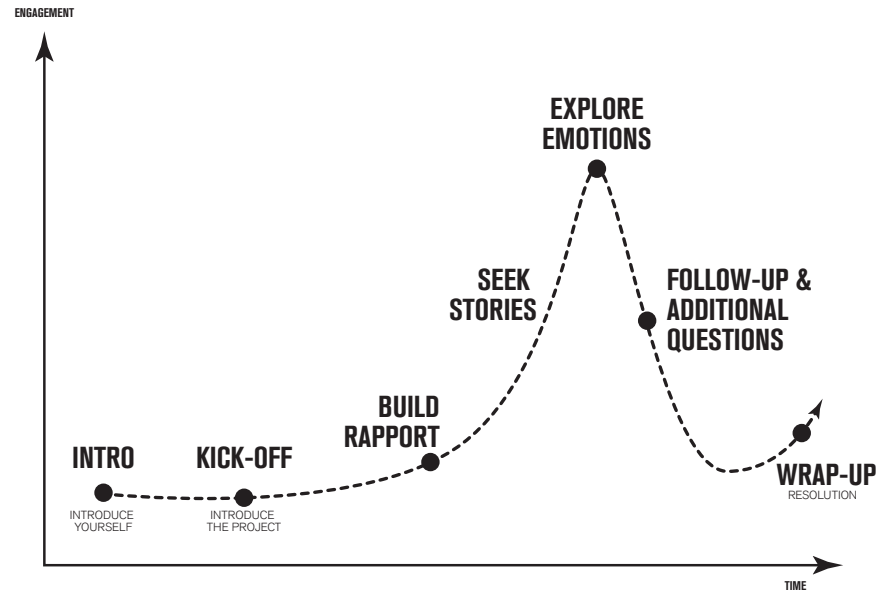
4.4.2 Method

Each interview that was conducted aimed to dive deep into individual lived experiences in the ED, to complement the broad and shallow nature of the qualitative data that was generated as part of the observational study. In this way, the combination of these two studies attempted to build them upon each other.

Between June and November 2018, three deep-dive empathy interviews of approximately 45 minutes in duration were conducted with ED staff: nurses and physicians at Cabrini ED. Recruiting other staff to participate in this study proved challenging, as a number of staff who were approached did not have the time, interest or capacity to participate in this research. As a major limitation of all three sub-studies, this point is briefly discussed below and unpacked in more detail in Section 4.9.

Each interview was guided by a 'script' that drew upon the 'shape of an interview' framework provided by Stanford D.school (2013). This framework is depicted in Figure 4.5, where the graphed line represents the general narrative of arc of the interview, the X-axis represents time and the Y-axis the 'emotional investment' of the interviewer and interviewee, which grew over time as rapport and trust were established. Each interview allowed departures from this 'plan', to embrace the serendipity of the encounter and enable researchers to explore issues, tensions and ideas important to those being interviewed, rather than fitting a predetermined questionnaire.

Figure 4.5:
Narrative arc of the
empathy interviews used
in this study. Redrawn by
author from (Stanford
D.school, 2013).



4.4.3 Limitations

This sub-study experienced significant difficulty in recruiting participants – both ED staff and patients – who were willing to give their time to the project. In particular, recruiting patients to speak about their experiences in an interview setting proved impossible at Cabrini. While the researchers were able to speak to patients and shadow them on their journeys through the waiting room – as presented in study 1 – interviewing patients after their experiences proved difficult. When approached, many potential participants declined because they were 'too busy', 'not interested' or 'didn't think they could help'. While a number of patients were recruited to participate in this study via the Cabrini Patient Experience Office – even providing signed consent forms and contact details to the researchers – no patients recruited via this approach eventually consented to an interview with the researchers.

Funding limitations meant that incentivising participation in the study was not possible, which further inhibited the capacity of researchers to encourage participation in the study. With more time and resources, a more substantial study and series of interviews could be conducted.



Figure 4.6:
An ED staff member
'prototyping' new
interventions for
the EDWR.

4.5. Study three: Co-Design 'sprints' with Emergency Department staff

4.5.1 Aims

This sub-study aimed to explore how ED staff felt about the waiting room, explore the ED 'wait profile' and engage staff through a participatory co-design process to develop low-fidelity prototypes of a future EDWR experience. This study aimed to illuminate the problems or 'pain points' within the design of the existing environment and identify what the attributes of a 'preferable' future would be. In total, 22 different ED staff members participated in these workshops. Figure 4.6 presents an action shot of a workshop in progress and Figure 4.7 some of the 'prototypes' provided to participants.

More than the observational study and interviews that preceded this study, the co-design sprints amplified the voices of ED staff through direct participation and making. The prototyping workshops provoked staff to discuss issues, tensions and challenges in the waiting room that would not have been gleaned without having them engage in a process of making. This approach yielded the richest data into ED experiences.

4.5.2 Method

In preparation for this sub-study, two styles of co-design workshops were prepared. Between June and September 2018, four co-design sprints were held with 22 different ED staff: nurses, clerks and physicians within Cabrini ED. These sprints lasted for approximately 45 minutes to an hour and were designed to replace the education hour made available to nurses at the end of their shift. These sprints worked well as a quick 'in and out' and suited the fast-paced work style of ED staff. While this study was aimed primarily at nursing staff, we found that other staff in the ED – clerks, doctors and sometimes others such as orderlies – also attended the workshop.

Figure 4.7:
Sample of the props
used in the Co-Design
workshops



Both of the workshop sprints employed deliberately unfinished paper and wooden props, supplemented by an array of Lego toys in various shapes, sizes and colours, to assist participants in materialising their ideas. Figure 4.7 presents a sample of some of the props that were used in the sprints. The sprints aimed to create an experimental 'playground' through which ideas about the future could be entertained and investigated (Sanders and Stappers 2012). The use of such low-fidelity props helped keep the study open, without constricting, formulating or restricting the discussion to what already exists. The act of making in this way proved to be a powerful method of assisting people to see what could be, of communicating a shared vision and of giving shape to the future (Sanders and Stappers 2012). As the 'things to-think-with' (Papert 1980), the props acted as a stimulus to trigger memory recall and enabled participants to materialise their personal thinking and open up conversations about individual and group experiences of staff in the ED, as well as connecting all participants to a common ground. The combination of fixed props with other flexible materials – such as paper, card and tape – enabled participants to express ideas that they could not articulate in words and to discuss contemporary problems in a new way. This tactile, haptic approach to the design of each co-design sprint assisted in uncovering points of contention and consensus, and ideas worthy of exploration that had not been raised directly in the literature.

The prototyping workshops and designed tools assisted in helping staff to discuss issues and tensions within the waiting room. The investigation conducted enabled the authors to unpack the issues and tensions within the EDWR and explore how these challenges might be addressed in the future.



Figure 4.8: Image of the blank EDWR, with the props on hand to enable participants to 'prototype' their version of the EDWR.

4.5.3 Workshop #1: Prototyping the Emergency Department waiting room

The co-design sprints asked participants to prototype – using low-fidelity materials such as paper, card and Lego – an EDWR in response to three provocations: the 'worst' waiting room they could possibly imagine, the 'safest' and the 'best'. Participants were asked to do so onto a blank 'gameboard' that depicted the architectural boundaries of the EDWR. Figure 4.8 presents this setup, and the provided props, prior to the arrival of participants for a workshop.

While participants made fantastical, humorous and critical objects (Figure 4.14), they drew inspiration from real waiting rooms and front-end operations that they had experienced in their working lives, both at the hospital they currently worked at and where they had worked previously.

4.5.4 Workshop #2: Mapping the patient journey

This co-design sprint asked participants to map a typical patient journey from the moment of health incident to when that patient was discharged from the ED. Participants were asked to do this in response to a persona character using a range of blank 'game cards' (Figure 4.9). This resulted in a paper journey map which was annotated with commentary by participants; this map is presented as a finding in Subsection 4.7.1. This sprint uncovered points of contention and confusion in the service journey, as well as facilitating conversations about what a future service journey might look like.

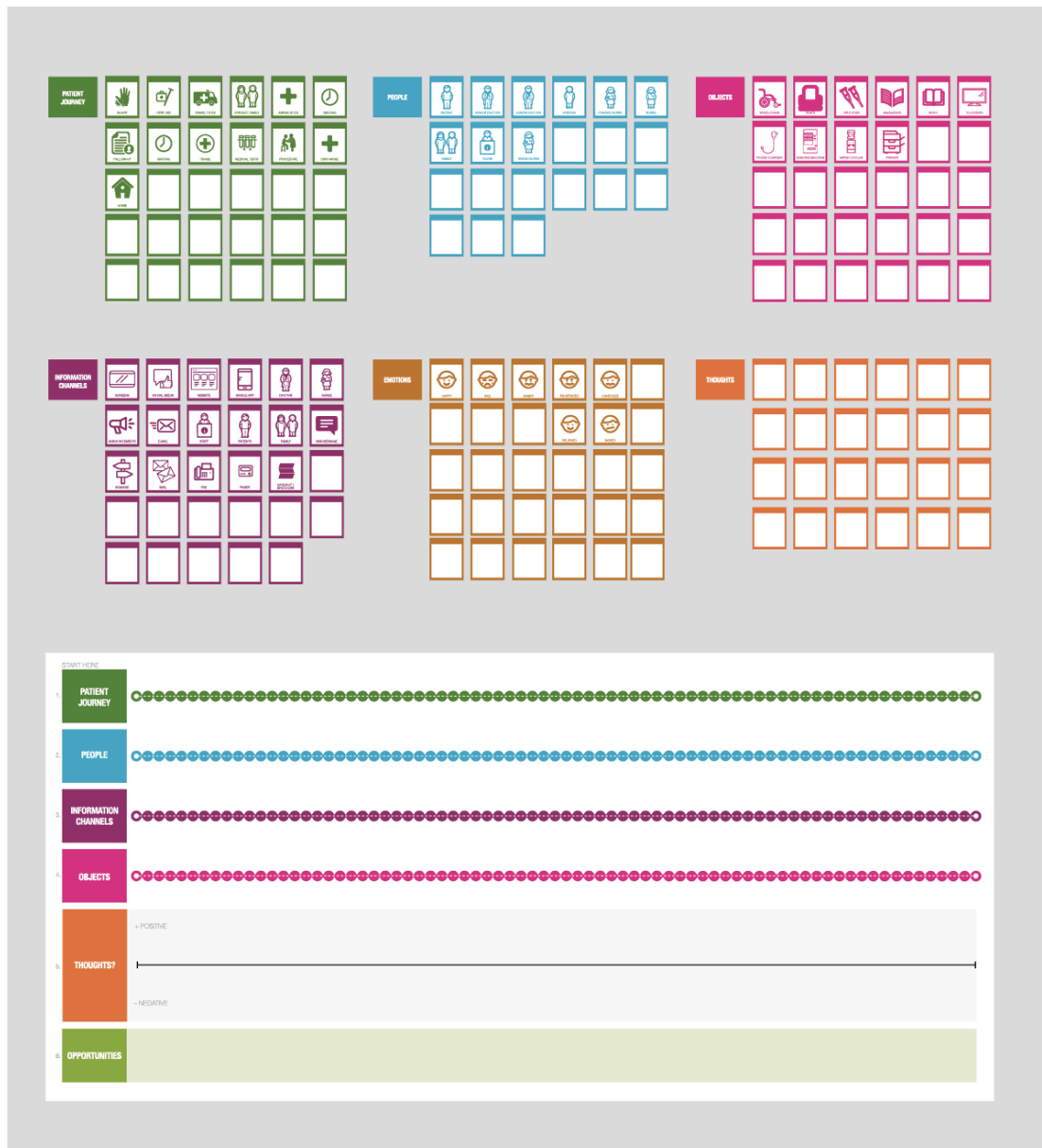
4.5.5 Limitations

While co-design proved to be a compelling and powerful method through which to investigate ED experiences, and perhaps yielded the richest data of any of the sub-studies presented in this chapter, it was not without its own set of limitations.

Figure 4.9:

Images of the 'cards' and 'gameboard' designed for use in workshop #2.

While some of the cards provided prompts for participants, most cards were left blank so that participants could draw their own responses to communicate the patient journey.

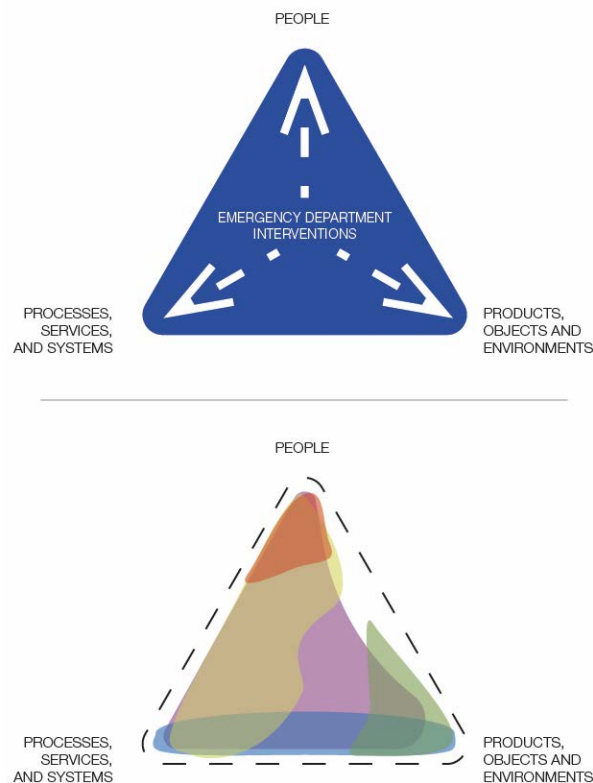


As Malpass (2017) contends, co-design aspires to empower all participants as 'creators' at the very centre of the design process, but is also a tool to help build relationships between designers and the community that is being designed for. In this way, co-design is not just a method to understand end-users, but also has a political dimension of user empowerment and democratisation. It became clear early in the study that the frontline staff – nurses, clerks and some clinicians – had little time, energy or interest in contributing to co-design activities to imagine future EDs. It was not until the sprints occupied the nurse education hour that many participants actually gave their time. Indeed, this study was predicated on interrupting the normal workflow of nurses and replacing their education hour with this research activity. While participants were not coerced into participating – and had the option of leaving their shift early rather than participating in the research activity – they only participated when this study formed part of their everyday routine. Cultivating staff buy-in to the project – especially when staff expressed that they did not understand or value the research approach – was a major challenge and limitation.

Another major limitation of all three sub-studies described in this chapter is that all were conducted solely at Cabrini ED, which is a very small part of the large Victorian health system. While informal visits to other EDs in Melbourne were conducted, gaining access and approval to conduct formal research activities elsewhere proved to be impossible. Future research should endeavour to replicate this investigation at other ED sites in Melbourne and beyond, and more actively include patients in the co-design process. These results should be interpreted as exploratory and should be repeated across multiple sites to further validate the findings.

Figure 4.10:

The data collection Framework, and how different data collection methods were employed to find convergence and validate findings.



4.6. The results

The results from the investigations concerning the EDWR can be summarised into five categories:

1. The ED patient journey
2. Defusing intense emotion
3. Safety in the waiting room
4. Privacy in the waiting room
5. The role of technology in the ED

Raw data in the form of participant quotations are presented in the following subsections under these categories. In support of these fragmentary transcribed insights, a series of photographs taken in the EDWR (study 1) and images from the co-design sprints (study 3) are also presented.

As discussed in section 4.1, the approach to data collection in this investigation aimed to triangulate findings across multiple data collection techniques in order to determine commonalities. (Flick, 2004, 178) describes triangulation as a term from social science research that is used to refer to the observation of the research issue from (at least) two different points. Triangulation is applied here as a validation strategy, and is used to validate inferences discovered in the coded qualitative data. Figure 4.10 presents how these different data collection methodologies overlap. The findings described in this results section are common themes that emerged from different data collection techniques.

The Emergency Department patient journey

There can be a whole range of things from not being able to get a car park, but more particularly it's about who you're working with. Emergency department, ED work is part of a team generally. If you've got a great team it's a great day, if you've got a lousy team it's a bad day. That starts from triage to the doctors you work with to can you get beds to ... So there's a whole many things that go into that.

— Consultant Doctor

I just try and keep an open line of communication, talk to the staff, get things rolling and think of it as a team sport.

— Consultant Doctor

... Because our job is actually more than just directing traffic and flow. It's about making sure patients are getting really good care.

Patients are getting safe care.

— Triage Nurse
(Nurse Manager)

You come on in and at 4:00 and there's six, seven waiting and have been waiting for some time. Not a lot done. Fuck, so it's head down, bum up until 8:00 and all sorted and you get on. So they're the kind of frustrating bits right?

— Consultant Doctor

So a good work day at work can be multifaceted. A good day at work you're thinking about flow. It could be that things are flowing, that we've actually got less access block than usual

— Consultant Doctor

If I'm able to complete the history and the notes so the nurses can read it and tell the patients what I'm going to do and order all the things and work on their immediate medications. Then there's this bundle of stuff for each patient that can then be managed by everyone else and book the bed.

[...]

Okay, 50% of that is a nursing task. Now I can do that.

— Consultant Doctor

I think they view the emergency department as a place of caring, as a way to get into the hospital. [...]

I think patients see it as a safe place I think.

— Consultant Doctor

I think the most important thing that an emergency department needs to be is to meet its goals of caring.

— Consultant Doctor

Emergency departments aren't there to look after people for long

— Consultant Doctor

So some shifts don't always look like that because we've got staff that are just task-orientated. They're just coming in and you need a drip, you need lines, you need pain relief, you need antibiotics. And they don't engage with the patient. So a good shift for me is where all the patients are happy.

The staff are happy. They feel like they've worked as a team

— Nurse Manager

[...] everyone's rushing, you know, rushing to go to cath lab so they don't get to ask questions and get their questions answered, so they just lay there in the trolley, **"Am I gonna be okay? I'm having a massive heart attack, oh God."** You know?

— Nurse

If you want to talk about interruptions to work flow, they're, for an emergency physician, they're multifaceted with probably **the busiest and most multitasking area of medicine**. So busiest is the wrong word because everyone believes that they're busy. But they're most simultaneously juggling quite a bit of doctors.

— Consultant Doctor

So like information, letting them know exactly what's going on with them rather than them sitting in the trolley wondering what the hell is going on with them. Sometimes you've just gotta be honest, "You're this sick," you know?

— Nurse

Well people are in ED sometimes not this one, but family members in for eight hours so they need somewhere to go.

— Nurse

I think if they're waiting for a couple of hours they're going to want to be comfortable.

— Nurse

But when I'm at triage I look at the time and it says like 20 minutes, I always tell them, "Look, it says 20 minutes there, this patient has been here since 12:40, it's now 1:30, they're still waiting to be seen. That's just an estimation", it's about communication at the end of the day.

— Nurse

4.6.1 The Emergency Department patient journey

The patient journey through an ED is a unique part of the healthcare system in that it is transient; patients are not meant to spend extended periods of time in the ED. In studies 1, 2 and 3, it became apparent that the flow of the ED from the waiting room – that is, how many patients are progressing through the system – is an informal indicator of performance in the ED. When the ED is not flowing, stress is exacerbated for patients and staff alike. The waiting room is an important part of the ED when both the ED is flowing and when it is not. Unlike upstream waits in the ED – such as waiting for a bed on a ward or medical imaging – the EDWR is the only part of the department that is 'elastic' – meaning that it is the part of the department to first fill when demand is greater than available supply. This overflow of people – which can be a combination of patients, carers and visitors – places additional stress on ED staff and the EDWR, which can further exacerbate wait times and negative waiting experiences.

A consultant physician articulates what makes a good day in the ED:

A good day at work you're thinking about flow. It could be that things are flowing, that we've actually got less access block than usual

While an episode of acute illness is experienced individually, a visit to the ED is rarely an individual activity. In our investigation most patients visited the ED with a 'carer' – a spouse, friend, sibling, colleague or other – who could assist them on their individual journey. The observational study revealed that the feeling of not knowing what was going to happen next was a significant stressor for patients and was also a cause of anxiety for those accompanying patients to the ED. Indeed, on a number of occasions it appeared as if there were more carers and visitors than patients present in the EDWR. ED staff confirmed this inference in studies 2 and 3.

In a workshop mapping a fictional patient's journey throughout the ED (Figure 4.11, Figure 4.12), staff noted that critically ill patients would rarely be asked to wait and would instead be rushed into the inpatient department. Family members and carers who could not accompany the patient bedside, however, would await news and updates in the EDWR. The emotional intensity of waiting for a loved one undergoing critical care can be more unsettling than actually waiting in the EDWR with one's own injury. While a private family room was often provided by ED staff to families, this was not always the immediate priority on a patient's arrival and often the individuals immediately accompanying the critically ill patients were forced to wait. Studies 1, 2 and 3 all confirmed this inference and validated the notion that the waiting room is not just about patients – the EDWR plays an important role for carers and other visitors when they come to the ED.

Defusing intense emotion

But I feel like if you've got tea/coffee making facilities in there, all these people are going to go in there and be like, "Oh my god, tea and coffee."

— Nurse

The patients have died and it's been sad and you think ... Last week, Easter Sunday, was such a sad shift. I went home feeling like gutted because we just had so many young ... You know, a 40-year-old with cancer. And that for me wasn't a really nice day at work.

— Consultant Doctor

Even though inside you're like, "Wow this person's really sick." You just act calm. "Okay, well I'm gonna walk you through now."

[...]

Pretty much the less detailing in the triage notes, the more sick the patient is.

— Triage Nurse

My patients can't always cognitively tell me what you'd think was an easy question of which three pills he's supposed to take every day.

They've got no idea.

— Consultant Doctor

With a TV and a few couches and because we are a big family, as you would know, you would be a big family if someone was dying, we would take turns to go into the actual room, but we would all be there from the typical family or for moral support, in that room. In ICU, you know the rooms around the corner from the ICU, there's a TV, couch,

— Clerk

And if you want to let your family know, your other half if you have one, then now's the time to say my whole day's written off.

— Consultant Doctor

"I'll get you a coffee." But sometimes it's not a priority. If you could say, "Go help yourself to the tea and coffee in the corner that'd be actually quite good."

— Triage Nurse

If I was there any longer, I probably wouldn't ... I might lose my empathy. Because you're dealing with ... some of the stuff that you're dealing with will drive you crazy.

— Nurse Manager

Think about why they're yelling. **Are they terrified, paranoid, in pain?** There's a difference between **someone yelling and freaking out because they're yelling and freaking out**, and being rude. That's the big difference

— Nurse

Nurse 1: Compassion.

Nurse 2: Empathy.

Nurse 1: Respect.

Researcher: So why those words? Why those words?

Nurse 1: Because not enough of it is given in these situations. Everyone's stressing.

— Workshop 4

The amount of time that you'll get relatives that'll crack it at you because their wife or husband or mother or whatever, yeah, hasn't had anything to eat or drink, and you'll like, well, **it's not our priority, really.**

— Nurse

Which is a bit shit when the café closes so fucking early here and patients and families have nothing to eat.

— Clerk

In the ward. Magazines in with the family while they're waiting to go to cath lab, or while they're waiting for her to finish up at cath lab. Yeah.

— Nurse

People get burnt out very quickly in ED, because it is really physically hard work. You're on your feet the whole shift. The turnover is really high, so you can be dealing with, like if you're in the cubicles, you could have 12 patients on that shift. And that's a lot of work.

— Nurse Manager

Researcher: How do you find family when they come to the ED?

Nurse 4: It's hit and miss. Some are okay, some are ...

Nurse 1: Anxious

Nurse 4: Yeah.

Nurse 1: Most anxious.

Nurse 4: At the triage they're still very anxious.

Nurse 4: Once you get them in, and stuff started, they calm down a bit.

— Workshop 2

And it's a distraction, for most people. You know, if you've come picked your mum up because she's fallen over and she's sick, and you haven't had anything to eat all day ... you're hungry, so it a pack of chips could save you

— Nurse

Just to help kind of brighten up the area. **Cause a lot of people sit in the waiting room and it's a very negative experience, in relation to, like, they're feeling like crap and they're sitting there waiting.** There's all these sick people surrounding them. Brighten it up a little bit.

— Nurse

"Anyone who enters an emergency department should have first on view of the triage nurse."

— Nurse

So, if they're distracted, it takes a toll off their waiting time and about they're ... and they're also anxious, and worried, and it's just a way to calm them down.

— Nurse

We actually did that at <hospital>. We put a big TV on the wall, because there's such huge waits there. So we had triage here, and clerical. And we put the seats like that. And we had video surveillance. So that people weren't watching other people come in, and getting taken through and everything. **They actually had something to focus on.**

— Nurse

I reckon doctors tend to freak out more than us when it comes to triage.

— Nurse

I thought that would actually work really well. They come in, see the triage nurse, the clerks are right there. They can actually be doing stuff together, 'cause the clerks come here

— Nurse

Whereas you just learn to be cool, calm, and collected at triage.

— Triage Nurse

if someone talks with you, or you haven't had anything to eat or drink, you know ... maybe a cup of tea or something ... you can always think about that sort of stuff. And it's just ... it does distract them, and it also stops them from talking at all the staff and what they're doing.

— Nurse

Yeah. I know we don't like it, but there's other times and systems where it's been good, and done well and people can see, oh they have FAQs. People need to have a screen for that kind of information

— Nurse



Figure 4.13:

Image from workshop #1. Co-locating triage and registration next to the front door in order to simplify the experience for patients and visitors.

4.6.2 Defusing intense emotion

An urgent visit to the ED can be a deeply unsettling experience and is often accompanied by a myriad of intense and diverse emotions. In a workshop mapping a fictional patient's journey throughout the ED (Figure 4.11), staff mapped an interrelated raft of emotions that a patient and carer might experience. In study 1, it appeared that this intense emotion was highest at the start of the patient journey – in particular, immediately prior to walking through the ED front door. The processes at the ED front of house – triage, registration and the waiting room – play a vital role in managing and calming this intense emotion in patients.

In study 1, we recorded the significant role that the triage nurse plays in settling and calming patients when they arrive at the ED. In study 3, this point was further validated as staff construed 'caring' and 'welcoming' caricatures which they believed would help 'settle' patients. Figure 4.14. presents such a caricature, prototyped by an ED staff member, to be 'welcoming', 'caring' and 'loving'. The idea was that the presence of people – trained medical professionals – is essential to ensuring that patients feel attended to and calm.

To deal with this emotional intensity, the EDWR is usually equipped with the tools to 'distract' patients and carers from the experience awaiting them. These tools often take the form of magazines, books, newspapers and television screens. In our investigation, we found that these

Figure 4.14:

Sample of the objects made by workshop participants.

The lego character represented a 'friendly' triage nurse



tools of distraction usually had little impact when it came to mitigating the anxiety of waiting. In Studies 2 and 3, ED staff confirmed this interpretation, claiming that the EDWR was a 'dull space' in need of 'brightening up' and being made more engaging.

In this investigation, it appeared that the inclusion of media distraction – televisions, magazines and play areas for children – proved inadequate when it came to settling patients and carers in the EDWR. In the literature, these 'positive' distractions are intended to afford a diversion from the stress associated with a visit to the hospital and are therefore valued for what they prevent (Huddy 2016). In contrast to the literature, this investigation seems to suggest that this approach of distraction does not work in the context of the ED, where emotions are higher than elsewhere in healthcare. As Subsection 4.8.1 illuminates in more detail, there is an unaddressed need to defuse the intense emotion in the EDWR that is being experienced by patients and visitors. The call to action for design in this context is to create an EDWR and associated systems that defuse intense emotions, provide reassurance and help patients understand the journey on which they have embarked.

Safety in the waiting room

I feel like maybe having like the Peds mixed in with the adults public like mental health and drugs and stuff. You probably want to separate the Peds from the adults.

— Nurse

Well, in our department, but no so much ... patients can get pretty violent. It's like, to save you, from ... protection. I think more like violence. [...]

Yeah. I think it is. Not from a patient's perspective, perhaps, but, it's like a reality, it's unavoidable that people are violent now

— Nurse

Something dividing but not blocking. Although when they have ... describing it feels unsafe, but, I feel like there's like ... wiring or something in front of you but you can see through it. To block. So people can't lean over

— Nurse

Just the old ladies yelling at you, saying it's their turn, don't you let them ...

— Nurse

Researcher: **So, do you think security makes people feel safe in the waiting room? Does it make you feel safe as staff?**

Nurse 3:

No.

Nurse 4:

No.

— Workshop 1

And, as a sick patient, I prefer to be lying on the trolley in the corridor than sitting neglected in a waiting room, personally.

— Nurse

Because, I think a lot of people actually get really, really, really annoyed and angry. Coming from a public hospital system, if they see a security person close by, they actually get really angry. It just heightens anger. Because they just wanna pick a fight.

— Nurse

We'd get a lot of the crazy drunks, and the, you know, ones on drugs, and all that sort of stuff. Whereas in public, like, I used to work up in the hills, and so you get all the ice people and you get all the Schizophrenics and a lot of the mental health that can be scary.

— Nurse

No one should have to come to work and feel unsafe.

— Nurse

From a hundred year old is different, to a fifty year old person on ice.

— Nurse

More than anything, can I tell you that I hate those glass panels ... those glass partitions. The places that **I've worked at with glass partitions, are the places where they've punched and spat, and yelled abuse.** So, all the years at <Hospital> that I've worked, we did not have a glass partition. And I was never abused like when I went to <Hospital> that has glass partitions. **There they were spitting, punching, yelling abuse, because they felt that the barrier made it okay to do so. And we've never had that here, because we've never had a partition here either.**

— Nurse

And the longer patients are in an Emergency Department, the worse the outcomes are, as well

— Nurse

Nurse 1: Possibly, it depends, like, for example, we're going to open a whole new ED. Are we going to grow the waiting room to help that? Are we going to put on a second triage nurse to accommodate it? Are we actually going to change the whole process? If you leave the process as it is now, and just add more beds, all it's going to do is congest.

Nurse 4: I don't think bigger necessarily means better.

— Workshop 2

"Violent patients could be hiding behind one of those beams and could jump out at you."

— Nurse

Probably a combination of factors, like being on drugs or alcohol and then they've lost their inhibitions, and they're just plain violent, or if it's brought on by fear and things like that. But, again, it's hard to excuse it.

— Nurse

Reassurance. You're okay. This is post op when she's sleepy.

— Nurse

That's the other thing with triage that we have now, is that the department can't see you, either, so if you do have an irate person out there that's ... no one can see you. But if you had a desk that you could get out there and there, it would be fine.

— Nurse

Because they don't know what to bloody do. They don't know ... They're not trained to ... I don't even know why they have security guards in this hospital, because they're not trained to deescalate the situation or anything like that.

— Nurse

That's the other thing with triage that we have now, is that the department can't see you, either, so if you do have an irate person out there that's ... no one can see you. But if you had a desk that you could get out there and there, it would be fine.

— Nurse

We're not supposed to, but the amount of times we've had people that were quite aggressive last year, and actually one of the anums tackled to the ground.

— Nurse

And by the way, most of the aggressive patients will be the elderly as well. Superhuman strength. [...]

Like they have no idea how they can't pull themselves up the bed, but they can break your f***ing arm.

— Nurse



Figure 4.15: Images designed by ED staff as to the 'worst' EDWR they could imagine. A crowded waiting room was often the designed response when ED staff where asked to create the 'worst' EDWR they could imagine.



4.6.3 Safety in the waiting room

It seems obvious that a feeling of safety is an important component of the provision of urgent care, but the conditions for creating safety in the EDWR are complex, multifaceted and transcend just the physical parts of the space. Indeed, safety in the context of the EDWR refers to both how the EDWR can support safe and effective medical care, but also how the EDWR deals with episodes of concerning behaviour and violence from patients and carers. An episode of violence from one individual can have far-reaching impacts on the feeling of safety for other patients and impact on the wellbeing of staff in their workplace.

This investigation highlighted that a crowded EDWR is a dangerous EDWR. When participants in study 3 were asked to prototype the most dangerous waiting room they could imagine (Figure 4.15), each workshop designed the same – implying that staff considered the attributes of the worst waiting room to be danger, confusion and chaos. Staff advocated that large open spaces at triage, registration and in the waiting room are best, where staff can see all patients and feel in control of those waiting. Staff also acknowledged, however, that large spaces make moments of privacy difficult and articulated a need to create spaces-within-spaces for intimate or confidential conversations. This tension between privacy, preventing episodes of violence and patient comfort prompted rich discussion in the workshops.

Throughout this activity, staff discussed their experiences with violence in the ED:

but, it's like a reality, it's unavoidable that people are violent now.

– Nurse 1, Workshop 2

Probably a combination of factors, like being on drugs or alcohol and then they've lost their inhibitions, and they're just plain violent, or if it's brought on by fear and things like that. But, again, it's hard to excuse it.

– Nurse 1, Workshop 2

and

Nurse 1: And by the way, most of the aggressive patients will be the elderly as well. Superhuman strength.

Nurse 3: Like they have no idea how they can't pull themselves up the bed, but they can break your f****ng arm.

– Workshop 3

Through this discussion, staff expressed that the motivations for episodes of violence in the ED were multifaceted, but linked feelings of anxiety and confusion as contributing factors. Many had experienced episodes in their current workplace and elsewhere during their careers. Staff articulated that they felt these episodes were most prevalent at the start of the ED journey – particularly in the EDWR and at triage. Staff linked the causes of violence and agitation to a heightened emotional

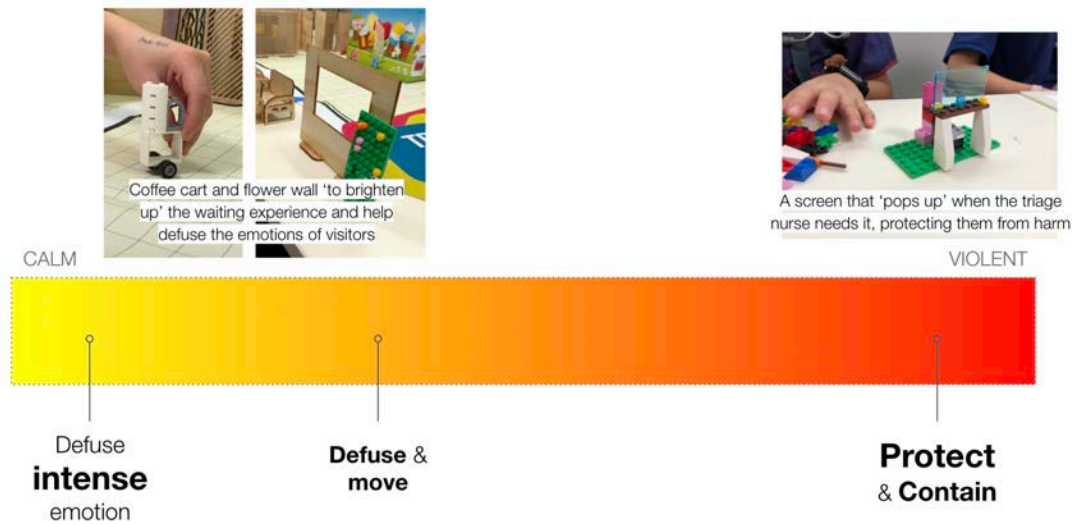


Figure 4.16: A diagram illustrating how different design interventions might be used to defuse episodes of violence in the EDWR, from proactive initiatives to reactive, such as a 'pop-up' screen at triage – like in a bank. Prototyped by an ED staff member. Diagram of 'calm-violent' redrawn by author from (PearsonLloyd, 2012).

state and that all individuals – from teenagers to the elderly – could behave violently. Staff articulated feelings of agitation as a spectrum that built over time and that patients would first present as agitated or confused, before escalating into some kind of violence. Feelings of anxiety, confusion and 'not understanding' were listed by staff as contributing factors for violence. While episodes of acute violence were not observed in this investigation, feelings of anxiety, confusion, misunderstanding, annoyance and frustration were observed in patients.

In study 3, participants built prototypes to address this challenge of creating safety in the EDWR against the spectrum of violence. This is mapped in Figure 4.16, showing staff prototyped interventions that addressed both the psychosocial factors that contribute to agitation and violence – such as anxiety, confusion, feeling unsettled – as well as the physical attributes of the environment required during violent episodes. One nurse prototyped a pop-up screen that could be fitted into the triage desk, with the purview that it would pop up to create a barrier when violent individuals presented. Through conversation, it became apparent that staff needed to feel as if they had an escape route or something they could do to maintain control of a violent situation.

Privacy

I like having the work area behind everything else. These don't have to be solid walls, doors and things.

— Nurse

Your family member's dying, we need you to leave and go to family room.

— Nurse

Yeah, it's like a bubble around. So it's like perspective bubbles. So, you're not ... it's not fully enclosed, but it's enough to keep the noise out. So you're talking to the clerk or the nurse, and you're talking directly. So it keeps out the external noise when you're speaking. And it stops it from going everywhere

— Nurse

And if you've got family but cubicles are small, could you please wait outside and we'll come and get you, and then if there's some way they can sit around a table then ... Have the discussion about what's going on in ...

— Nurse

I feel like privacy issues would be with the cameras, in saying that, Royal Melbourne has cameras, which I do like.

— Nurse

As long as there's some privacy for here. 'Cause that's where there are problems at the moment. We don't have any, when we're registering patients. They all come in ... when registering ... they all come and look about

— Nurse

This is not a family room. It's a sensitive topic space. If someone's coming in with sexual assault, then they need privacy.

— Nurse

4.6.4 Privacy in the EDWR

Once in the EDWR, study 1 observed the behaviours of individuals awaiting treatment. In this study, it was observed that individuals like to 'claim' and 'define' their own part of the EDWR. As a public, open space, the EDWR is made up of a series of chairs arranged around the perimeter and clustered throughout. Individuals would then define a space by leaving objects – such as a coat, bag or personal belonging – on an adjacent seat to signify that it was occupied. This behaviour of 'micro-nesting' in the EDWR seemed to be an attempt to create a moment of privacy and intimacy, and avoid having to share an adjacent seat with an unwell stranger.

The theme of privacy in this investigation refers to both visual and acoustic privacy, which is a design challenge for the open nature of the EDWR. Creating moments of privacy in the EDWR is a compromise with patient safety and in study 3, staff hypothesised about how this tension might be addressed to create privacy in the EDWR in the future:

Yeah, it's like a transparent bubble around triage, but it's enough to keep the noise out. So you're talking to the clerk or the nurse, and you're talking directly. So it keeps out the external noise when you're speaking. And it stops it from going everywhere.

– Nurse 2, Workshop 2

Staff aimed to create visually connected but acoustically separate spaces within the EDWR. In doing so, staff hypothesised that they would enable spaces where confidential or sensitive discussions could be had without disturbing other patients awaiting treatment. Figure 4.17 shows such a space in the EDWR. Staff hypothesised that such a space could be flexible and accommodate different users with different needs. As one nurse articulates about the Figure 4.17 prototype:

This is not just a family room. It's a sensitive topic space. If someone's coming in with sexual assault, then they need privacy

– Nurse 4, Workshop 3

Building upon this notion, a clerk within the same workshop reflected on her own experience as a carer supporting another patient through end-of-life care in an ICU and how the EDWR does not afford the same privacy in moments of such emotional intensity:

With my father, with the family member dying, they had a family room like that. [...] With a TV and a few couches and because we are a big family, as you would know, you would be a big family if someone was dying, we would take turns to go into the actual room, but we would all be there from the typical family or for moral support, in that room.

– Clerk 1, Workshop 3

Figure 4.17:

A multifunctional private room within the EDWR, separated with transparent dividers.



Additionally, it is not just patients who often require more privacy in the waiting room to ensure their wellbeing. As articulated by a doctor about family who were waiting in the EDWR;

The other day I was working there was an old guy in his 80s who had metastatic cancer of the bowel I think. He came in with chest pain and abdominal pain. So he got put into RESUS. I had a brief look at his notes and the nurses were about to start attacking him with IVs and things. I said, "Hang on a minute. What do you mean?" I said, "This guy could be ... God may be calling and we may actually need to give him some morph." So I spent 10 minutes looking through his notes, chatting with his family and it was clear that he was in palliative care at home and he was dying. Prolonging his life with an IV wasn't the smartest thing in the world.

– Senior Doctor, Empathy Interview

How to balance acoustic and visual privacy for patients and ED staff remains a persistent challenge for EDWR design. What is clear is that the EDWR design is a question of compromises – how the contribution of design features balances safety and privacy while providing a calming environment for patients and carers. In this investigation, it seems that the use of flexible, transparent barriers can be applied in the EDWR to maintain both confidentiality and connection to patients.

The Role of Technology in the Emergency Department

The writing it all down I've proven with my work **is 30 to 45 minutes**, which is just crazy. But the synthesis part might be **five minutes**.

— Consultant Doctor

My usual day is 90% of the time I can't do what I'm supposed to be doing. So I struggle with processes not working and I struggle with interruptions

— Consultant Doctor

Being in the 21st Century and essentially having a paper record, particularly for nursing staff is kind of old world.

— Consultant Doctor

Without a prioritizing filter. A prioritization filter would help tremendously.

— Consultant Doctor

Yeah but like, you're like, oh I need a pain relief. As opposed to I'd like some morphine and a bed pan and a cup of tea, thanks.

— Nurse

Now in the process of all of those steps, I'm repeatedly interrupted. I take systems that require me for each of those to look in 12 different places and might be six different systems. There's a different system for pathology, a different system for ordering imaging and finding imaging and looking at images. There's a different system for pharmacy and different tasks for booking a bed and so forth. So I'm continually interrupting myself with **going from one system to another**.

— Consultant Doctor

So I am, could do with any way of doing that more sensibly and design fixture that would help with minimizing interruptions

— Consultant Doctor

I decided a long time ago I would burn out of emergency medicine if I got upset by all the processes that didn't work, that weren't of my creation

— Consultant Doctor

I'd like to see efficiency. I'd like to not see duplication or triplication.

— Consultant Doctor

You could have 12 patients in the waiting room that, as the triage nurse, you're technically responsible for at the moment. But you're also getting new ones coming in all the time, and so it's hard to keep track of what's going on in there

— Nurse

I know you're never gonna get rid of the manual handling from nursing, but it's still an absolute disgrace

— Nurse

Mine's a video camera, because I think it's unsafe out there, from triage that you can't see your patients. One time I accidentally a lady out there for ages. I thought that she had gone through, and then I heard someone call her, and I thought, "Oh, my gosh. She's still there"

— Triage Nurse

We need to try something different, because what we're doing now is not great.

— Nurse Manager

Paramedics have those awesome strikers (trolleys) and, you know, why don't we?

— Nurse

If we had a screen of who wants what, you can say, oh okay well we'll do this and this first and the ward assistant can come and help us with that. Or whatever.



Figure 4.18:
Images of triage area at
Cabrini 2018

4.6.5 The role of technology in the Emergency Department

Chapter 2 highlighted some of the literature concerning how technology is shifting urgent-care practice. This theme of technology and its potential for improving care experience and delivery was probed at length by participants in this investigation.

In study 1, a number of patients were observed using their own devices to communicate with family, friends and carers outside the ED – as well as searching for information as to their own condition. ED staff quipped – especially those who worked in triage – that the thing that people in the EDWR desire most are phone chargers. At Cabrini, this led to the implementation of a phone charger stand that individuals could use while in the EDWR. In study 1, it seemed apparent that many individuals were using their own devices to distract themselves from the EDWR experience, rather than using the provided media such as the magazines or televisions.

Observations highlighted that the ED is a cluttered space, with objects stored in makeshift spaces and locations. This approach saw technology – diagnostic equipment, portable laptop workstations and medical instruments – as ‘black box’ add-ons within the ED rather than items integrated into the wider environment. Figures 4.18, 4.19, 4.20 and 4.21 depict this clutter of objects.

Figure 4.19:
Images of the
EDWR at
Cabrini, 2018





Figure 4.20:
Images of the
EDWR at
Cabrin, 2018



Figure 4.21:
Images of the
EDWR at
Cabrin, 2018

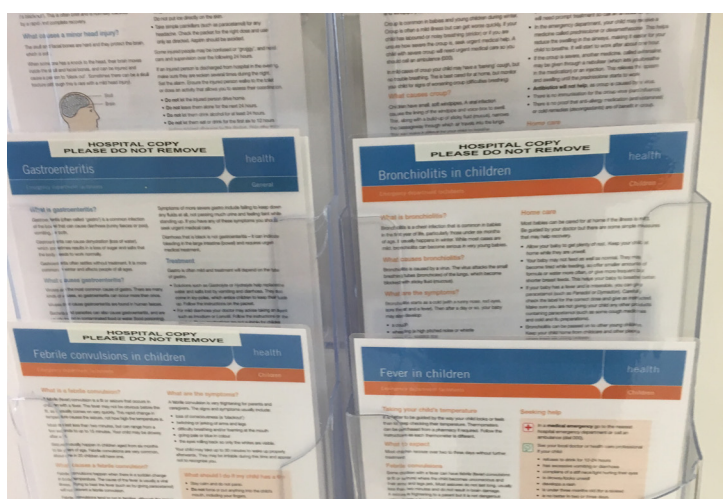
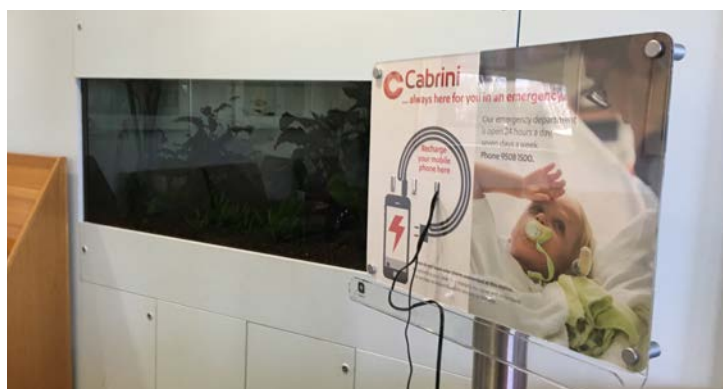




Figure 4.22:
Images of Emergency
Department doctors
station.
Cabrini, 2018.

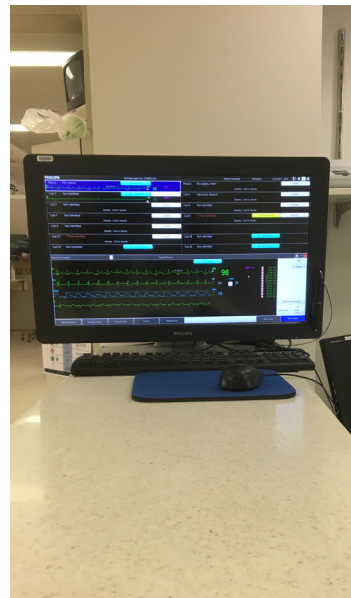


Figure 4.23:
Images of the
ED ward environment
Cabrini, 2018.

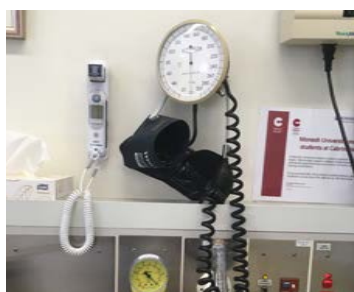




Figure 4.24:
A diagram illustrating
a digital interface that
patients might interact with.

Model by nurse
participant in Study 3.

The clutter in the ED seems to be in tension with the claims made by ED staff about how a crowded EDWR is a dangerous EDWR. While ED staff recognised that this clutter of equipment could inhibit workflow, no staff expressed that they could see a solution to the challenge. The problem was not within the realms of healthcare practice or EDWR service design but, rather, a failing of the architecture in which the ED operates. This supports the design recommendation that the inclusion of technology into the ED should be considered at spatial and architectural levels – and that technology should be made ambient in the EDWR, built within the existing furnishings and infrastructure, rather than as an add-on.

Throughout this investigation, multiple staff alluded to the potential of technology to support medical workflow and assist them in balancing the multitude of tasks required of them on any given shift. This request was often split into two themes: assisting ED staff with the physical tasks of the day – movement of patients, transporting medical equipment, distributing food – and assisting with the prioritisation of tasks – managing hospital systems, filtering urgent requests, managing administrative tasks. In doing so, staff claimed that technology would enable the most urgent priorities of patients to be addressed first. In one prototype, a nurse designed a system where patients could press a button to request what they wanted rather than the buzzer system that currently exists in most hospitals. Similar prototypes also appeared in other workshops. Figure 4.23 depicts their model and, as the nurse articulates:

But, then you can sort of, or even there's similar systems where they just press what they want. So you can see it on your screen that it's a bed pan request, or if it's like a pain thing, or whatever it is. So that you can sort of prioritize without seeing the patients.

— Nurse 2, Workshop 3.

4.7 Summary of research findings and the opportunity for design

Unlike a product design specification which often forms part of design practice, this table provides a framework to guide the design speculation. It is not a set of criteria through which to measure the impact or validity of the design outcome. Instead, it summarises and synthesises the primary research conducted in this chapter and provides insights for extrapolation in the SSD practice. Collectively, Table 4.8.1 presents the ideas and dreams for a future EDWR as articulated by ED staff.

Table 4.1:
A table summarising
the insights
determined for
the design of
ED waiting areas

Thematic from primary research	Research findings summary	Design recommendations / guidelines
The ED patient journey	<ul style="list-style-type: none"> A 'good' day in the EDWR is when patients are 'flowing' through the department and not 'stuck' in the EDWR. When the ED is not flowing, patients and visitors should be provided real-time feedback and information to understand what's going to happen to them on their journey. The EDWR is an important component of the ED for carers and visitors, not just patients. Literature and this investigation support the notion that a positive experience at the start of the ED journey is important. 	<ul style="list-style-type: none"> Provide mechanisms for patients and those who accompany them to receive feedback about what stage of the ED journey they are at and how long they can expect to wait. Facilitate a patient-led service journey, where patients can access information about each stage of the ED journey and what they can expect as they progress through the ED. Provide personalised interactions, media and context to patients, carers and visitors – especially those with a long wait time – as a way to occupy their time in the EDWR.
Defusing intense emotion	<ul style="list-style-type: none"> Emotions are highest at the start of the ED journey, usually just prior to walking in the front door. Triage, registration and the EDWR play essential roles in calming anxiety for incoming patients, carers and visitors. Agitated or difficult patients often behave as such due to the intensity of emotion they are experiencing. In order to calm these individuals, the EDWR and ED staff should be given the tools and techniques to defuse this intense emotion. 	<ul style="list-style-type: none"> The design cues for the EDWR should aim to defuse intense emotions and foster a 'sense of calm'. Design in the EDWR should aim to defuse intense emotion first and then distract patients by providing interactions that can occupy their wait time. This could take the form of personalised media entertainment or chargers for patients'/carers' own devices. Reinforce the notion through design of EDWR environments that medical care commences from when the patient arrives at the ED and in the EDWR, not just when the patient receives a place in a cubicle. The EDWR should also be able to provide information to patients/carers about what will happen to them. This should include their estimated wait time, what kind of treatment or procedures they might need and what will happen to them on their ED journey.

Safety in the EDWR	<ul style="list-style-type: none"> ▪ A crowded waiting room, is a dangerous waiting room. ▪ Feeling 'safe' in the EDWR is central to the provision of safe and effective care. Safety is important for all participants in the ED setting. ▪ A physical presence of security and/or the design of barriers in the EDWR does not necessarily make the ED feel safer for ED staff, patients or carers. 	<ul style="list-style-type: none"> ▪ Create open spaces where ED staff can remove themselves from potentially dangerous situations. ▪ Active monitoring – such as video or other technology – should be implemented into the EDWR so that deteriorating patients can be identified and then staff alerted. This active monitoring should also be utilised to notify ED staff and/or security of concerning, aggressive or violent behaviour. ▪ The EDWR should provide ED staff with the tools to defuse intense emotions and de-escalate agitated, confused or violent individuals.
Privacy in the EDWR	<ul style="list-style-type: none"> ▪ Acute illness is experienced individually, not together with others. In general, the co-location of other 'sick' individuals can exacerbate stress and anxiety. ▪ There is a lack of both acoustic and visual privacy in contemporary EDWRs. This can also exacerbate stress and anxiety in patients and carers. ▪ Occupants of the EDWR will attempt to 'micro-nest' and define their own space. Occupants do this by placing objects (coats or other belongings) to create their own waiting space. ▪ There is also a lack of private spaces in the EDWR that afford confidential or sensitive communication. 	<ul style="list-style-type: none"> ▪ Create open spaces that are divided using transparent, or semi-transparent, materials. Place dividers into the EDWR to create moments of privacy. ▪ Create opportunities for individuals to 'micro-nest' – create furnishings that establish boundaries and are flexible so that patients and carers can define their own space in the EDWR. ▪ Create multifunctional 'intimate' waiting spaces, separated within the EDWR, to afford visual and acoustic privacy for larger groups and individuals who require more privacy than the rest of the EDWR can provide. ▪ Create spaces where sensitive or confidential conversations can be had, whether they relate to 'comfort talk' for a patient or 'case talk' or 'social talk' among ED staff.
Role of technology in the EDWR	<ul style="list-style-type: none"> ▪ Technological innovation in the EDWR is well positioned to offer optimisations for ED staff, as well as providing a consistent reference point for patients and carers. ▪ Technology should be applied to optimise operations in the EDWR and front of house. This means assisting ED staff with physical tasks, as well as systems to manage, organise and prioritise work tasks. ▪ There is a perception that technology has not yet entered the EDWR, with many innovations that are now commonplace in other parts of the healthcare system yet to become part of the EDWR. 	<ul style="list-style-type: none"> ▪ Technology should be made ambient in the EDWR, integrated into existing furnishings and architecture (chairs, walls, benches) rather than as a 'black box' add-on. ▪ Technology should be applied to assist ED staff in prioritising tasks and managing their workload. ▪ Technology should be applied to unify and synthesise multiple ED processes to simplify workflows for ED staff. ▪ Wherever possible, moments of physical labour should be designed out through intervention.

4.8 Chapter conclusion

While previous chapters have set out to investigate ED experiences through the literature, this chapter has engaged with the environment through the lens of individual lived experiences. The chapter describes a series of sub-studies that have engaged directly with ED participants, collected stories and images of artefacts, and documented co-design engagements where ED stakeholders prototyped visions of future ED waiting areas. In response to the primary research question: How might speculative design research and practice inspire change for the problems facing the emergency department waiting room of the future? and subsidiary research #2: How can the speculative design research and practice on the emergency department waiting room be communicated to inspire change? This chapter makes a significant contribution to the overall study by providing a grounding from which speculative design practice might grow. It demonstrates a practical application of the first arc of the SSD framework as discussed in Chapter 3 and provides a platform for a speculation to emerge through design practice. While the speculation itself might be fictitious, the platform of insights collected in this chapter ensures that the outcome is informed by everyday experience in the ED and thus brought closer to reality as a result. How these insights are used as 'signals' to inspire design practice is discussed in subsequent chapters, which in turn lead to the major design project generated and disseminated by this study: a speculative vision of an EDWR.

Chapter — 05

Crafting the speculation; the design experiments

CHAPTER OVERVIEW —

This chapter outlines and visually documents the creative exploration and design experiments that formed the design outcomes, building upon the published literature discussed in Chapter 2 and the data generated through co-design engagements as discussed in Chapter 4. This chapter discusses both the craft and design of a speculative service journey for the ED and then the design of touchpoints – product, experience and communication design outputs – that support the speculative service journey.

DESIGN FICTION SUMMARY —

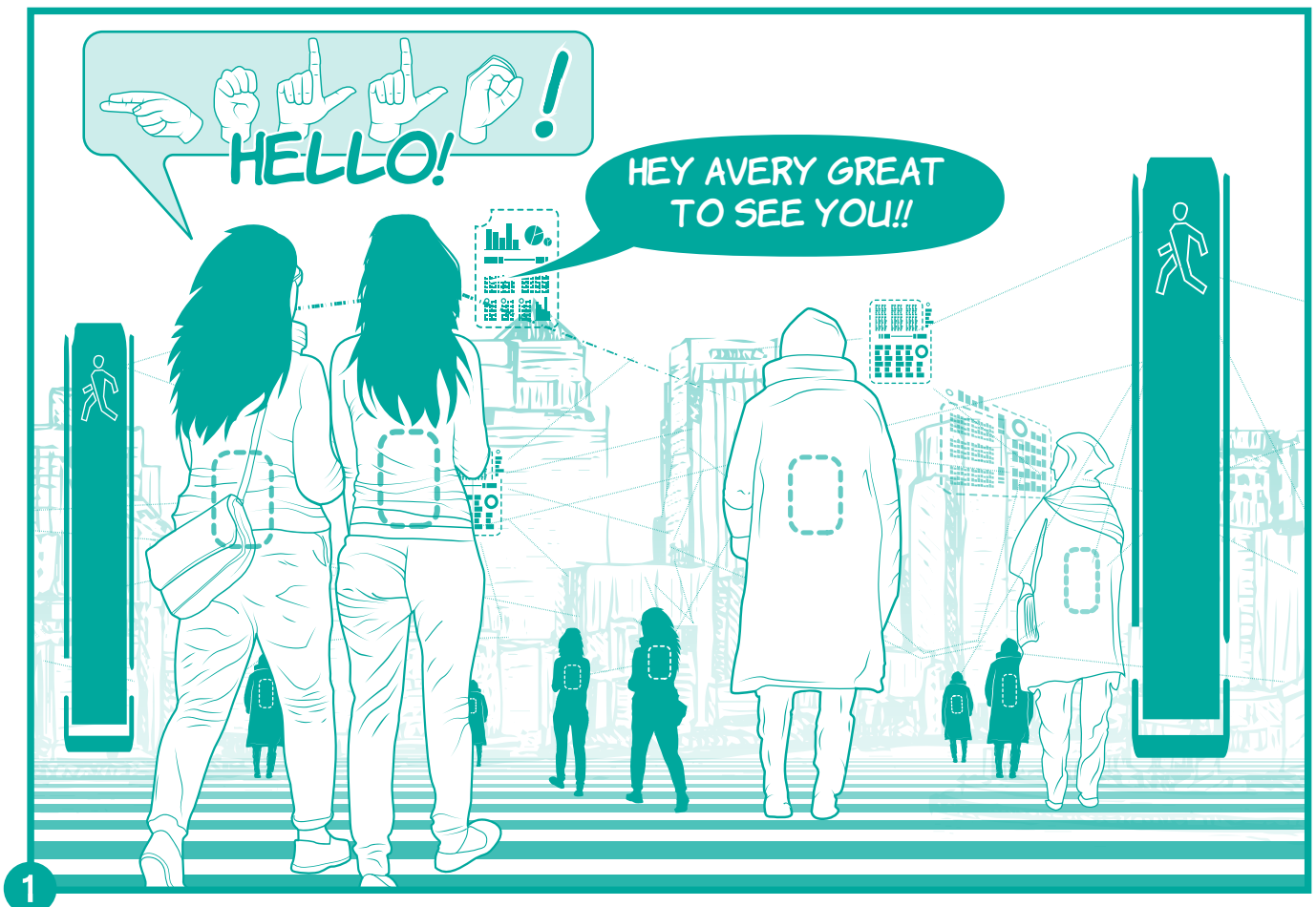
Ivy is in the waiting room with a close friend, Avery, who WAS having a great birthday. Unfortunately for her, after dancing on a bar, she took a tumble and hurt her leg. As her friend, Ivy took her to the nearest Emergency Department – Clearview ED. Right now, it's the early hours of the morning and both Ivy and Avery are bored out of their minds.

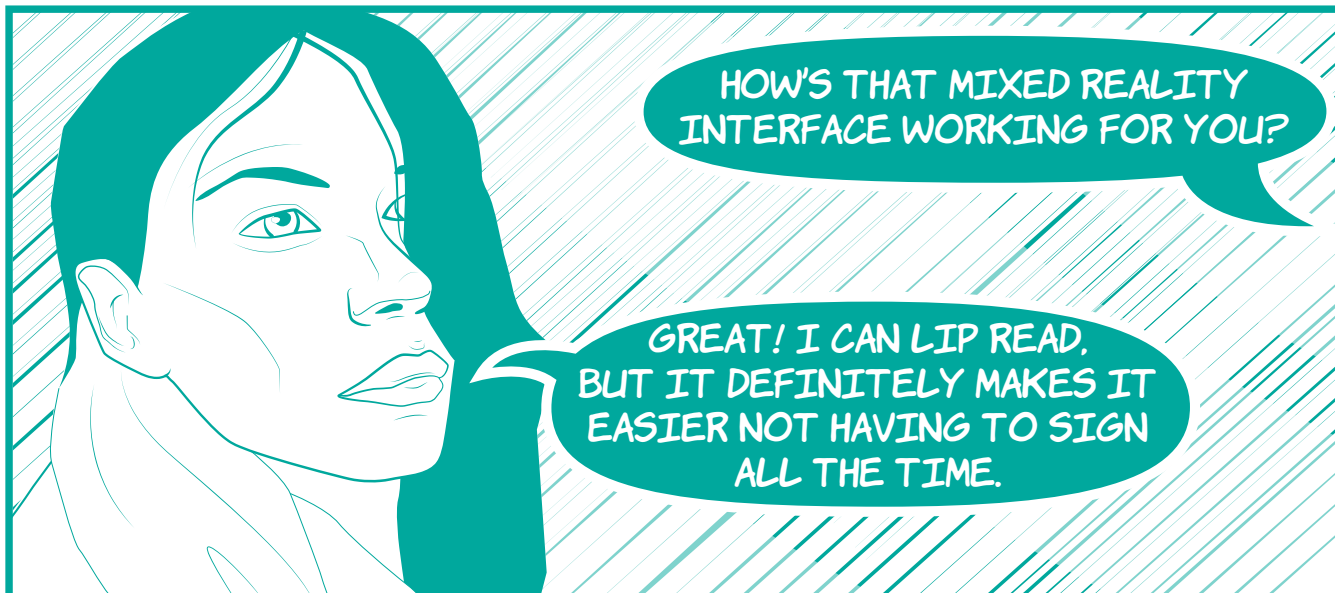
Key Thematic:

Dealing with boredom in the waiting room —

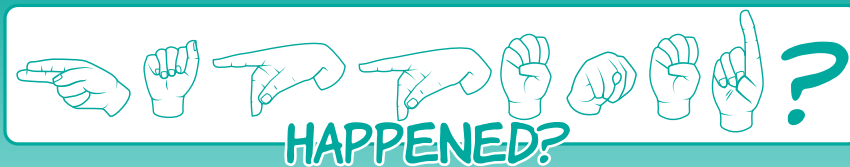
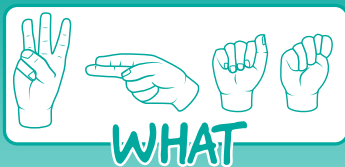
Yoon and Sonneveld (2010) write in their study, concerning patient anxiety in the ED, about how feelings of uncertainty, confusion and annoyance are present among patients in the waiting room. For those of us who have attended an ED first-hand, we will remember many of the same feelings and more; many will recall the uncomfortable and anxiety-inducing elements within the ED: the smell – a mixture of cleaning chemicals and body odour – and loud and sudden noises. For patients who need to spend many hours in the waiting room, the initial adrenaline of the visit can wear away, leaving just feelings of boredom and fatigue.

This design fiction probes these typical feelings of fatigue, boredom and how they might be impacted on by technology. To what extent do media actually help distract individuals from the ED experience? Can we ever really be distracted from the reality of injury?









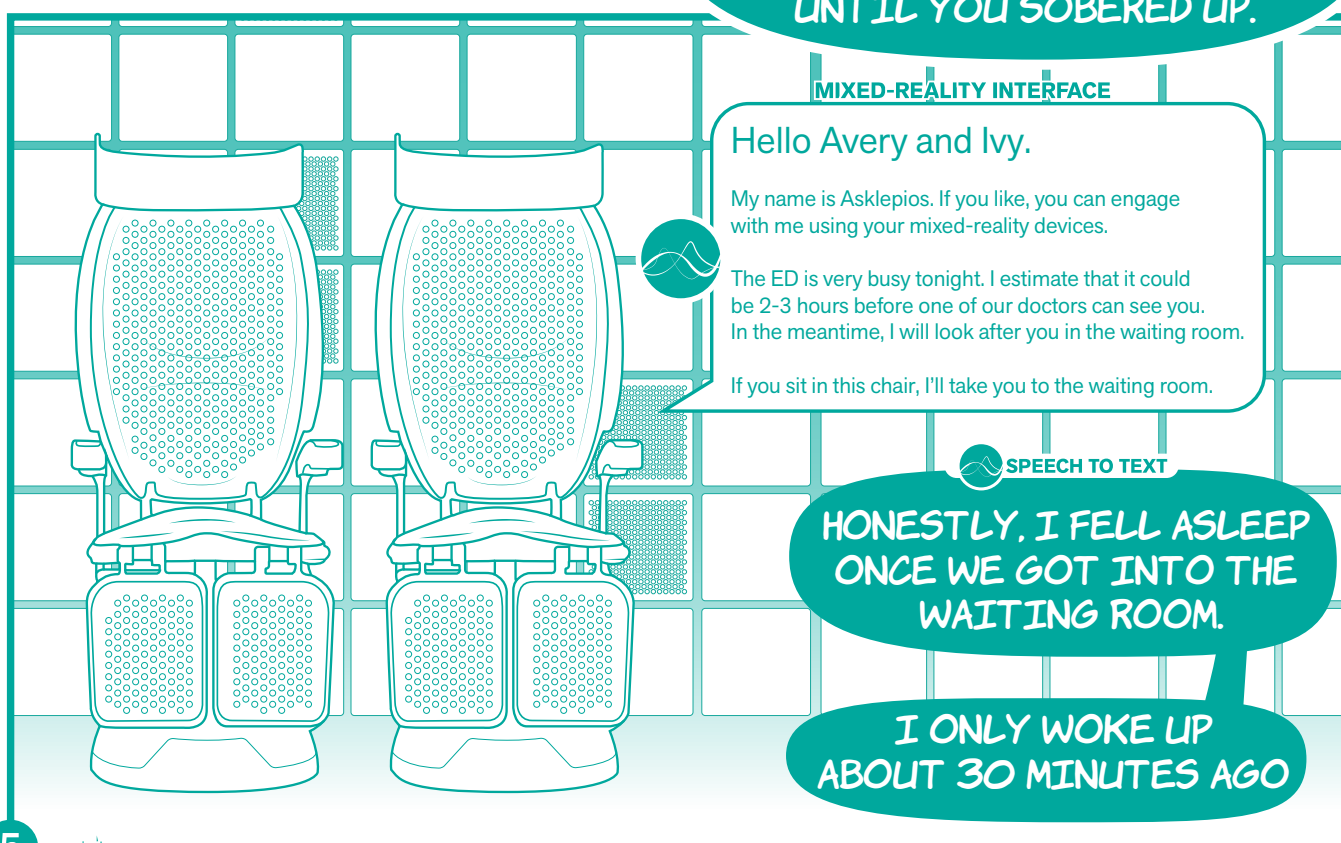
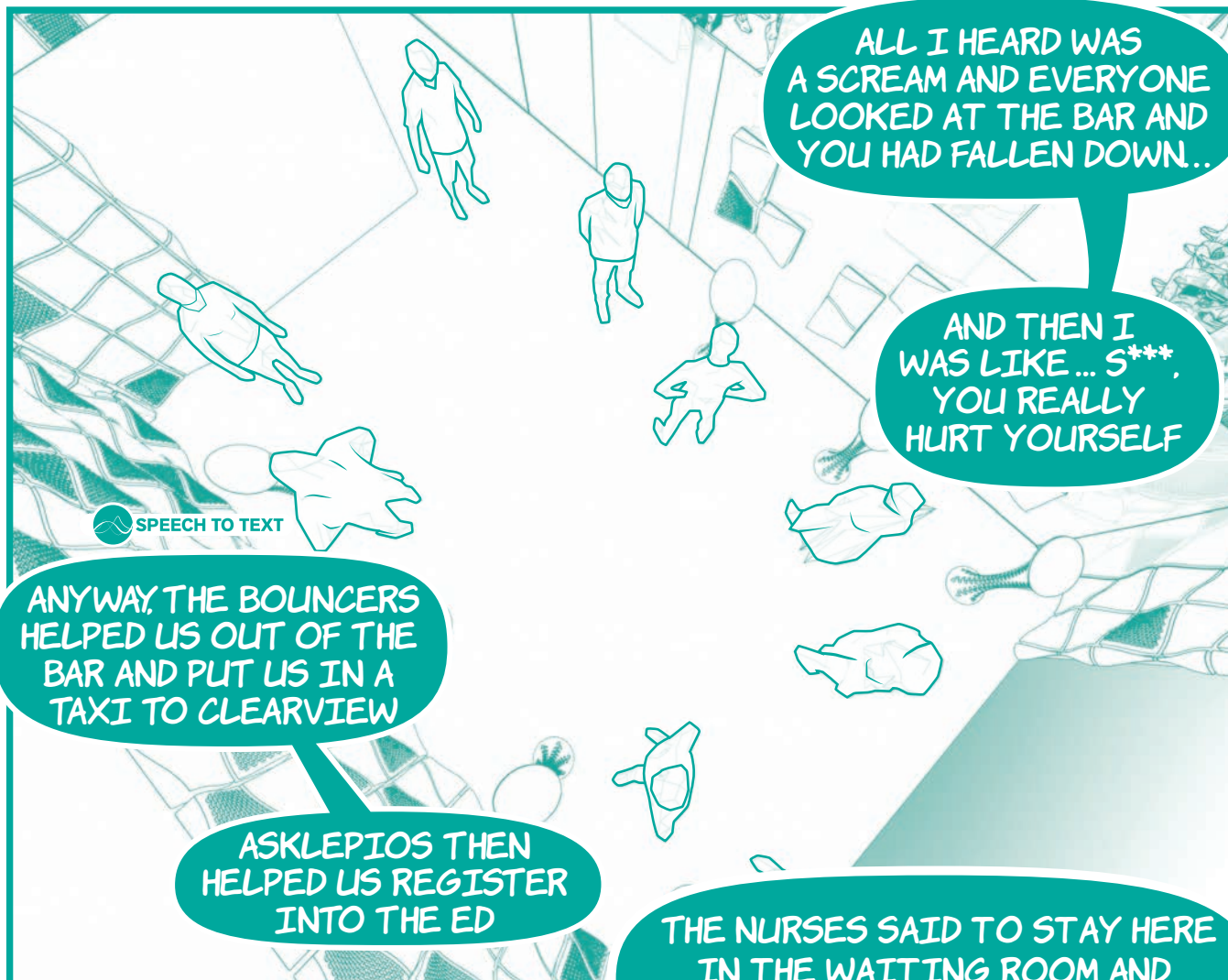
 SPEECH TO TEXT

YOU FEEL OFF A
TABLE AT A BAR AVERY

ARTS HERE

 SPEECH TO TEXT

WE'RE AT CLEARVIEW
HOSPITAL NOW AVERY.
YOU WERE A BIT OUT
OF IT, WITH THE FALL
AND THE ALCOHOL
I GUESS



DID YOU KNOW THAT ASKLEPIOS CAN STREAM TV SHOWS NOW? IT WORKS VIA THE MIXED REALITY THING

ASKLEPIOS SAYS THEY'RE QUITE BUSY HERE TONIGHT ..

APPARENTLY THERE WAS A BIG PILE UP ON THE HIGHWAY AND LOTS OF THE INJURED CAME HERE

APPARENTLY THERE'S A HUGE LINE OF AMBULANCES OUTSIDE ..


HOW

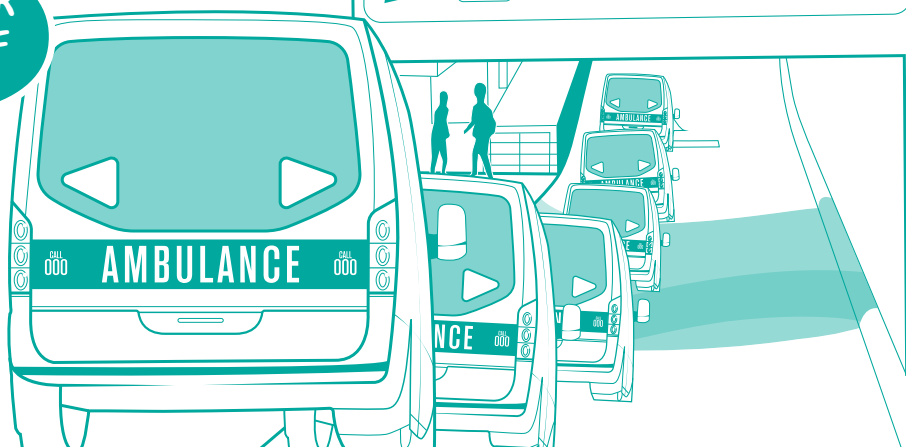

MUCH

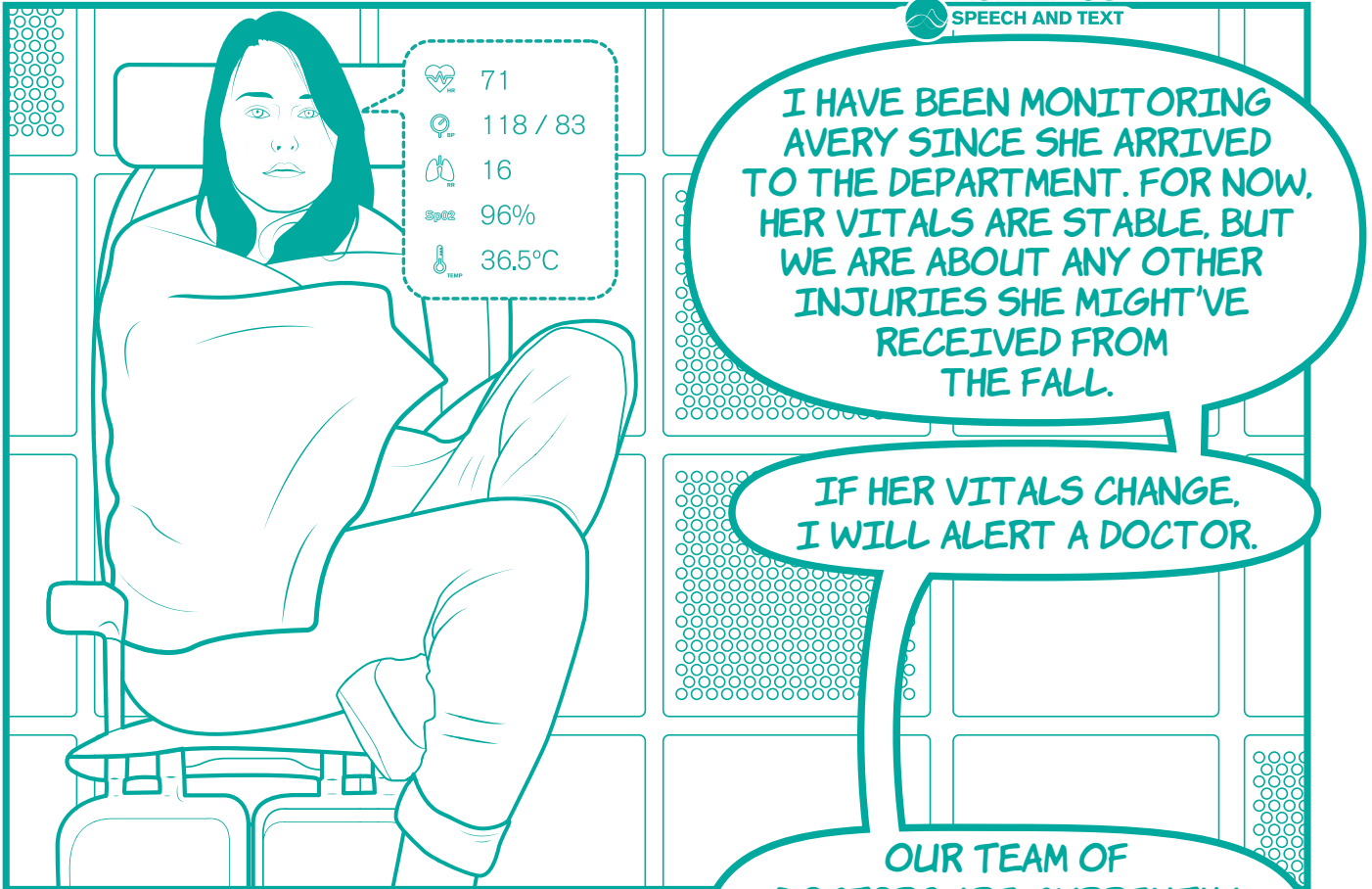

LONGER?

WE'VE BEEN HERE FOR ALMOST 3 AND A HALF HOURS NOW

HOW ARE THINGS LOOKING NOW ASKLEPIOS?

  CLEARVIEW HOSPITAL
EMERGENCY





I HAVE BEEN MONITORING AVERY SINCE SHE ARRIVED TO THE DEPARTMENT. FOR NOW, HER VITALS ARE STABLE, BUT WE ARE ABOUT ANY OTHER INJURIES SHE MIGHT'VE RECEIVED FROM THE FALL.

IF HER VITALS CHANGE, I WILL ALERT A DOCTOR.

OUR TEAM OF DOCTORS ARE CURRENTLY DEALING WITH A SURGE OF PATIENTS DUE TO AN INCIDENT ON THE FREEWAY.

UNFORTUNATELY, IT COULD STILL BE MUCH LONGER BEFORE ONE OF OUR DOCTORS CAN SEE YOU

MMM...

IN THE MEANTIME, I WILL CONTINUE TO MONITOR AVERY.

I THINK SHE'S FALLEN ASLEEP AGAIN

YOU MUST BE FEELING BORED IVY. CAN I GET YOU ANYTHING?

A CUP OF TEA WOULD BE
QUITE NICE ASKLEPIOS

AND _ YEAH _ I GUESS
I AM BORED.



I DIDN'T THINK I'D
END UP HERE TONIGHT _

AT LEAST I HAVE SOME
TV TO WATCH WHILE WE
WAIT FOR AVERY _



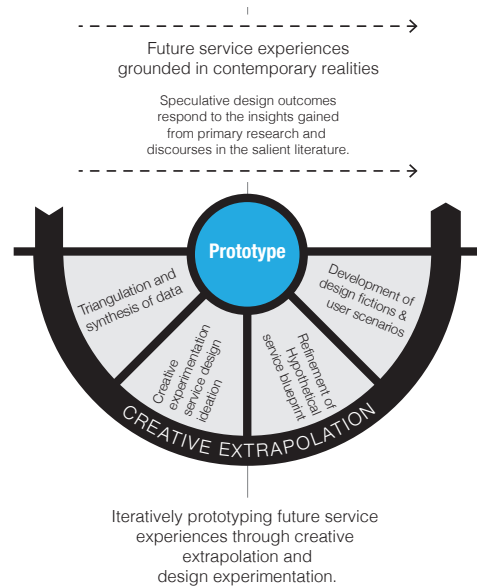


Figure 5.1:
The middle arc of
the SSD framework.

5.1 In summary: The direction for design

This chapter outlines the project-grounded research ([Findeli 2010](#)) component of this project that explores the EDWR of the future. The chapter guides the reader through the creative chaos of discovery that led to the design outcome, an integrated sequence of physical and digital touchpoints that guide people experiencing acute ill health from the moment of their health incident through to the moment that they leave the EDWR. This chapter describes the design experimentation process as a form of creative synthesis through an iterative exploration of form and ideas through sketching, low-fidelity model making, role play and journey mapping. This chapter documents the design process of iterative experience, while the subsequent Chapter 6 presents the design outcome and its various articulations. This process of experimentation speaks visually through the artefacts of creative practice: sketching, making and iterative refinement. Examples of this process are showcased and summarised in this chapter, and in doing so this chapter demonstrates a practical application of the middle arc (Figure 5.1) of the SSD framework.

This chapter responds directly to the design question of What if we leverage the power of emerging and not-yet-available technologies to enhance the service delivery and experience of emergency department waiting rooms? which in turn forms a central part of the overall research question. In doing so, this chapter straddles the broad domains of design, futures and emergency medicine. These macro-arenas are too broad to cover in a single PhD study; however, as Manzini ([1989, 58](#)) states, it is incumbent upon designers to collectively consider the macroscopic ('broad and coherent social scenarios') while zoning in on the microscopic ('giving form to plans and propositions') to deliver relevant design outcomes.

On the macro-level, this design investigation explores the broad arenas of technology and the impact of automation on urgent care for patients, carers and staff. At this macro-level, the speculative design practice is concerned with exploring how technology might manipulate and manage the waiting experience, but sits within the broader context of what a future world might look like. As an emergent and exploratory endeavour, the design experiments aim to open up more questions than they can answer, leaving the window open for new possibilities and alternatives. On the microscopic level, this project provides a grounded exploration into scenarios of waiting experiences and how those experiences might be affected by a shift in how urgent care is delivered. In doing so, the design responses gives form to the immaterial facets of technology, exploring how interactions and collaborations with technology might unfold in the ED context. The uniqueness of the problem space – an EDWR – is different to any other waiting environment and is worthy of specific attention.

The creative work undertaken in this study in response to the 'what if' question does not begin with a 'problem' per se, but a series of hunches. Unlike a hypothesis, which can be tested, these hunches build upon the themes and insights described in Section 4.7 and point the creative practice in directions which can be further explored through iterative, cyclic, associative and inductive thinking. This process has ranged from the rush of inspiration and creation to moments of contemplation and the microworlds of design detailing and refinement. In support of these hunches and designerly processes, this chapter also provides a brief review of the literature concerning how waiting experiences have been designed in other analogous contexts.

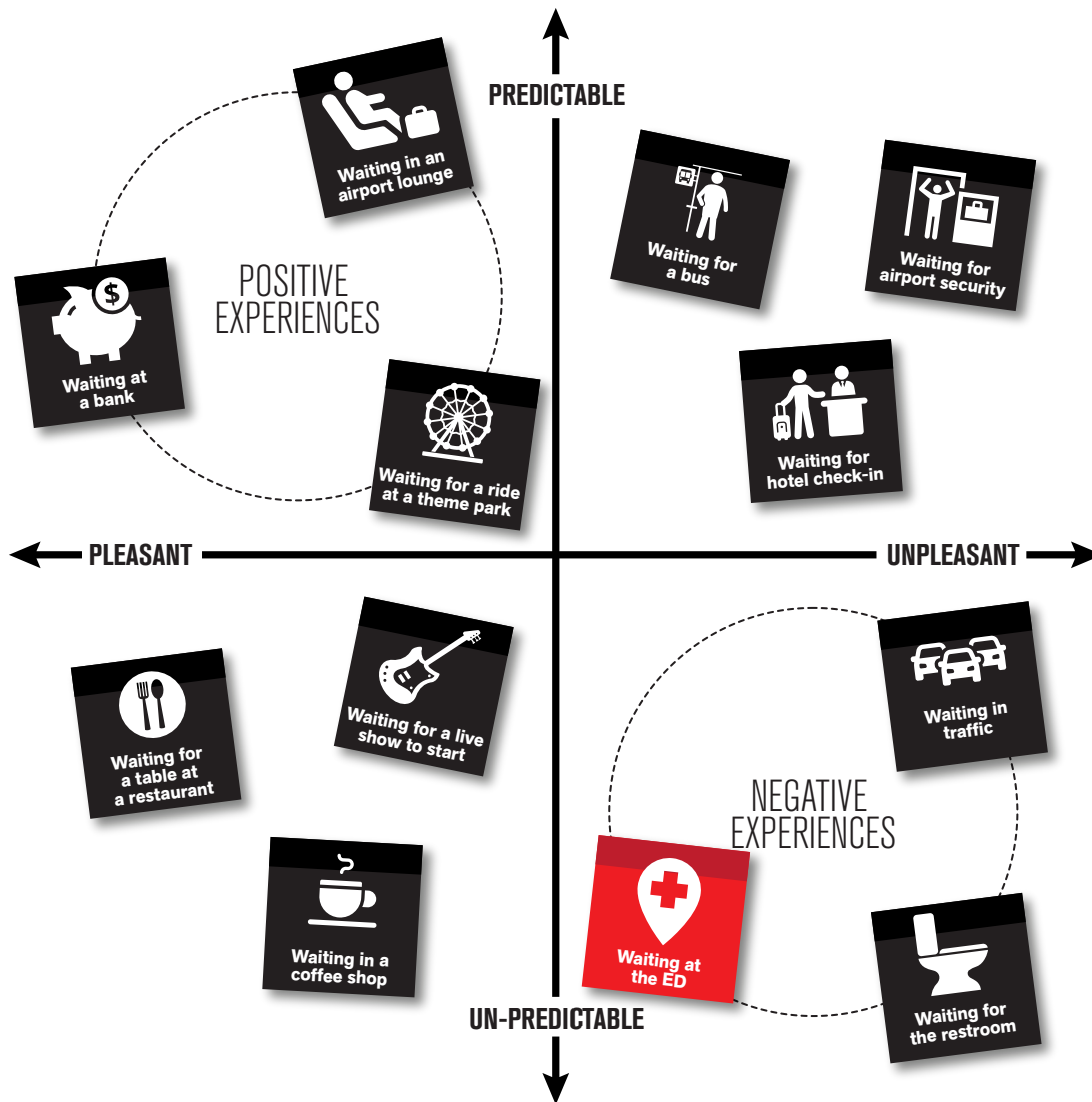


Figure 5.2:
Mapping waiting
experiences

5.1.1 Analogous waiting experiences

During 'surge' periods, EDs are expected to handle extra patient arrivals without necessarily receiving any extra resources, requiring the ED to do more with less (Rongsheng et al. 2012). The phenomenon of a surge is not unique to healthcare and can be observed in a number of analogous contexts. What is unique in the ED is the emotional and physiological stakes: patients with serious or significant injuries who must share a space with others with similar serious and or visible injuries, as well as dealing with the anxiety of being unwell.

Waiting for any service in any sector has long been recognised as an unavoidable, yet strong determinant of overall satisfaction for users (Hui and Tse 1996; Pruyn and Smidts 1993; Taylor 1994). Service operators often attempt to counteract negative effects of waiting by shortening queues or increasing flow of users and various operational management techniques have emerged to do so (Forero et al. 2011). In the ED, despite conjecture as to how to reduce waiting times, no clear consensus is available in the literature concerning the optimal arrangement of services (Wiler et al. 2010). Donald Norman (2009), however, articulates that not

all waits are inherently bad and that the 'perceptions' surrounding the wait are more important than the reality. As contended by Norman (2009) and the psychology of waiting principles as articulated by Maister (1984), Figure 5.1 presents a map of waiting experiences from other analogous contexts outside the ED on a 2 x 2 matrix of predictability and pleasantness. Through this diagram, we are able to unpack different waiting experiences.

For example, a wait in an airport lounge is highly predictable – a ticket directs you to the correct gate where you can catch a flight, digital signage that can be updated rapidly guides you in the case of unexpected changes and, depending on the airport, the surroundings are often luxurious and comfortable. Waiting for a live music act to start can be highly unpredictable but exciting; we might even suggest that the anticipation of the act actually improves the overall experience. As Norman (2009) highlights, waiting in contexts that enhance our anticipation actually make the overall experience more memorable. In contrast, our current understanding of the waiting experience in the ED suggests that longer waits correlate with increased nerves and anxiety.

Unlike waiting in an airport lounge, waiting in an ED is highly unpredictable and unpleasant. Unfamiliar surroundings, filled with strange and confronting noises, medical equipment and other patients – often with visible injuries – can amplify the stress and anxiety experienced by the patient and their carer. Part of this reason for this anxiety is the different wait profile in the ED, where waiting can be accompanied by the rapid onset of illness. As we have seen in Chapter 2, the paucity of design research and practice concerned with EDWRs has resulted in few interventions to mitigate this experience. As the investigation described in Chapter 4 revealed, cold furniture, daytime television, out-of-date magazines and vending machines do little to improve the user experience, and do little to help patients understand the environment they have been thrust into.

In order to design more pleasant and predictable waiting experiences in the ED – and thus, more positive user experiences – careful thought needs to be applied to how different elements of the ED service might be manipulated. Both Norman (2009) and Maister (1984) articulate that how a wait starts and how it ends are critical components of the overall experience. As Norman (2009) discusses:

A century of research on human memory indicates that, all other factors being equal, the best remembered parts of an experience are the beginning and ending. The middle is least well remembered. (Unique, significant events are remembered, regardless of their position.) Studies show that progress bars are most effective when they go slowly at first (underestimating actual progress) but speed up at the end: The memory of the end dominates.

— Norman (2009)

Drawing upon this idea, the experience at the start of the ED journey – from health incident to the waiting room – sets the tone for the rest of the ED experience. As Norman (2009) recognises, 'human memory is not an accurate, faithful image of the past. It is an active reconstruction subject to many possible distortions'. Designing positive waiting experiences at the start of the ED journey will likely have implications for how patients and carers report their overall patient experience.

The scope of this study does not intend to design an implementable service solution that improves the waiting experience in the ED in some way, nor is it in pursuit of a solution to a problem. Rather, the intent is to provoke debate as to how the waiting experience might be impacted by different interventions and the preferable attributes for these spaces into the future. The design outcome articulated in this study acts as a kind of 'litmus paper' ([Auger 2013](#)) for how different interventions might actually impact on the EDWR. The design work conducted within this study is an extrapolation upon the current status quo, including the literature surrounding current ED challenges, waiting design literature and primary data collected throughout the study.

5.2 Early learnings through design practice

This section presents visual documentation of a series of design experiments which led to the development of the SSD outcome generated by this project. These design experiments emerged from within the contemporary grounding established through co-design engagements; the design experiments conducted within this study aimed to 'extrapolate' (Auger 2010; Blythe and Encinas 2016) upon the signals uncovered through primary research and salient literature. This extrapolation and investigation is guided by the design question, as set out in Chapter 2:

What if we leverage the power of emerging and not-yet-available technologies to enhance the service delivery and experience of emergency department waiting rooms?

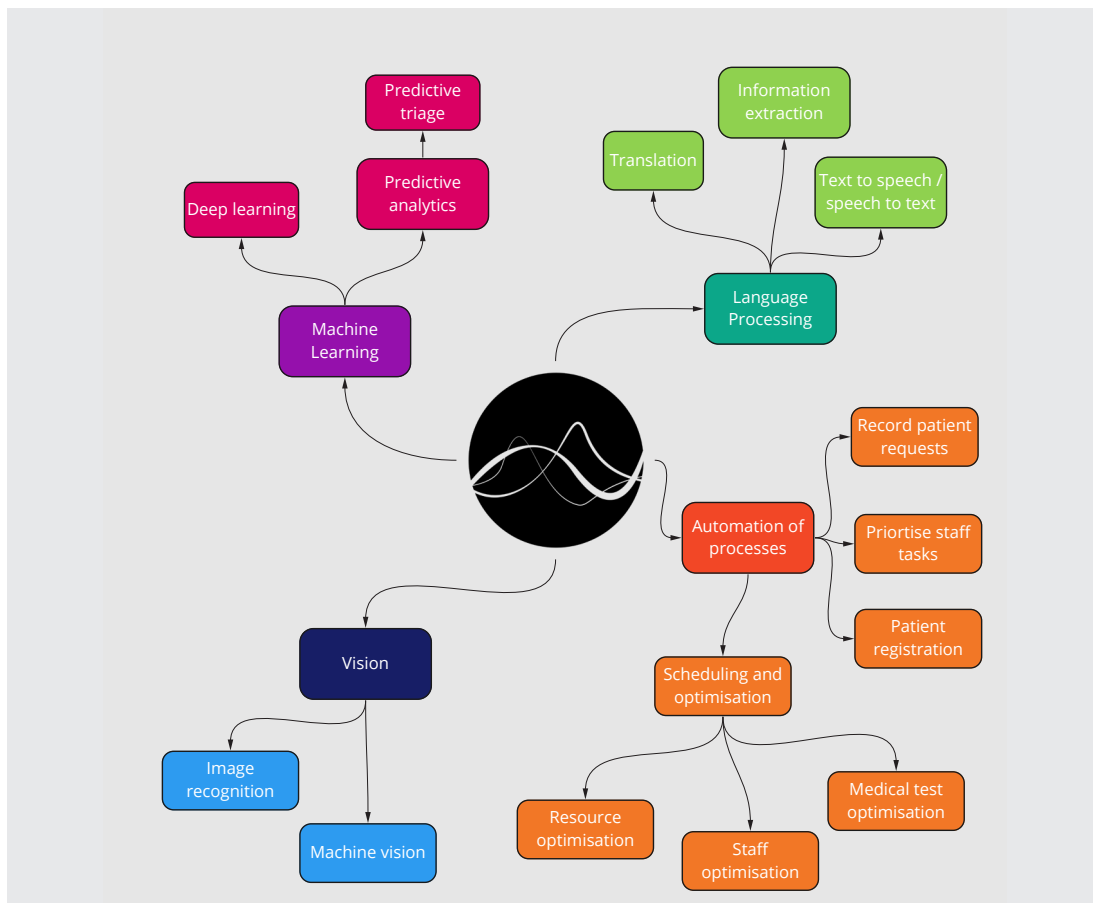
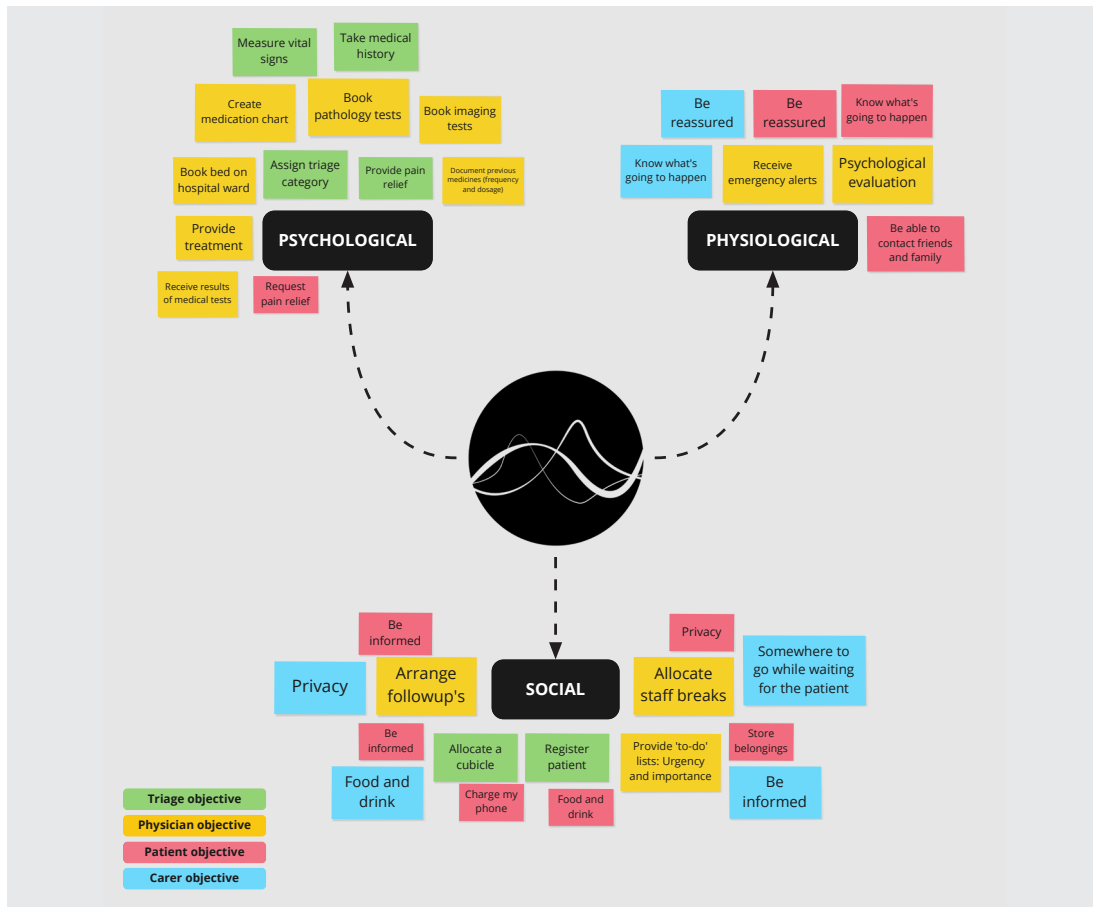
The extrapolation and interrogation of this question is supported by the insights gathered in Chapter 4. At a high level, these are:

1. The ED patient journey
2. Defusing intense emotion
3. Safety in the waiting room
4. Privacy in the waiting room
5. The role of technology in the ED

These insights became like hunches that provided focus to the creative practice, elements that could be extrapolated and examined through design practice. Through associative and inductive thinking, these design experiments aimed to explore different aspects of alternative user scenarios and made the possible commercial benefit subservient to speculative design practice. As discussed in the SSD framework, this kind of design process stands in opposition to the typical new EDs that are built in Australasia to the specified codes discussed in Chapter 2.

Design-led exploratory research, or research-through-design as contended by Frayling (1993) and clarified by Friedman (2008), uses design practice to generate knowledge, embedded within the outputs of design experimentation. In this study, the research aimed to break away from the familiar, and claimed a space where the design practice could follow tangents, embrace serendipity and step into unknown spaces where the 'failures' – that is, ideas that would typically be too outlandish in commercial or pragmatic design practices – could still be entertained and explored. The knowledge generated through this activity is then translated into explicit knowledge, to inform new design theories for the development of new healthcare facilities.

This section first discusses the development of the fictional AI construct Asklepios which was developed in response to the insights gathered in Chapter 4. The next section begins by mapping the potential features of Asklepios, before then detailing the development and refinement of a speculative service blueprint for the EDWR. The following section then discusses the development of each touchpoint within the service experience in regards to both function and form.



5.2.1 ASKLEPIOS: The AI for the Emergency Department of the future

"You're free to think about what you want to do, rather than how to get the computer to do it. The Macintosh stays out of the way of your work. Think of watching a good movie: You quickly become involved in the plot and don't think too much about the screen or the mechanics of making the movie"

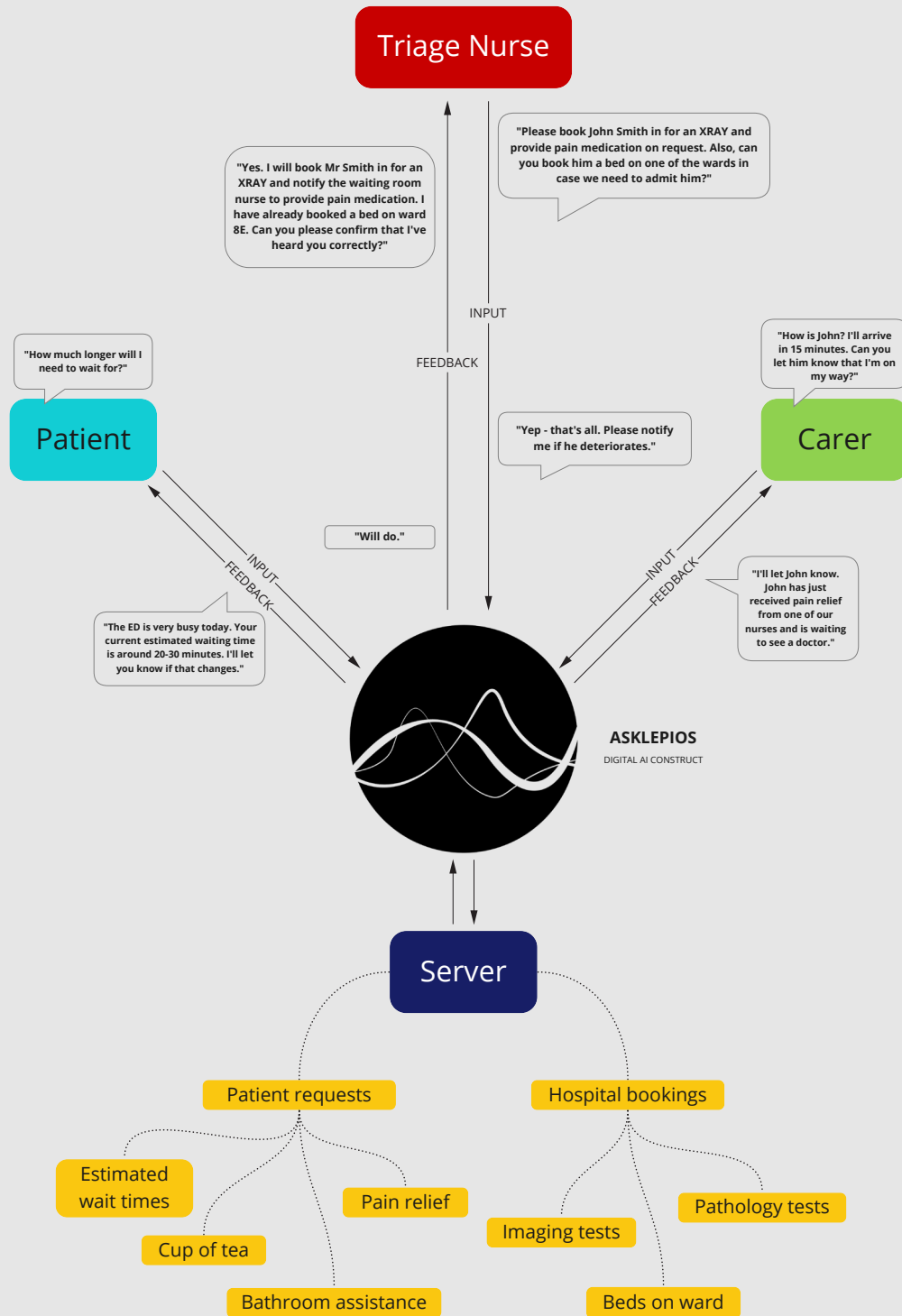
— *Macintosh user manual* (1984, 45)

When the first desktop computers arrived in the 1980s, they were accompanied by bulky printed manuals that held the hand of users through a steep learning curve of how this new machine 'worked'. With the arrival of the Macintosh in 1984, Apple had optimised the user interface to draw upon the semiotics of real life. Visual metaphors – the desktop, the folder, the document, the trash bin – explained how we could use the new device by relating virtual concepts to physical ones, an approach now known as skeuomorphic design (Page 2014). The focus of the Macintosh was how technology might complement and integrate within existing workflows, as articulated in the user manual: 'What can you do with your Macintosh? Your work!' (Apple 1984, 45). These early examples of home computing demonstrated a shift where the focus of the technology was not on the machines themselves, but on how society lived and worked with them. Scholars such as Weiser (1991) hypothesised a future of 'ubiquitous computing', where the machines would fuse with the bricks and mortar of a space and 'disappear' in a kind of 'embodied virtuality' (Weiser 1991, 80).

While the modern ED certainly has computers, it has not fused with the bricks and mortar of the environment or even become entirely integrated into ED workflows. While sophisticated technological packages exist in the ED – from electronic medical records (EMRs) to AI-powered interventions like botMD (botMD 2019) – these interventions are add-ons and not yet central to ways of working for staff and often completely invisible to patients. In contrast to these examples, the design experiments aimed to investigate how technology might fade away as it is used, becoming an invisible mediator of 'care' and 'caring' between participants. As Heidegger (2010, 98) articulates, when using a hammer, the 'hammering' itself becomes a continuation of the arm, phenomenologically transparent during action. The focus is on the task, not the tool.

In order to understand how technology might become 'phenomenologically transparent' in the ED, early design experiments began by mapping different features and interactions within the ED system. Firstly, Figure 5.3 maps potential features in response to user needs. Then, these needs were translated into a map of how a technological construct might be used to amplify human strengths and personal qualities, as well as enabling machines to collaborate with humans. In Figure 5.4, the technological construct manages requests from both human (patients, carers, staff) and non-human actors (hospital systems, pharmacy dispensary, business metrics such as wait times). For example, the technological construct might access organisational metrics to provide an estimated wait time to a patient and carer. In doing so, the machine can then advise a carer

Figure 5.4:
Asklepios System
Mapping: Interacting
with both human and
non-human actors

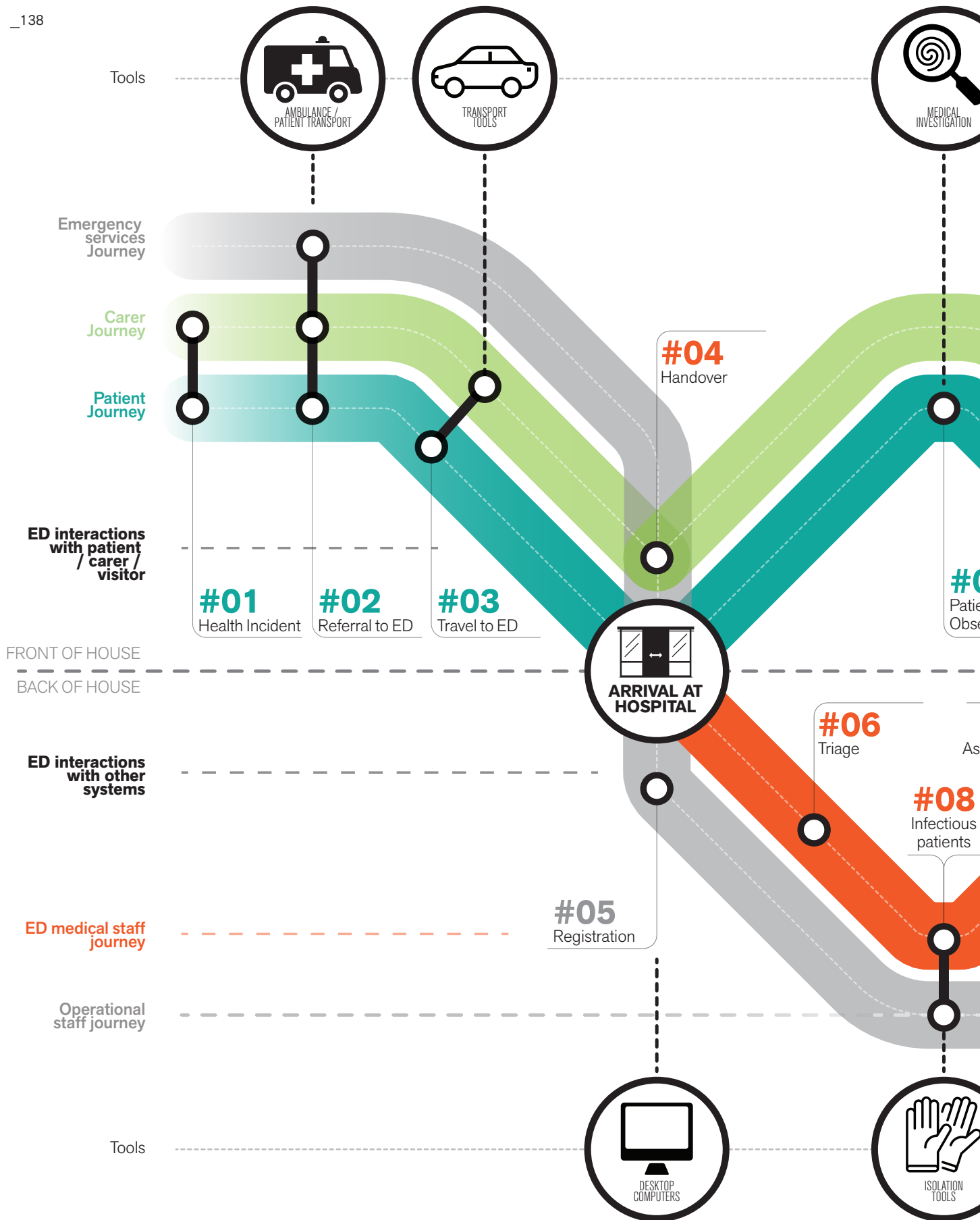


of how long they should pay for parking. When a patient requests a cup of tea, the task can be prioritised against other work orders, ensuring that staff attend to the most urgent needs first, such as dispensing pain relief or assisting patients undergoing an episode. Recognising that the human touch of providing a cup of tea is important, Asklepios leaves that task to a human when they are able, augmenting activities humans are best at while removing the ones they are not as good at. In doing so, the construct is not a replacement for any one particular ED system or service, but a facilitator of many services. In this sense, technology acts as a non-human collaborator to improve both clinical activity and patient experience, without actually replacing the array of disparate hospital systems.

As this mapping matured, the technological AI construct was named Asklepios, a name derived from the Greek god of medicine, Asclepius. The name Asklepios – like Siri or Alexa – is intended to be distinct from most human names, while still helping to build rapport between the human and non-human agents. The aim of giving the technological construct a name was to humanise both people and systems by building connection and empathy.

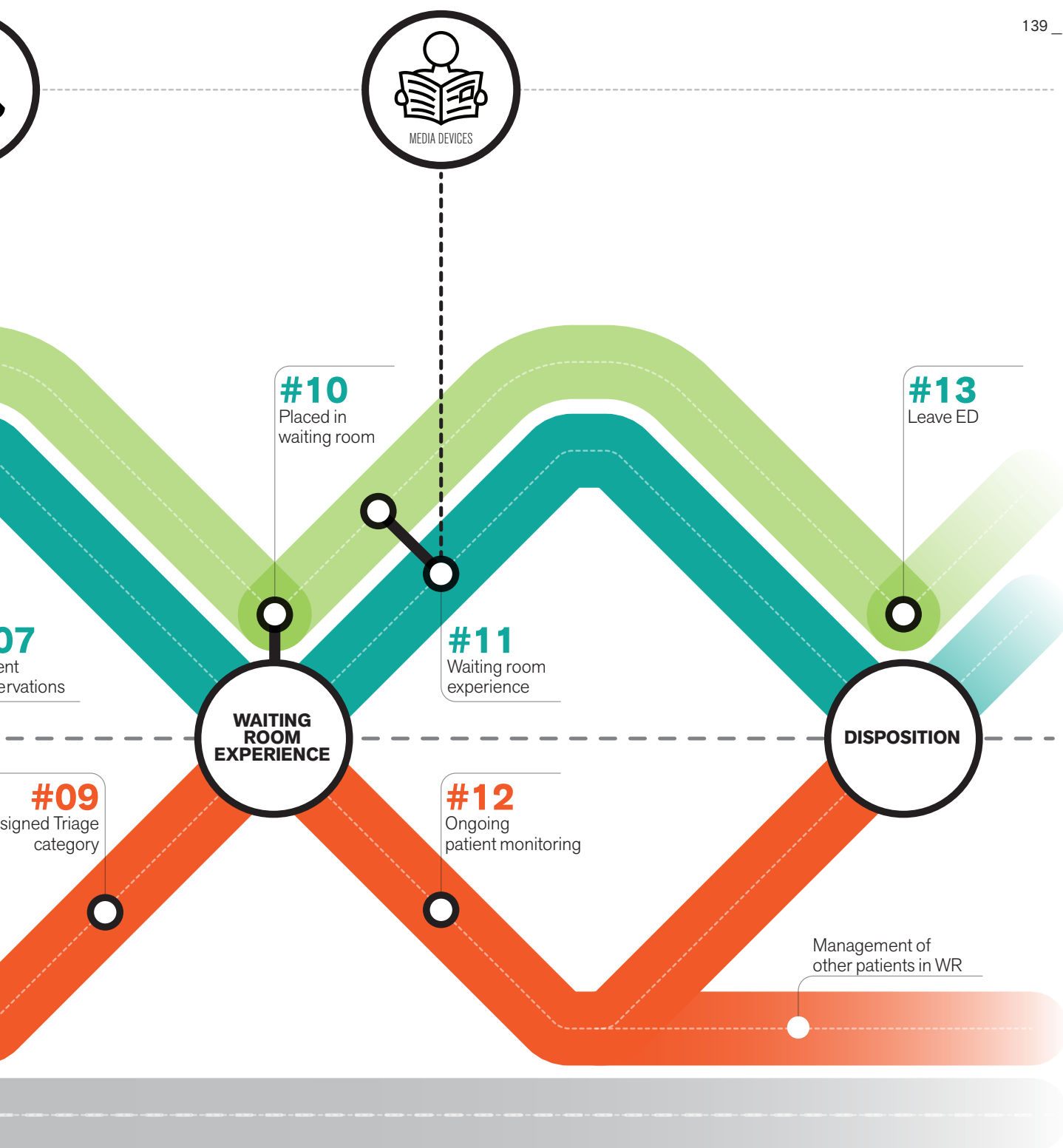
5.2.2 Speculative Service Design blueprint

The current service ecosystem that underpins urgent care in the context of the ED can be broken down into a series of phases, where each part of the overall experience has its own set of touchpoints. We might consider these phases of the experience 'silos' ([Stickdorn et al. 2018](#)), where each part forms an important part of the ED journey, but they are not necessarily linked together throughout. In each silo, a myriad of visible and invisible processes to the user support care delivery. Having established the potential role and mapped the features of the AI Asklepios system in the ED, this section explores the service design: how interactions between human and non-human actors might be choreographed to co-create urgent care. This exploration is undertaken through speculative enquiry and interrogates an alternative future where an AI construct is omnipresent. Figure 5.5 presents a service blueprint of the ED front-of-house and waiting experience as it exists today. Figures 5.6, 5.7 and 5.8 present some early examples of the service blueprinting and associated ideation that was conducted within the study. The result of this ideation process, a speculative service blueprint generated through this research, is presented as part of the design outcome, discussed in detail in Chapter 6.



EMERGENCY DEPARTMENT EXISTING SERVICE EXPERIENCE

Figure 5.5:
A service blueprint of the current Emergency Department waiting room experience
(diagram repeated from Figure 1.1)



MENT WAITING ROOM
BLUEPRINT (NOW)

EMERGENCY DEPARTMENT WAITING ROOM EXISTING SERVICE BLUEPRINT (NOW)

#01

Health Incident

Critical patients: Patient sustains a critical injury that requires urgent medical attention. First-aid is provided by responders who contact Emergency Services.

Non-Critical patients: Alternatively, patient sustain an urgent, but non-critical injury that requires medical attention.

Primary care professionals provide a 'letter of referral' to the patient who should then present it to the ED on arrival. This letter usually outlines what actions the primary care professional has taken.

#02

Referral to ED

Critical patients: Paramedics provide medical care and life support to stabilise the patient ready for transport to a local Emergency Department.

Non-Critical patients: Patient visits a primary care health professional (GP, pharmacist, nurse or similar) who refers the patient to an Emergency Department. Primary care professionals provide a 'letter of referral' to the patient who should then present it to the ED on arrival.

#03

Travel to ED

Critical patients travel to the ED via ambulance. Carers may accompany the patient in the ambulance, or meet patients at the ED via another mode of transport.

Non-critical patients or carers may walk, drive, catch public transport or hail a ridesharing service.

#04

Handover

A priority rating is attached to the patient when an ambulance is dispatched. When the paramedics handover care of a patient to ED staff, an ATS category (see #06) is assigned.

#05

Registration

When patients arrive at the hospital, they are registered into the hospital system. This is a process usually undertaken by hospital clerks.

#06

Triage

After patients are registered, patients are assessed by a triage nurse who ascertains the severity and urgency of their condition. Triage is a complex nursing specialisation, and can include taking relevant medical history, the delivery of medication such as pain relief, preliminary observations and emotional support to the patient.

#07

Patient Observations

A triage nurse may collect observations from a patient to inform the delivery of urgent care later, usually by a physician.

#08

Infectious patients

Patients who are identified as potentially infectious by a triage nurse are isolated in a space separate from all other patients. Exactly how this is achieved can differ between hospitals, but usually involves the movement of a patient from the waiting room directly to a cubicle, or other space.

#09

Assigned Triage category

After the patient has been assessed by a triage nurse, the patient receives a 1-5 category rating based on the Australasian Triage Scale (ATS). This rating indicates the length of time that a patient should wait to receive care from a physician.

#10

Placed in waiting room

Once a patient receives a triage rating, they are placed in the waiting room by the triage nurse. How long a patient spends in the waiting room is dependent on the triage rating, but also the availability of a physician to see them, or capacity in the ED to assign that patient a cubicle space.

#11

Waiting room experience

Patients can spend many hours in the waiting room, and the experience of waiting can vary between hospitals. Most waiting areas contain a variety of newspapers, magazines or televisions to entertain patients. Some also include childrens toys, or interactive media displays.

#12

Ongoing patient monitoring

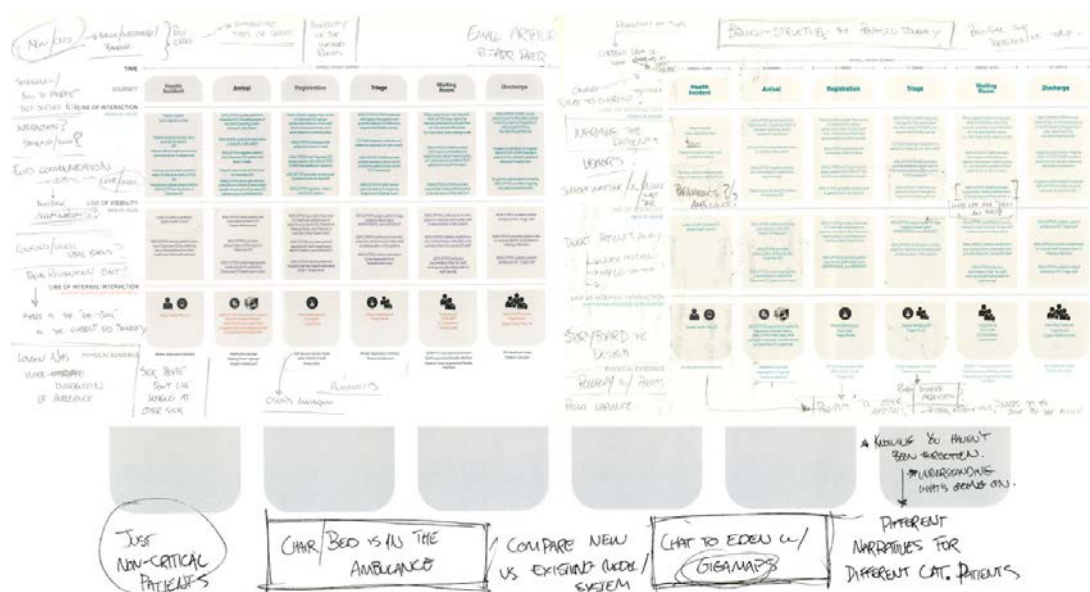
While the patient is in the waiting room, the triage nurse - or waiting-room nurse in larger hospitals - is responsible for the ongoing management of patients before they are seen by a doctor. This can include the ongoing observation of patients, so that patients who have a medical episode, or deteriorate, can receive urgent care.

#13

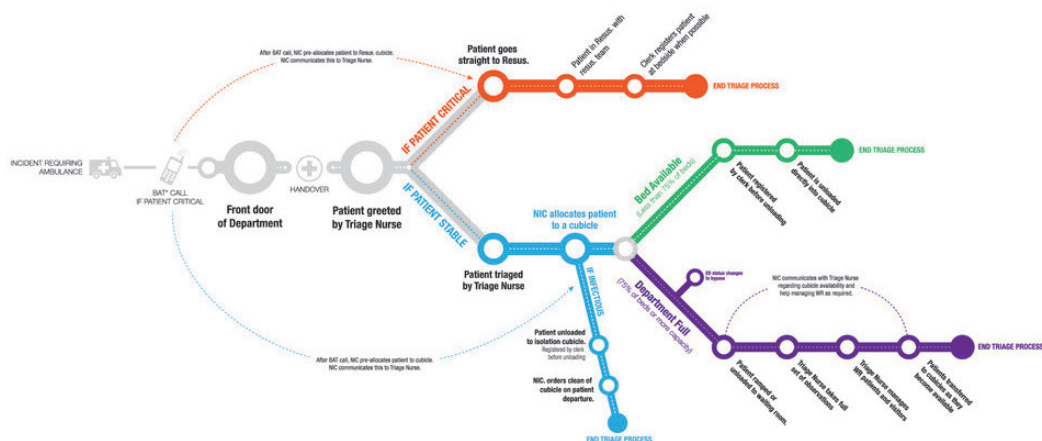
Leave the ED

After patients are treated by a physician, they may be either admitted to a hospital ward for ongoing care, or discharged from the ED with a plan for followup care as required. Patients who are discharged may return home, to support accommodation or a correctional facility.

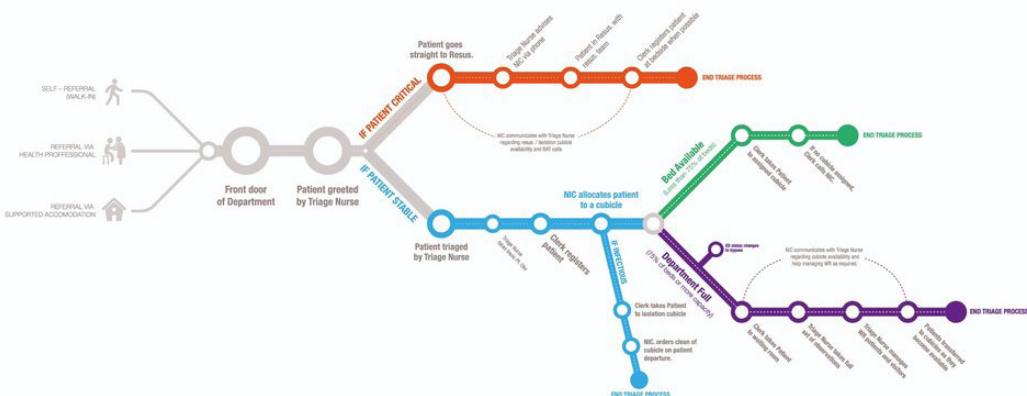
Figure 5.6:
Service blueprint
ideation and iteration.



EMERGENCY DEPARTMENT PATIENT VIA AMBULANCE



EMERGENCY DEPARTMENT PATIENT WALK-IN



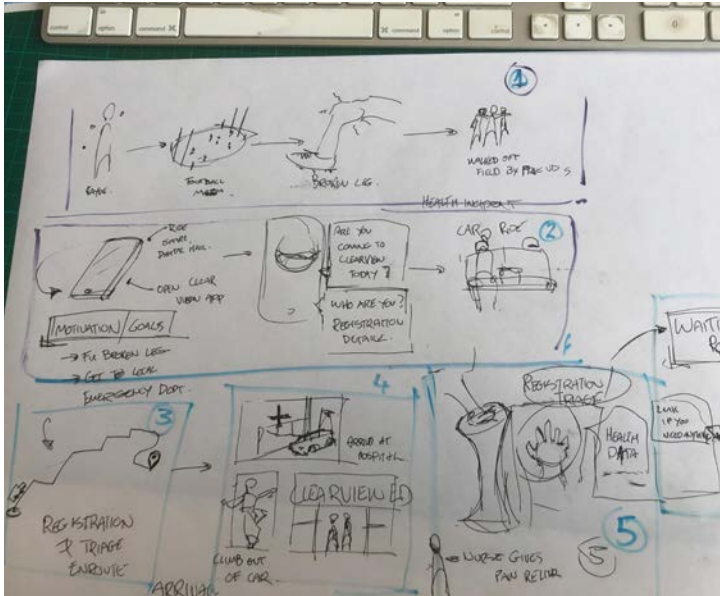


Figure 5.7: Image of a low-fidelity storyboard of the service experience. Elements of these storyboarding activities became the basis for the design fictions.

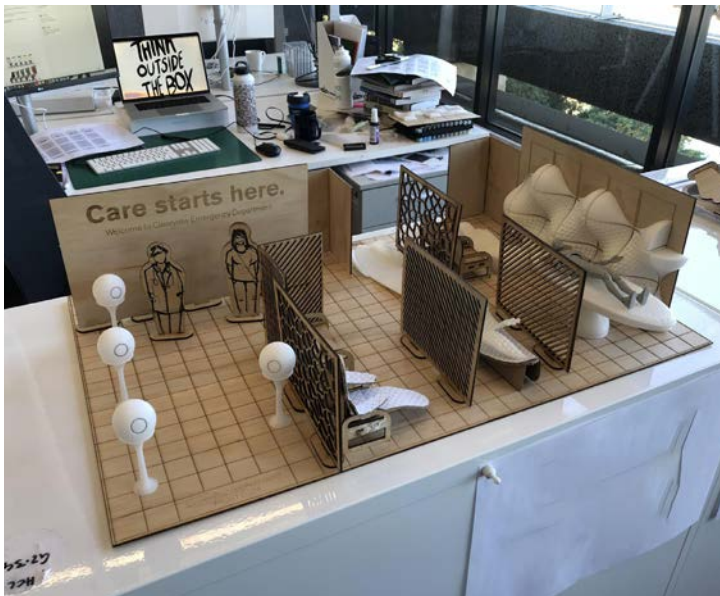
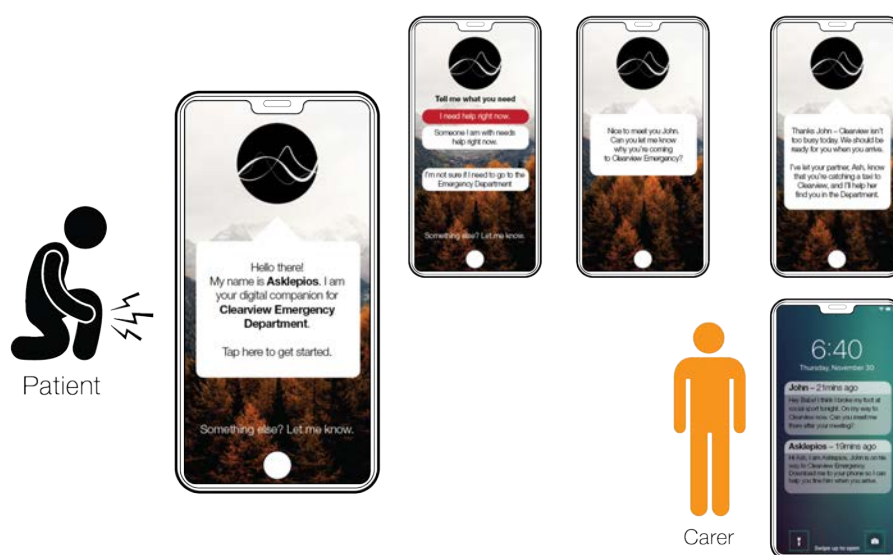


Figure 5.8 Images of a 3D mockup of the EDWR and triage. Plastic, paper and plywood prototypes were made to explore different configurations, and role play service scenarios at scale. Details, or characters, were drawn onto existing pieces of wood and card.



Figure 5.9:
Asklepios 'app'
exploration



5.3 Speculative touchpoints and hypothetical artefacts

Having established some of the features of Asklepios, a schematic of the existing service in the form of a blueprint and some of the ideation of alternative service experiences, this section examines the process of design and refinement of the touchpoints within the speculative service journey. The section speaks visually through artefacts generated via the design process, where touchpoints materialise from sketches into rough models, before being refined through iterative processes of further sketching, modelling and making. This exploration seeks to examine not just aesthetic qualities, but also qualities of form and finish, in order to make the speculative outcome tangible and clear but not a fully resolved or deterministic representation of just one particular future.

5.3.1 Pre-Hospital touchpoints

Early experiments into how Asklepios might manifest from the moment of health incident included how a patient might interact with the ED using their own digital device (Figure 5.9). The idea here was that patients could 'pre-register' their arrival to the ED with Asklepios, which could take initial details and begin a 'digital triage' to be confirmed by an ED staff member on arrival. Through this kind of app interface, Asklepios would record a patient's medical history, chief complaint and details for next-of-kin or carers, whom Asklepios could contact on behalf of the patient. Elements of these early experiments into pre-hospital touchpoints eventually became part of the overall speculation, but were left deliberately abstract and unfinished so that the focus of the speculation was on the actual ED.

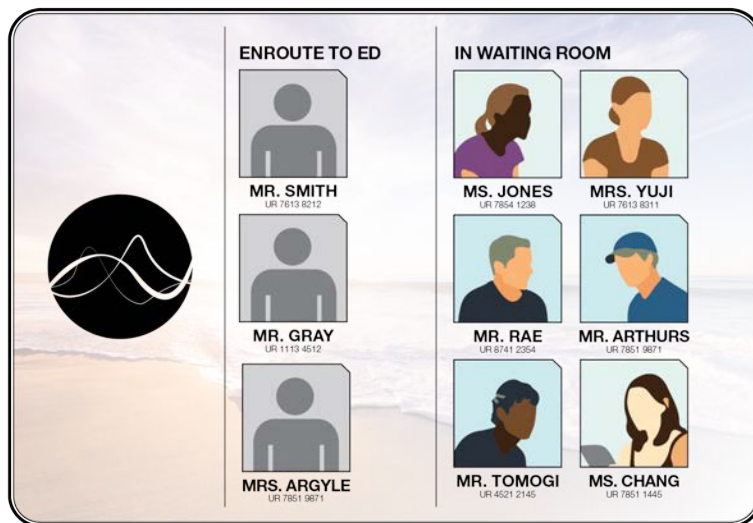


Figure 5.10:
Exploring patient
whiteboard for triage,
including patients
en-route and patients
already in the EDWR.



Figure 5.11:
Development of the
registration kiosk

5.3.2 Registration and triage into the ED

Recognising the important roles of triage and registration in overall waiting times and experiences, design exploration into how the role of triage might be optimised and supported by Asklepios was undertaken. Ideally, in this speculation users would register and commence digital triage prior to their physical arrival at the ED. This meant that for triage nurses, it would be possible to track not just patients or carers physically in the ED, but also those en route. Figure 5.10 presents a low-fidelity 'patient whiteboard' for triage that indicates patients both physically in the ED and those en route. Figure 5.11 presents an exploration of the first touchpoint to greet patients on physical arrival, a kind of 'kiosk' that patients could engage with by placing their hand on the centre of the device. Asklepios would then talk through the kiosk, using either text-to-speech or vice versa, supported by a mixed-reality interface. Figure 5.11 captures the iterative process and refinement of form, from both traditional and digital sketching, 3D-printed prototypes and scale mockups using scaled plastic prototypes and a 'gameboard'.

Development of the touchpoint to support the processes of registration and triage took broad inspiration from other sectors that have replaced face-to-face exchanges with automated systems, either partially or entirely with machines. Like self-service machines at supermarkets and airports, the speculation here was to change the role of ED staff from being behind a desk or barrier to 'floating' in an ED space where they could support patients and carers more directly.

5.3.3 Waiting room chair

We feel a slight disgust when sitting down in a chair warmed by a stranger, as well as a slight pleasure in sitting down in a chair that we ourselves have warmed.

— Susan Stewart, *Poetry and the fate of the senses* (2002)

The waiting room chair is a central feature of the ED and a central touchpoint in any kind of ED service journey. It seemed pertinent, then, to make the design of the waiting room 'chair' a central touchpoint and part of the narrative in this speculative service future. Figures 5.12, 5.13, 5.14, 5.15, 5.16, 5.17, 5.18 and 5.19 present different design experiments in relation to iteration and refinement of form and aesthetic qualities. In this concept, the chair is digitally integrated into the Asklepios system, where occupants might engage via voice and text while having their vital signs actively monitored through an array of embedded sensors.

The idea of the 'connected' chair device aimed to ameliorate at least some of the anxiety that accompanies the waiting room, by more explicitly connecting waiting room furniture with the 'ED system'. The form exploration of this device was guided by how the chair could 'hug' the occupant, reinforcing narratives of care and support.

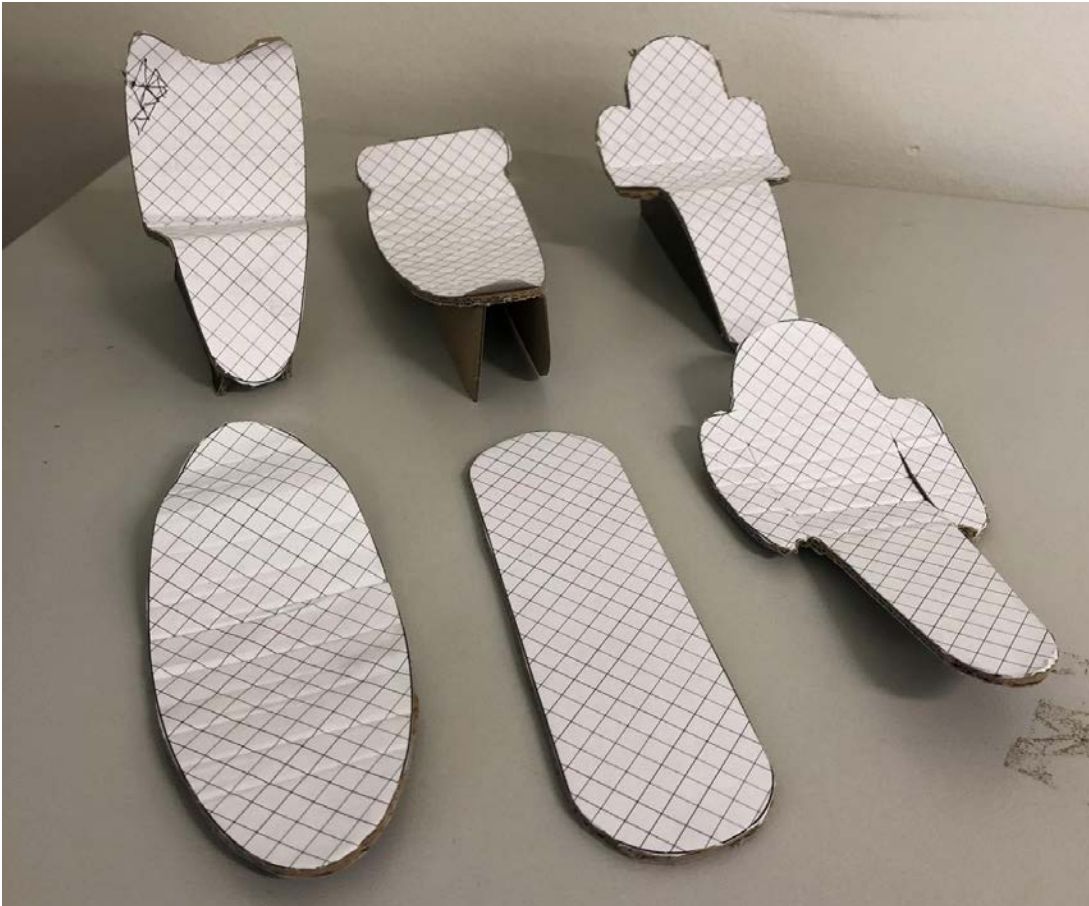


Figure 5.12:
Paper prototypes of the
Asklepios chair



Figure 5.13:
3D printed plastic
prototypes of the Asklepios
chair.



Figure 5.16:
Experimentation into a blanket to accompany
the Asklepios chair device.



Figure 5.17:
3D printed prototype of the Asklepios
chair at 1:5 scale.

Figure 5.18:
3D printed prototypes of
the Asklepios chair at 1:5
and 1:12 scales.



Figure 5.19:
3D printed prototypes of
the Asklepios chair
at 1:5 scale with
prototype blanket



As a feature that accompanied the chair device, Figure 5.13 presents imagery of a blanket that the occupant might use to wrap themselves in. This concept aims to address the intensity of emotion present in the EDWR by having the device 'hug' them, creating a sense of comfort for the occupant through the warmth and intimacy of touch. Early experiments saw this concept as an additional element to the chair, while later concepts explored how the blanket could be more fully integrated into the device.

The blanket chair aims to provide a number of the same benefits as a weighted blanket, which some link to a reduction in anxiety (Mullen et al. 2008), which in turn affords a calming effect and increased mood. Experimentation of this concept included detailing, overall colour and trim, as well as texturing. The final outcome, however, is presented deliberately abstract so that the focus of the speculation is on the idea of a blanket, rather than specific elements or details within it.

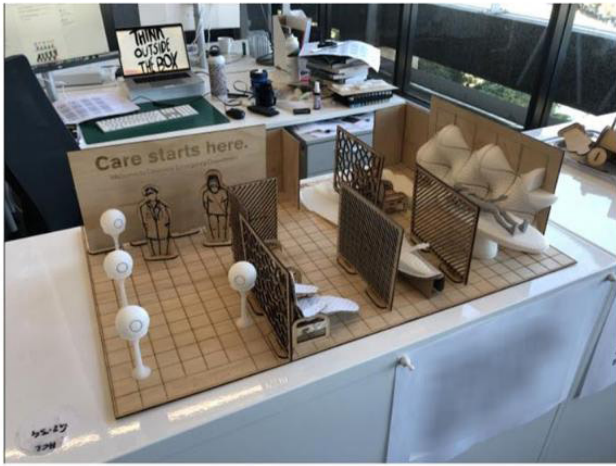
5.4 Waiting room environment development

Recognising the important relationship between spaces and service delivery (Bitner 1992), this section examines the development and refinement of the ED spatial environment and layout. This experimentation aimed to draw together elements from the service blueprint and explore how the overall layout might help or hinder service delivery. Through sketches, visualisations, scale models and 3D models, the 'assemblage' of things in the ED, and how they could be manipulated, was investigated. This series of prototypes (Figure 5.20, 5.21 and 5.22) and visualisations proved to be useful for exploring the overall atmosphere and mood that frame the service journey.

Central to this experimentation was the notion of how the environment might defuse the intense emotion that accompanies an ED visit. To do so, the experimentation drew on cool colours and large, slow-moving imagery of landscapes (Figure 5.21 and 5.23) in the waiting room to move away from the daytime TV or medical imagery that is typically found in the EDWR. The motif of water was applied throughout the experiments to reinforce the narrative of 'washing away' intense pain or emotion while in the ED.

5.4.1 Waiting room signage

Exploration into signage in the ED, to complement the Asklepios AI system, focused on how digital signage might be integrated with physical elements in the ED space. This exploration into graphical interfaces aimed to establish a hierarchy (Figure 5.21 and 5.23) and further explore the motif of slow-moving landscapes to defuse intense emotion. With the implementation of digital signage, moving images, changing text and text in languages other than English could be entertained. The language of 'care starts here' aimed to simplify the language of 'triage' and 'registration' for patients and carers, while reinforcing the narrative that the waiting room is part of – not ancillary to – the 'caring' experience. While the development of a extensive signage system is a task beyond the scope of this study, and would require collaboration with visual communication design disciplines, these results of design practice might demonstrate how signage might connect with other parts of the ED and overall service delivery.



EMERGENCY DEPT.
FRONT OF HOUSE
OVERVIEW

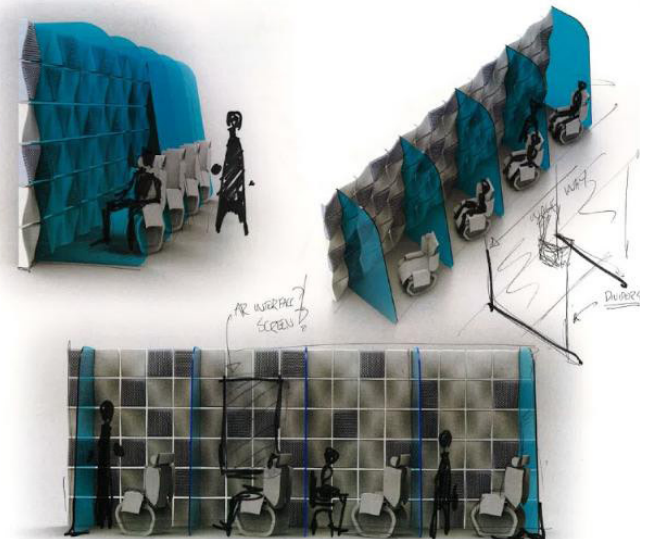
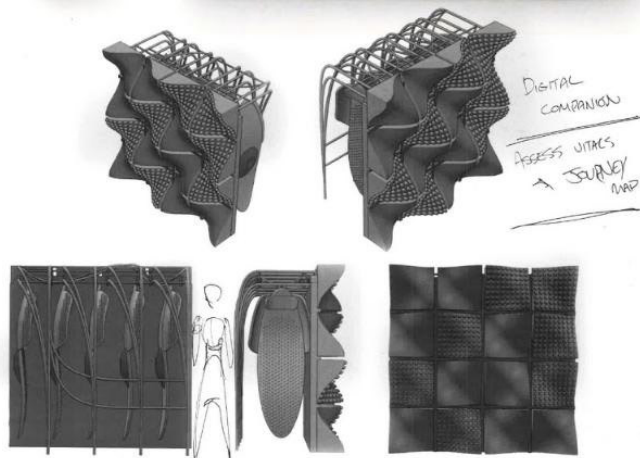
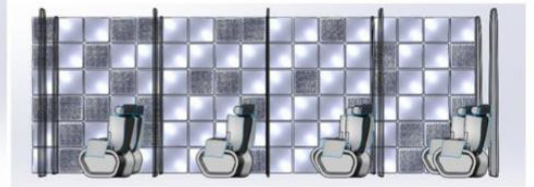
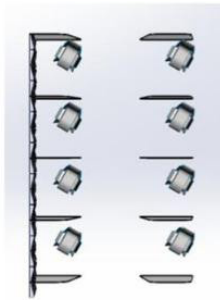
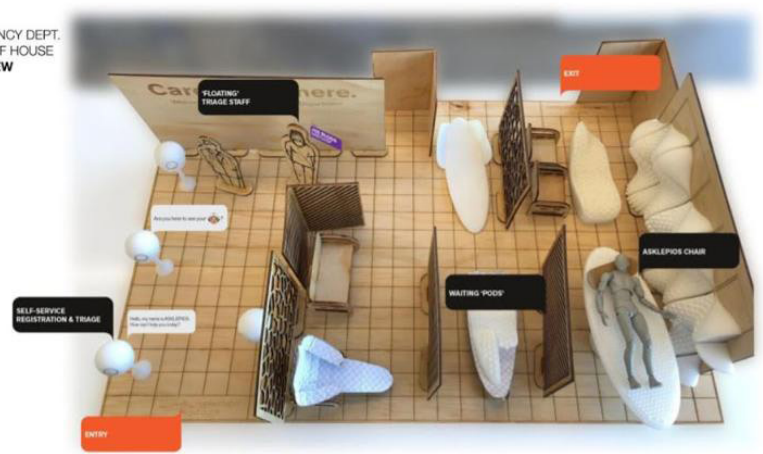


Figure 5.20:
ED waiting environment
form exploration

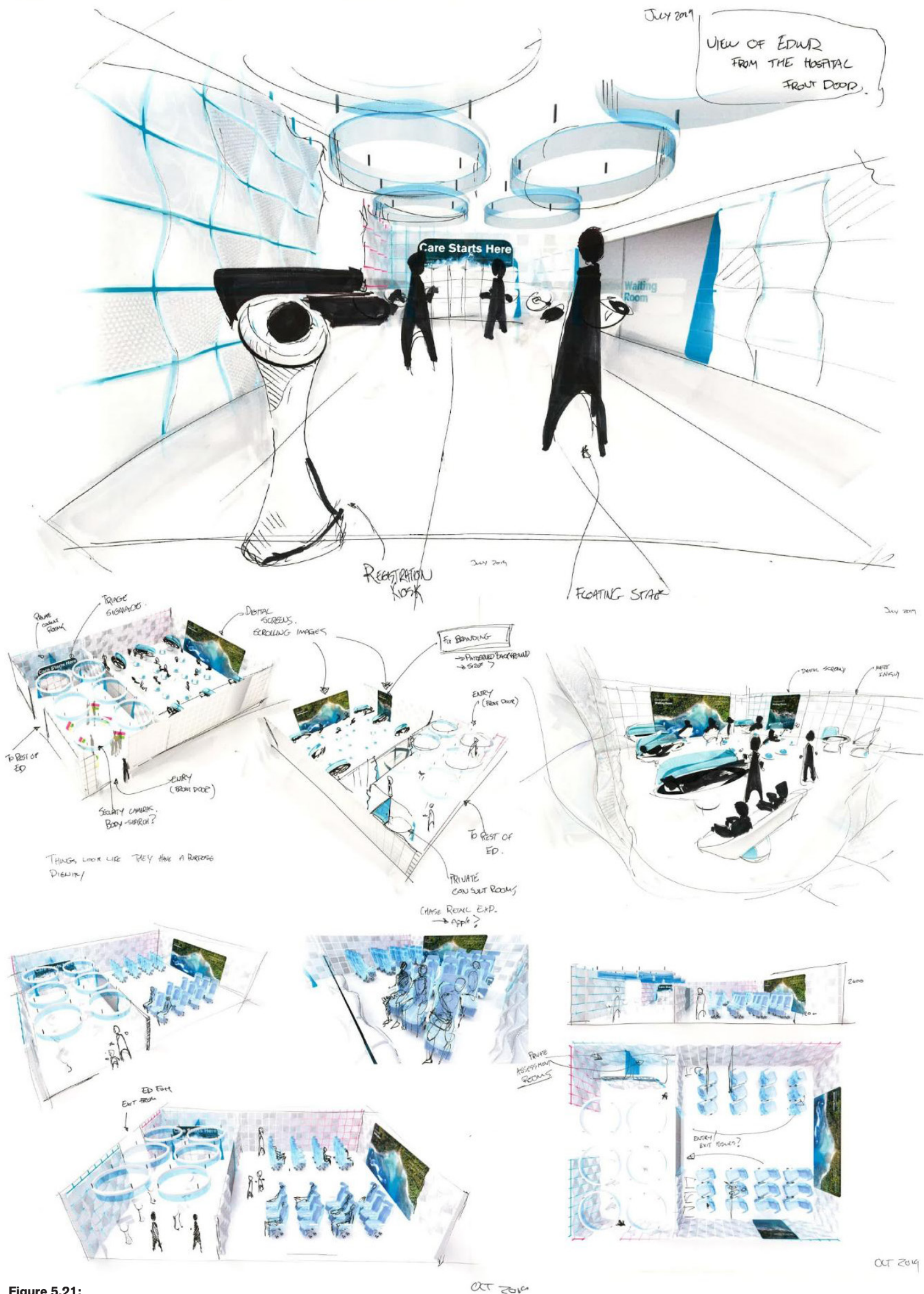
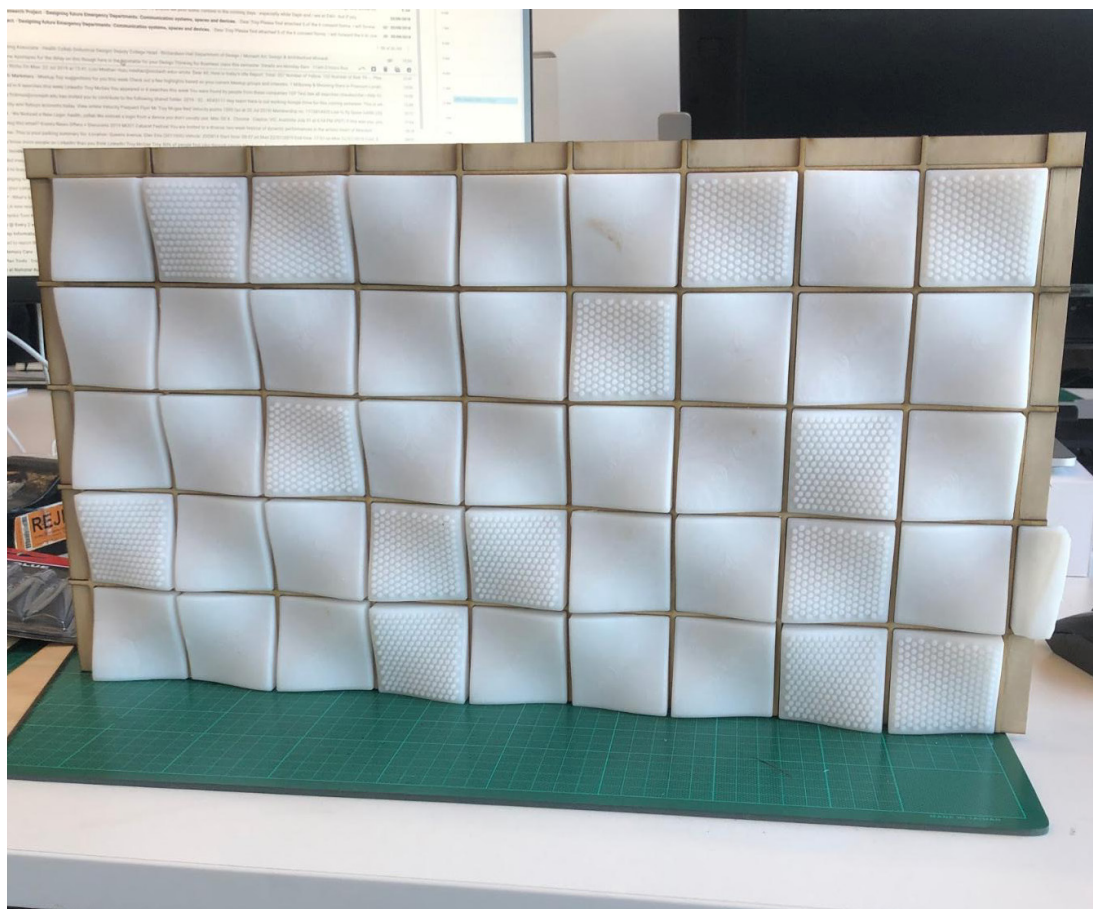


Figure 5.21:
Exploring EDWR layout and atmosphere
through sketch and visualisation

Figure 5.22

Prototyping of ED walls use plastic 3D prints and plywood wall. The form of this wall and each panel aimed to create a 'softness' in the ED environment.



This experimentation was in opposition to the design guidelines suggested by ACEM (2014) and the work of anonymous graphic designers in EDs of today – where large, red and bold EMERGENCY typography dominates the waiting environment. In this speculation, the needs of users are put first – along with how the signage might still be made clear, but in perhaps a more soothing and calming way.

5.5 Learning through iteration: Discarded pieces of the design practice

A number of creative experiments undertaken based on either the literature or data collected through co-design engagements were ultimately rejected from being developed further through creative synthesis. Figure 5.24 presents a short sample of some of these undeveloped, or unprogressed experiments. These items were rejected as experiments as they lacked grounding in contemporary ED experiences or extrapolated too far from the status quo. As Auger (2013) articulates, the challenge is to ensure that the speculation is 'real enough' that it is possible for an audience to engage with it and 'fictional' enough that it challenges the assumptions made by an audience. The speculation must be managed and tailored to the 'complex and subtle requirements of an identified audience'. As Auger (2013) continues, the challenge for designers is to bridge the audience's perception of their world with the fictional concept. Many of the ideas presented in Figure 5.24 were rejected for failing to bridge reality and fiction.



Figure 5.23:

Exploring digital signage, including patient whiteboard, including patients en-route and patients already in the EDWR.

5.6 Limitations of the design practice: Too busy speculating?

Why look so far into the future when the current problems are so urgent? Isn't this project just a piece of art? How does this help? Indeed, a discourse of literature has emerged in critique of speculative design in recent years which argues that although the growing practice raises debate, it rarely offers an account of the impact of this debate and engagement (Malpass 2013; Tonkinwise 2015). A broad criticism of speculative design work – and thus, the work of this study – lies in the capacity for that design to mobilise change. Tonkinwise (2015) asserts that 'design that does not already future, fiction, speculate [...] is inadequate designing' and 'calls out' the 'specialist versions of designing benefits only in the artificial ecosystems of academic design research, especially the bubble that is HCI'. But he then goes on to argue that designers create 'futures to help others realise those futures' and that such futures help motivate transitions from current states to preferred ones. Unlike existing design approaches to the ED, which have led to dramatically slow or no change in the waiting room, this work aims to inspire change in current approaches and provide a platform for new strategy. Tonkinwise is correct when he argues that design that does not provoke is inadequate design. As was underscored in Chapter 4, the EDWR is filled with inadequate design and that is exactly why speculative thinking is needed.

The design experiments cultivated within this study provide a fertile field from which new research, design and development might flourish. This speculation is in a continual state of becoming and will be enriched by multiple interpretations, critique and debate. For example, further practice-based research could involve exploring which aspects of the speculation might add the most value to the ED journey and investigating how they might be prototyped and tested at higher fidelity. Moreover, this study has focused on the waiting experience in the ED, but other moments in the ED journey could also be explored in more detail, from pre-hospital care to triage and physician workflow.



Figure 5.24:
A sample of some of the ideas rejected through speculative design activity.

5.7 Chapter conclusion

This chapter has described the creative process of design practice undertaken within this study and established the role, features and system of the AI construct Asklepios, before presenting an existing service blueprint of the current EDWR and the iterative ideation process to develop a speculative alternative. The chapter has then expanded upon this proposed service blueprint by exploring the form, aesthetics and interactions of touchpoints within the speculative service journey through design experiments. Central to these touchpoints are the design of the Asklepios chair device and blanket, as well as the overall spatial layout and digital signage of the EDWR. The ideation and materialisation of this concept through the creation of prototype models and touchpoints demonstrates a response to the research and designs question declared in this study.

Collectively, these articulations of design practice are not deterministic of the future, but provocational proposals that invite discussion, reflection and debate as to what the preferable future is for the EDWR. These proposals are formative – not summative – and provide a platform on which further design work and speculation might grow. This contribution is not a definitive designed outcome, but a platform for further speculation and research which can be used partially or entirely to inform the design of new healthcare facilities. Like the open-design and open-source movements, this design outcome might be applied as a starting point for further research and development, inspiring further change for future EDWRs.

The process of design experimentation is an integral part of developing the speculative outcome. In doing so, this project demonstrates disciplinary confidence, taking the position that design is a discipline before it is a profession – an approach that can create new knowledge embodied within the material and immaterial artefacts of design practice ([Malpass 2017](#)). Design here is applied as a method of navigating the ambiguity of the future through creative practice, where such practice is not necessarily in pursuit of a solution to a problem or interested in making things 'better' for end-users, but concerned with exploring the intricacies, complexities and contradictions of human experience. This sets the scene for Chapter 6, which will further document the speculative design outcome, and Chapter 7, which will unpack some of the conversations elicited by the work.

Chapter — 06

A speculative vision for the future for the Emergency Department waiting room

CHAPTER OVERVIEW —

This chapter presents the design outcomes: a speculative service blueprint, associated hypothetical touchpoints and a suite of design fictions. The contribution of these outcomes is primarily as a provocational device and they collectively illustrate one vision of what daily life might be like in the ED of the future.

DESIGN FICTION SUMMARY —

CONTENT WARNING: Depictions of violence and racism in the ED.

74-year-old Jeremy, who was recently diagnosed with bladder cancer, is out for a walk on a Sunday morning with his daughter, when he starts to feel a sharp pain in his stomach and thinks he may need to go to hospital. As a result, the group quickly rush Jeremy to Clearview Hospital.

On his way to Clearview Hospital, Jeremy realises this will be his 10th visit to the Clearview ED this year. On arrival, the group are greeted by a Malaysian nurse. Jeremy has trouble understanding what she is saying, and then asks to speak with an “Australian nurse”. He becomes a little agitated, and then curses at her.

Key Thematic: Cultural competency in the waiting room —

Kimani et al. (2016) discuss some of the thorny legal, ethical and clinical complexities that racist patients present ED staff with in the context of urgent care. ED staff might be offended by the problematic behaviour of a patient, but know that the same patient might have a serious medical condition and that they cannot treat them against their will. These complexities and episodes can be painful, confusing and scarring for the professionals involved (Kimani et al. 2016). Under Australian law, healthcare staff have the right to a workplace without discrimination on the basis of protected attributes such as race, colour, religion, sex and national origin. Patients also have the same right to care, free of discrimination based upon protected attributes (ACEM 2010), but this can be made difficult for staff in practice when patients themselves act in a racist or discriminatory way – such as by the character Jeremy. ED staff must balance patients’ interests with staff employment rights and the duty to treat injury (Kimani et al. 2016).

The challenge of cultural competency in the ED is a pertinent theme that emerged through studies discussed in Chapter 4 and is explored in this design fiction as it might relate to this technological future. This design fiction alludes to the capacity for technology such as Asklepios to both reinforce, and subvert, aspects of cultural competency in the ED as a question worthy of exploration. To what extent should technology hold an individual accountable for unacceptable comments? To what extent might a staff member deflect the patient to technology to avoid having direct contact? What are the overall implications for others in the waiting room who witness such an outburst? While patients and carers are central users of the waiting room, as we see in this design fiction ED staff also play an important but sometimes understated role in this experience.



IT WAS A NORMAL DAY OUT...

WE'D JUST BEEN TO A CAFE,
AND THEN GOING ON A WALK WITH DAD...

THIS IS MY STORY WITH
CLEARVIEW EMERGENCY DEPARTMENT.



SHORTLY AFTER, DAD WAS LAID OFF FROM HIS FIRM ... HE WAS 'TOO OLD' FOR THIS ECONOMY, ACCORDING TO HIS BOSS.

AND NOW HE'S RETIRED ... AND LONELY. I'M THE ONLY SIBLING THAT STILL SPEAKS WITH HIM. DAD CAN BE A LITTLE DIFFICULT AT TIMES.



AND THEN ...

DAD WAS DIAGNOSED WITH BOWEL CANCER.
THE DOCTORS GAVE HIM ABOUT 18 MONTHS...

THAT WAS 9 MONTHS AGO...



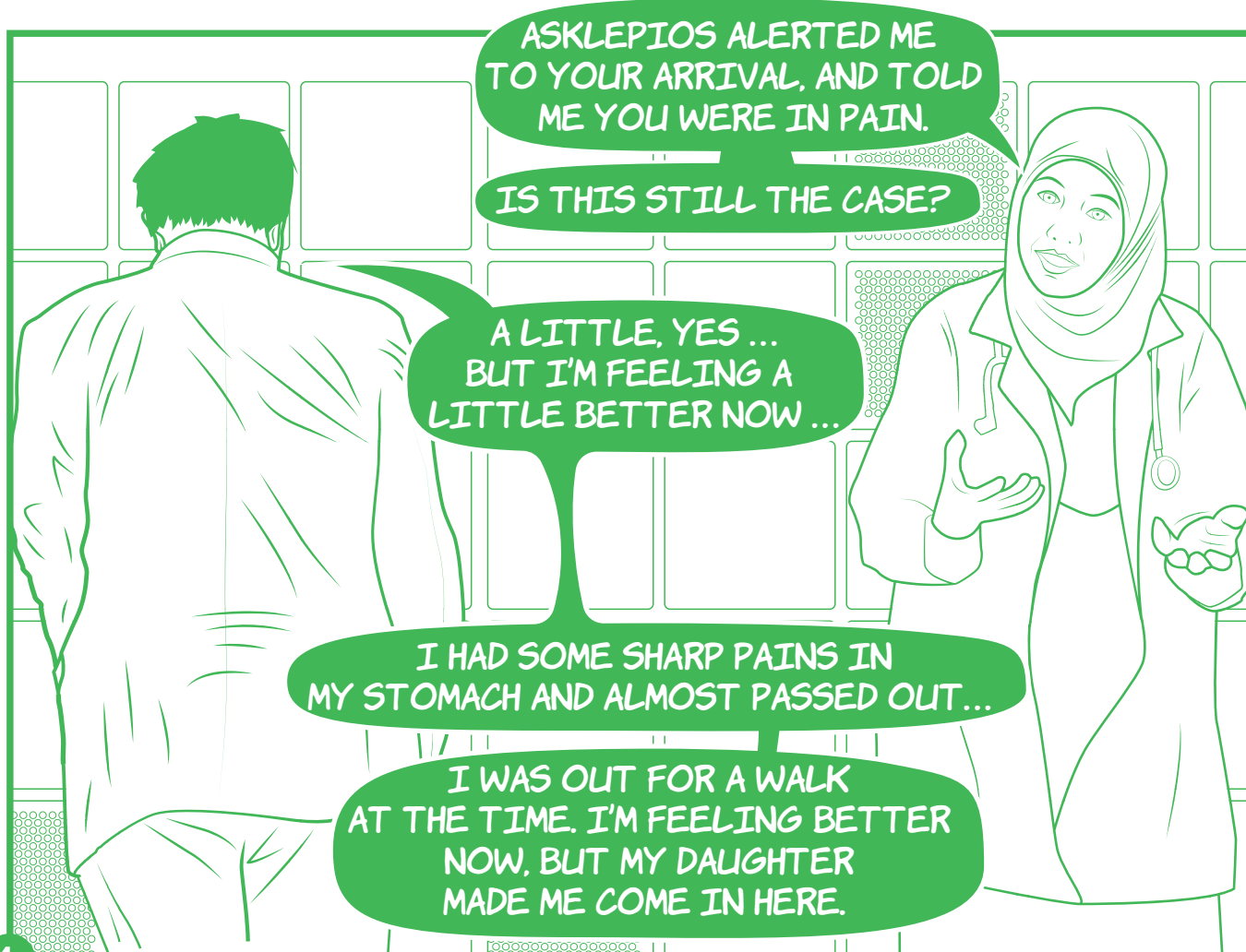
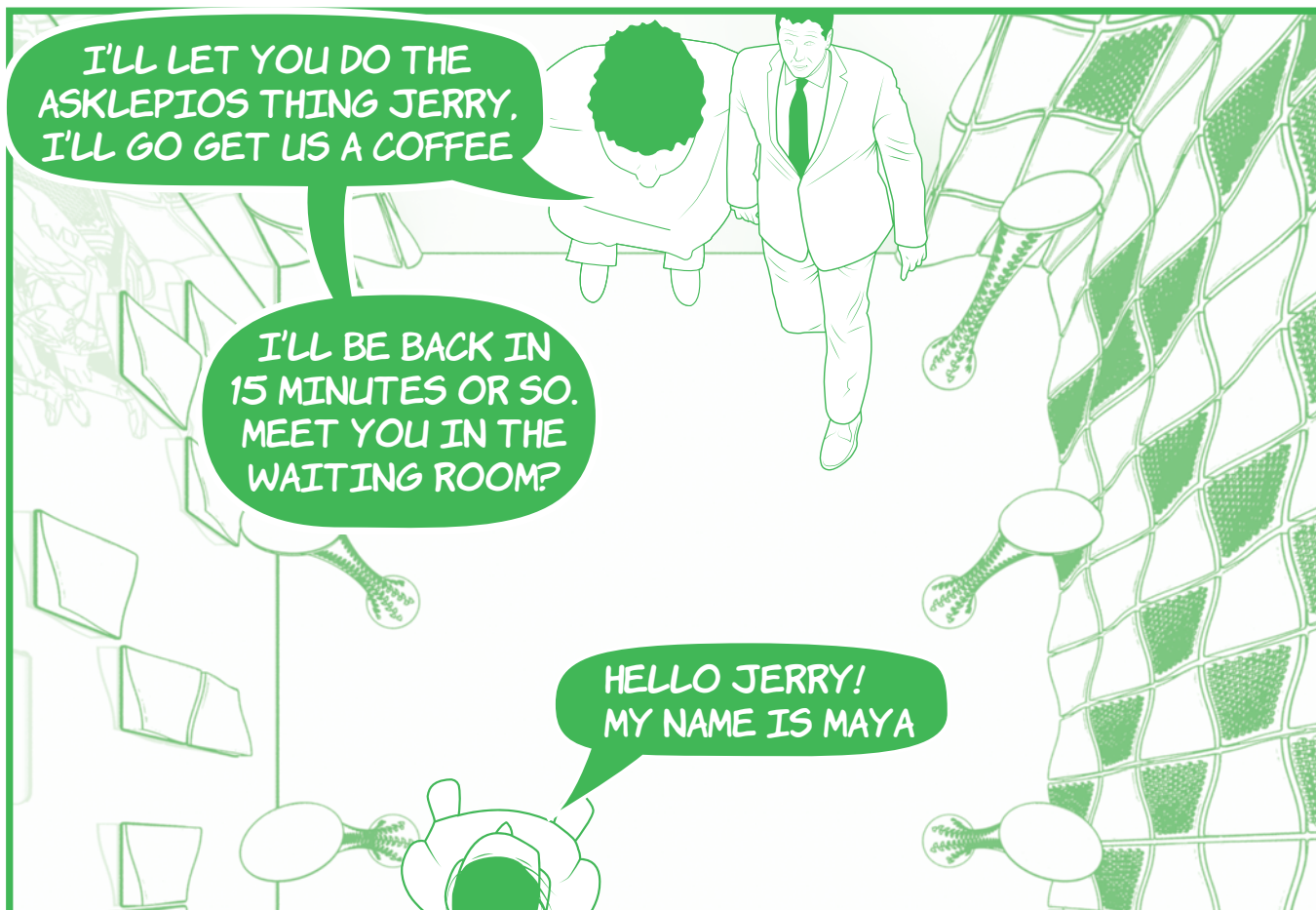
WE REALISED ON THE WAY TO
THE ED TODAY, THAT THIS WILL BE
OUR TENTH VISIT TO CLEARVIEW
SINCE DAD WAS DIAGNOSED

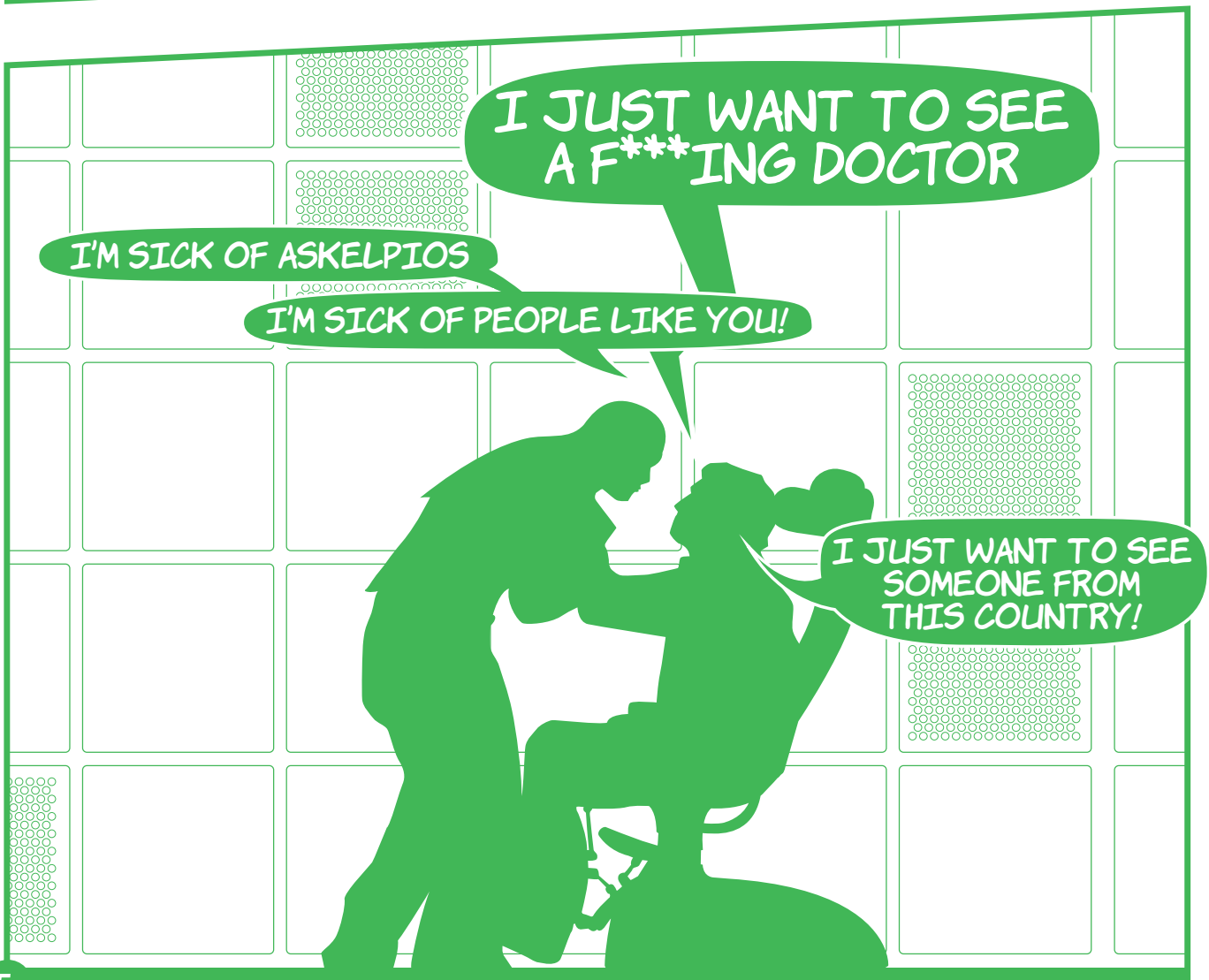
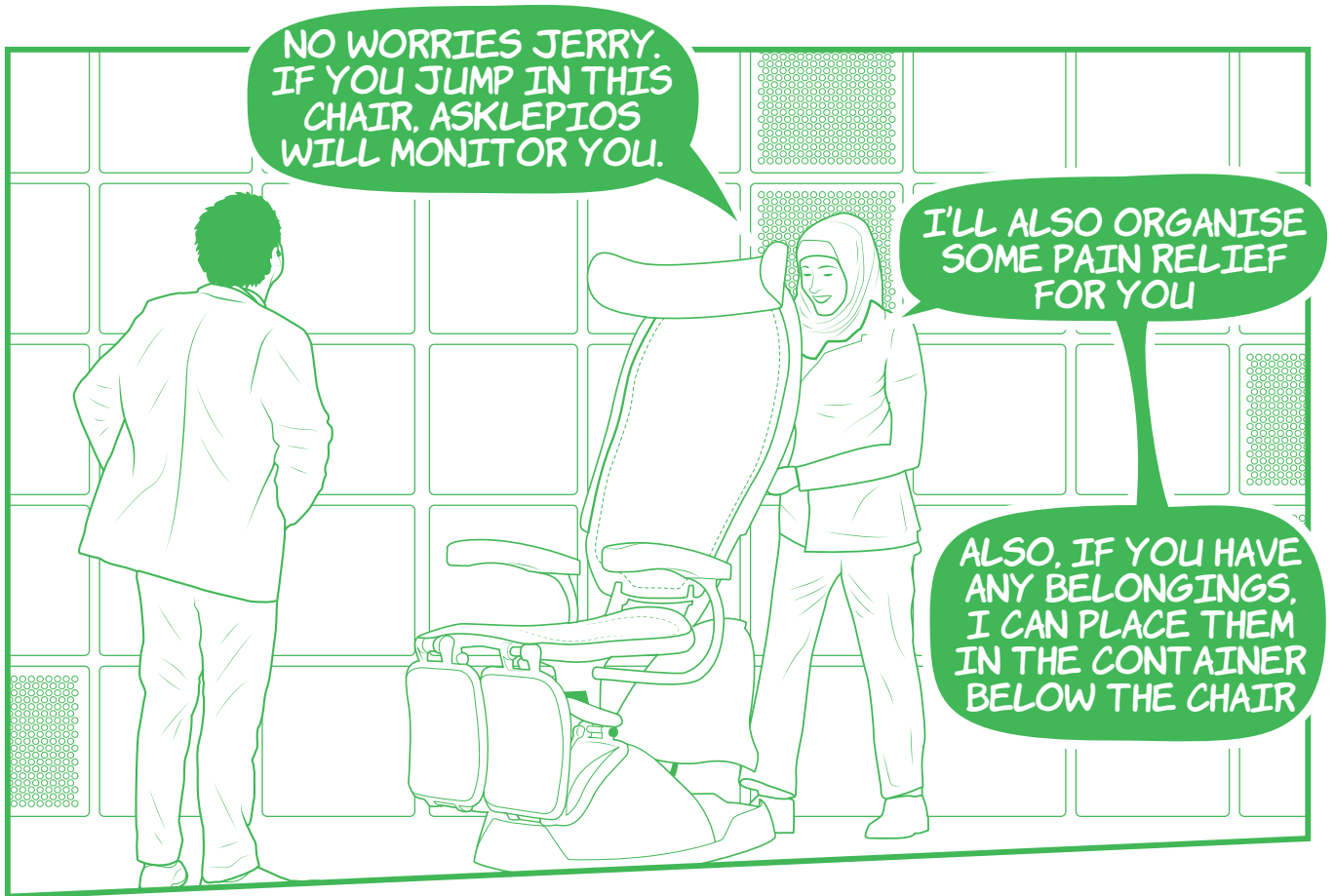


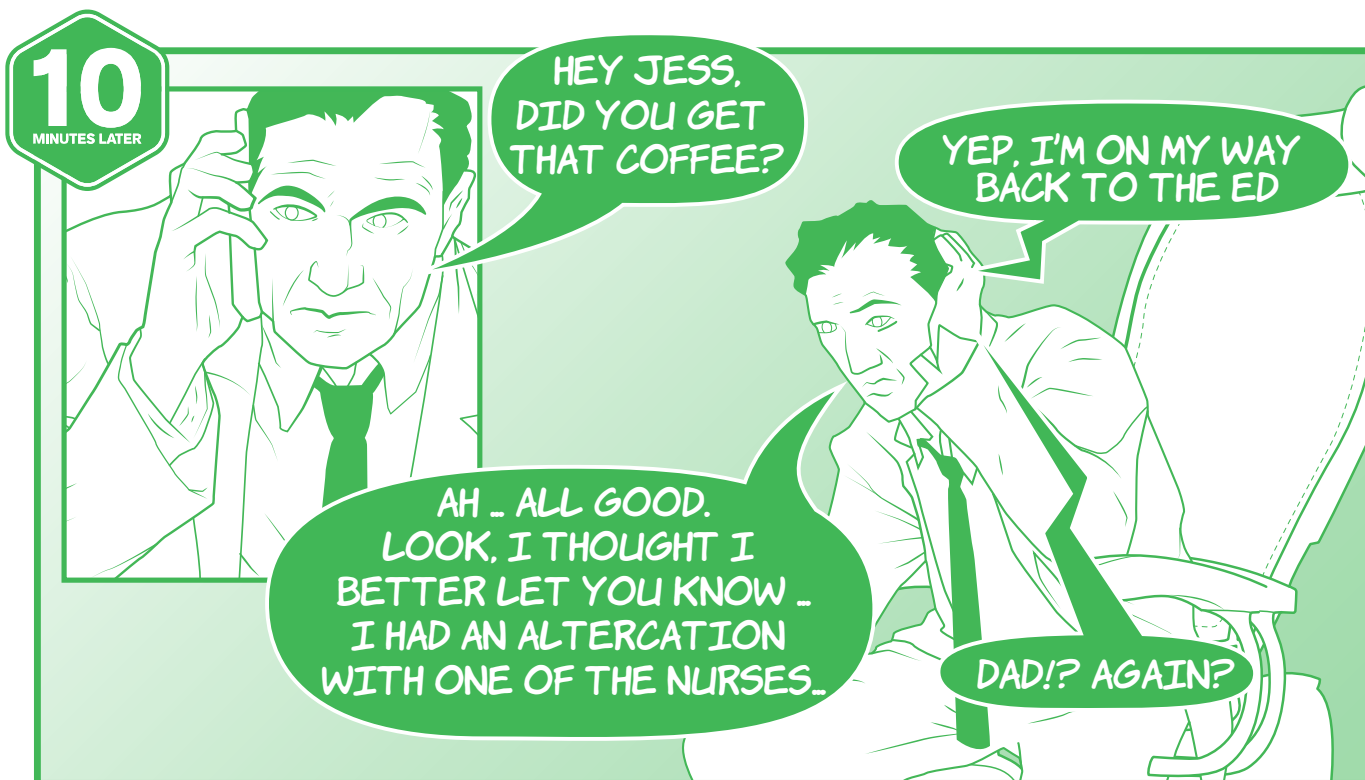
ASKLEPIOS AI

WELCOME TO CLEARVIEW ED JERMERY.

WE'VE GOTTEN QUITE USED TO OUR VISITS.
WE GET OUT AT THE FRONT DOOR, AND ASKLEPIOS
HELPS OUR CAR FIND A PARK.







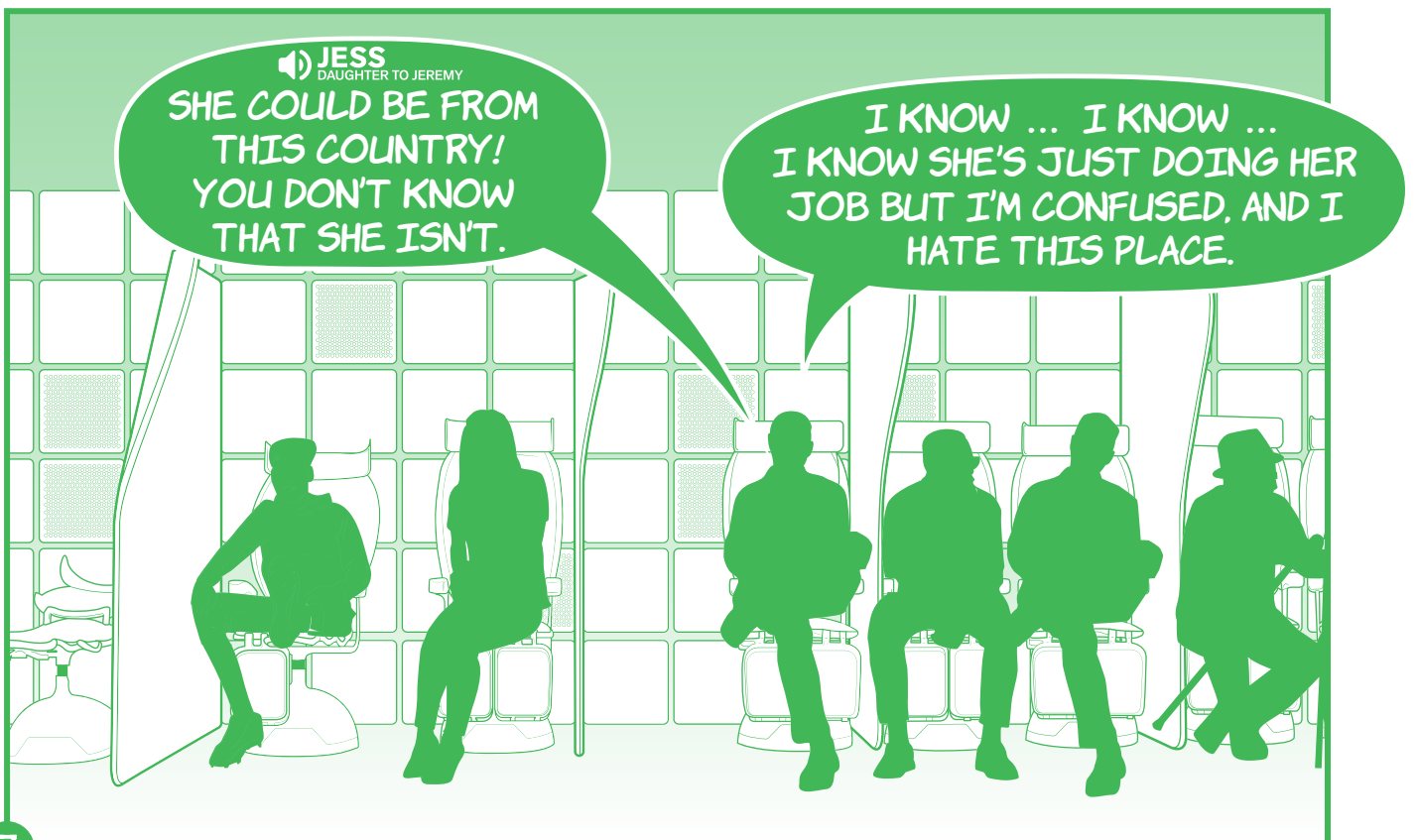
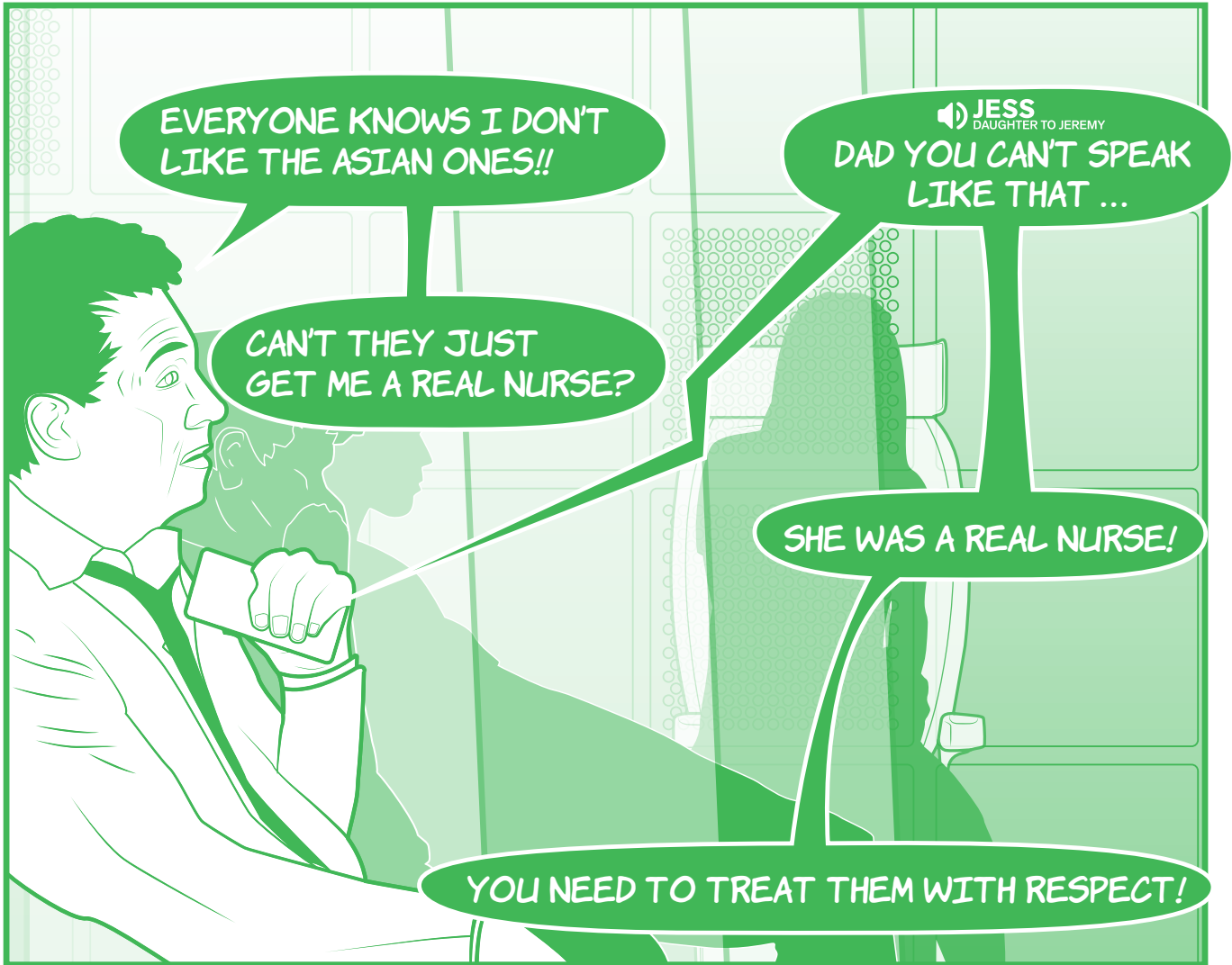
MEANWHILE...

ASKLEPIOS AI

MAYA, ARE YOU OKAY?
WOULD YOU LIKE ME TO CONTACT
THE EMPLOYEE ASSISTANCE
PROGRAM FOR YOU?

NO ...UH,
I'M OKAY ASKLEPIOS. THANKYOU
PLEASE KEEP AN EYE ON HIM
FOR ME ASKLEPIOS.


I SWEAR THIS KIND
OF S*** HAPPENS
EVERY SHIFT...





AT THIS RATE I'M ONLY GOING TO
LAST A FEW MORE WEEKS ...

LET ALONE A FEW MORE MONTHS ...



I'M SICK OF ALL THIS.
I'M SICK OF BEING SICK.
I HATE UPSETTING THE
NURSES, AND YOU ...



I'M SO SICK OF SEEING
ASKLEPIOS ALL THE TIME

MAYBE THINGS WOULD
BE BETTER IF I WASN'T HERE ...



JESS
DAUGHTER TO JEREMY

IT'S OKAY DAD, BUT YOU SHOULD
APOLOGISE TO THAT NURSE IF YOU CAN.



I'M NOT GOING ANYWHERE. IF
ANYTHING, VISITING CLEARVIEW
ALL THE TIME HAS MADE
ME REALISE WHAT
MY PRIORITIES ARE

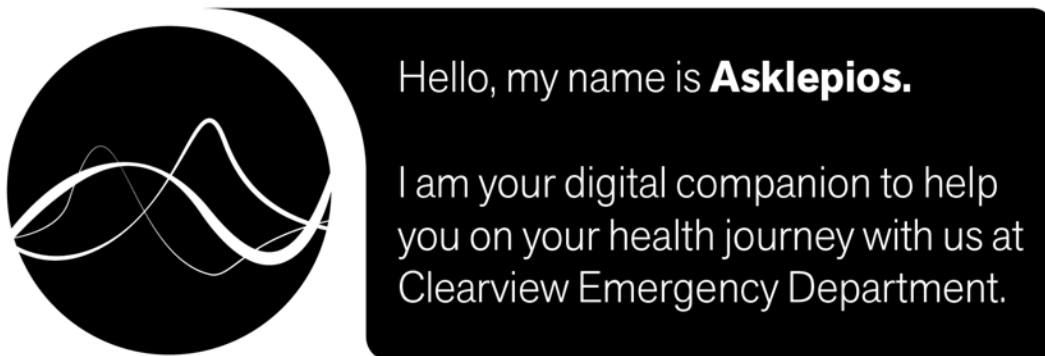
LIFE IS NOT ABOUT THE JOB, THE MONEY, OR THE RUSH

IT'S THE PEOPLE YOU LOVE ...
NO MATTER HOW DIFFICULT THEY ARE

AND THAT ONE MINUTE THEY MIGHT BE HERE,
AND GONE THE NEXT ...

END

Figure 6.1:
The Asklepios Artificial
intelligence system



6.0 Introduction to the outcome

Technology is not valuable, meaningful, or consequential by itself; it only becomes so when people actually engage with it in practice.

— Martha Feldman and Wanda Orlikowski, *Theorizing practice and practicing theory* (2011)

Chapter 5 presented the series of design experiments, iteration and refinement leading to the development of the speculation. This chapter presents the results of such experiments, in the form of the speculative service design outcome. This chapter begins by establishing the Asklepios AI as central to the speculative service blueprint, which is then presented and unpacked. In support of this blueprint, the chapter then goes on to present the different articulations of the outcome and design practice in the form of visualisations, physical models and a suite of design fiction publications. The chapter concludes by discussing how these articulations are brought together by the exhibition-in-a-box, which acts as both a place and a method for speculation on ED futures. This then sets the scene for Chapter 7, which explores the many conversations generated by the speculative outcome. In doing so, this chapter demonstrates a practical use of the SSD framework, as set out in Chapter 3.

6.1 Asklepios: The digital AI for the emergency department

The speculation developed in this study through SSD practice might be summarised as the provocation:

That the integration of intelligent, automated systems into the EDWR will enrich patient experiences by providing live feedback, the supply of information, guiding patients through their journey and support ED staff workflow by prioritising tasks, active monitoring of patients, and supporting digital triage.

Our digital devices – such as our smartphones – have become like our passports between two worlds, mediating complexity and possibility in this new, networked century. Ishii and Ullmar (1997) write that 'we live between two realms: our physical environment and cyberspace. Despite our dual citizenship, the absence of seamless couplings between these parallel existences leaves a great divide between the world of bits and atoms'. Within healthcare, this fusion of our digital and physical lives is only just beginning. Networked technologies such as AI are already having a profound impact on how all of us live, work and play. It is likely that the shift that has already occurred in many other facets of life will continue to permeate throughout the ED and Asklepios is one speculation as to how this might manifest.

In a highly connected and digitised ED, devices that monitor and respond to our wellbeing in real time have significant implications for both clinical workflow and user experience. Useful health data – including medical histories and data from wearable devices – can be used to complement urgent care practice (Shapiro et al. 2006; Wang et al. 2019); digital tools can also assist healthcare staff in managing workload (Wang et al. 2019) by prioritising or entirely automating process-driven tasks. When workload for clinicians is made more efficient, patients have to wait less (Fong and Ratwani 2018). Responsive digital interfaces can provide patients and carers with real-time, accurate and reliable information about their condition and what they should expect on their journey (Bisantz et al. 2010). As discussed in Chapter 5, this technology should become 'phenomenologically transparent' (Heidegger 2010), becoming an invisible mediator of care and caring. As such, Asklepios aims to become transparent and embedded within the ED environment and architecture, focusing on supporting clinical workflow and patient experience.

In the speculative service blueprint, Asklepios plays a central role in mediating interactions between ED participants. The next section presents the speculative service blueprint, contrasts it with what already exists and explains how each touchpoint might fit within that experience.

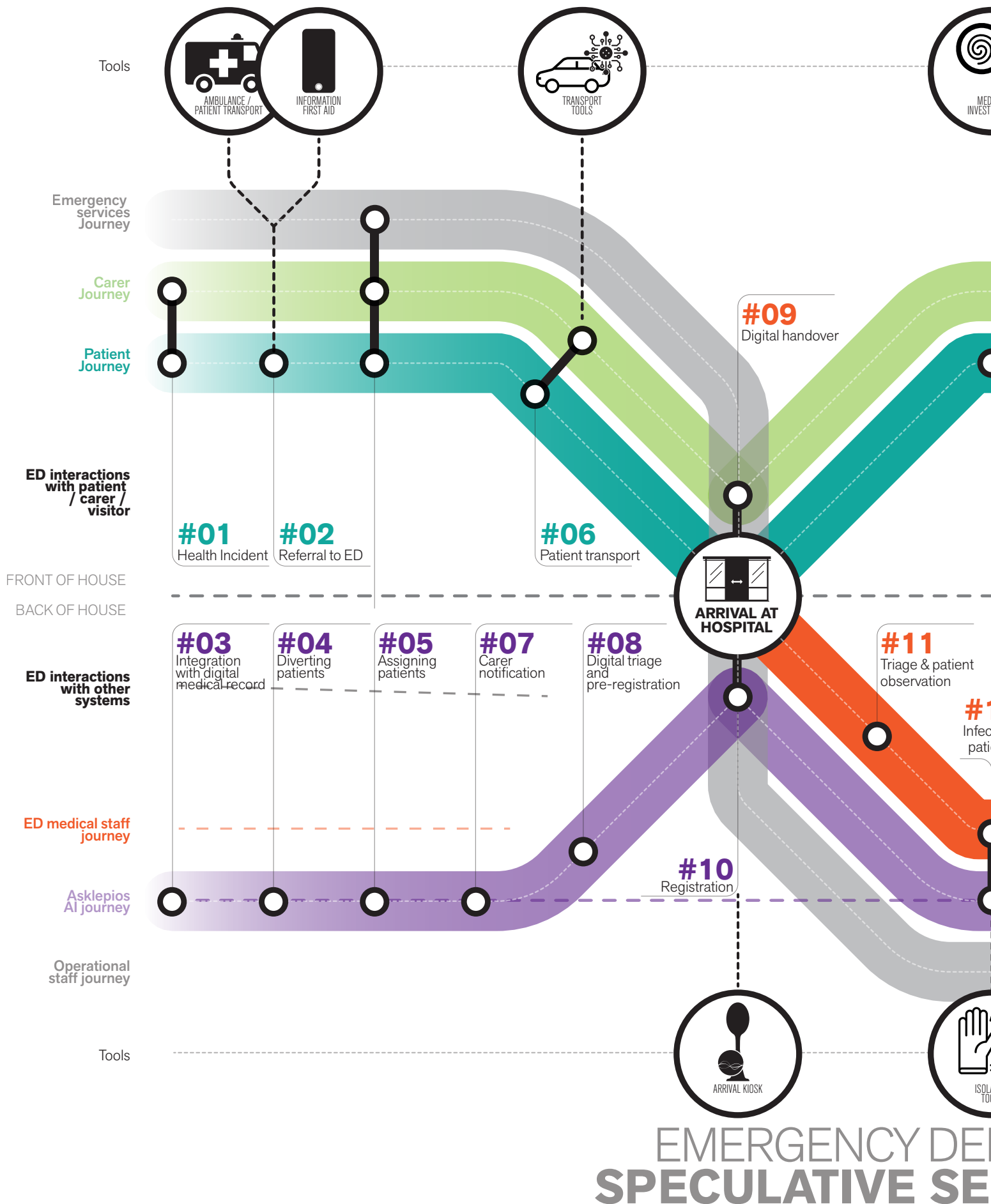
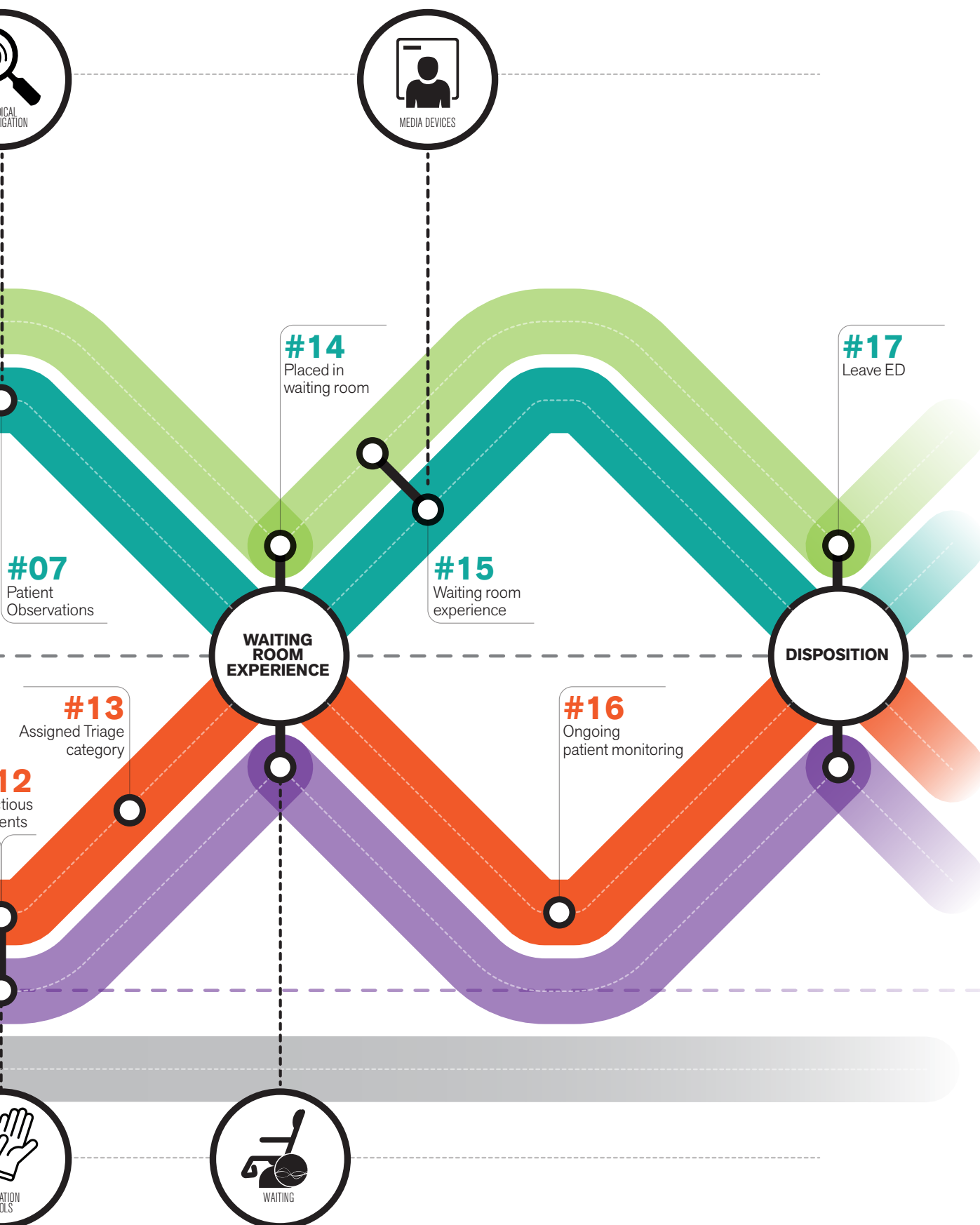


FIGURE 6.2:
The Speculative service blueprint, highlighting how the Asklepios AI construct might be integrated into ED operations



DEPARTMENT WAITING ROOM SERVICE BLUEPRINT (NEXT)

EMERGENCY DEPARTMENT WAITING ROOM SPECULATIVE SERVICE BLUEPRINT (NEXT)

#01

Health Incident

Critical patients: Patient sustains a critical injury that requires urgent medical attention. First-aid is provided by responders who contact Emergency Services.

Non-Critical patients: Alternatively, patient sustains an urgent, but non-critical, injury that requires medical attention.

#02

Referral to ED

Critical patients: Paramedics provide medical care and life support to stabilize the patient ready for transport to a local Emergency Department. Paramedics then transport the patient to the nearest ED with appropriate capacity.

Non-Critical patients: Patient visits a primary care health professional (GP, pharmacist, nurse or similar) who refers the patient to an ED. Primary care professionals upload a 'letter of referral' to the digital device of the patient, which can be accessed by Asklepios and staff at the ED.

Patients may also identify themselves that they need urgent care, and go to the ED without engaging with primary care.

#03

Integration with digital medical record

When the patient is referred to the ED, ASKLEPIOS accesses the digital health record for the patient at hand and connects the medical record with other patient data collected by paramedics or ED staff. This data is then used to inform medical care throughout the patient journey.

#04

Diverting patients

For non-critical patients, ASKLEPIOS AI diverts non-critical and/or non-urgent patients away from the ED and towards other urgent care services that are able to deal with the individual patient case. In doing so, ASKLEPIOS helps to reduce the load of patients presenting at ED's.

#05

Assigning patients

ASKLEPIOS encourages patients to attend the most appropriate ED based on location and the lowest estimated wait time, even if that means diverting the patient to an ED further away from the location of their health incident.

#06

Patient transport

ASKLEPIOS interfaces with the mode of transport the patient is using (i.e: private car, taxi, public transport) and assists the patient/carer on how to travel to the ED, including with route planning.

#07

Carer Notification

At the request of the patient, ASKLEPIOS will contact family members via text or phonecall and provide updates in realtime.

#08

Digital triage and pre-registration

Enroute to the hospital, ASKLEPIOS begins registration and triage processes. ASKLEPIOS registers patient into ED, and overlays presenting symptoms with medical history, and then assigns a preliminary triage category.

#09

Infectious patients

Patients who are identified as potentially infectious by ASKLEPIOS are transferred to a separate part of the ED where patients can enter the ED without coming into physical contact with other patients.

#10

Digital handover

Patients who travel by ambulance enter the ED via the Ambulance entry. Paramedics handover the patient to triage nurses on arrival. ASKLEPIOS AI provides documentation about what care was provided to patients.

#11

Registration

Enroute to the hospital, ASKLEPIOS begins registration and triage processes. ASKLEPIOS helps patients register into the hospital system by confirming their identity and details.

For patients, carers and visitors who do not engage with ASKLEPIOS prior to physical attendance at the ED, they are greeted by ASKLEPIOS self-service kiosks, positioned near the front door.

#12

Triage and patient observations

ASKLEPIOS self-service kiosk triages patients, by synthesising all data that has been provided on the journey to the ED with presenting symptoms and vital signs. Through an array of embedded sensors, the kiosk device detects vital sign readings.

ASKLEPIOS orders relevant diagnostic tests and procedures required for the patient, and dispenses medication to be administered by ED staff to patients as needed.

FIGURE 6.2:

The Speculative service blueprint, highlighting how the Asklepios AI construct might be integrated into ED operations

#13

Assigned Triage category

ED staff assign a triage category using the Australasian triage scale (ATS), confirming or modifying the initial rating given by Asklepios.

#14

Waiting room experience

ASKLEPIOS provides information and feedback to individuals about their waiting experience - their place in the queue, how long they can expect to wait and what is likely to happen on their health journey. Patients can also access media entertainment via ASKLEPIOS through a mixed-reality interface.

ASKLEPIOS monitors the patient through an array of embedded sensors within each waiting room chair. If the condition of the patient deteriorates in the waiting room, ASKLEPIOS alerts medical staff.

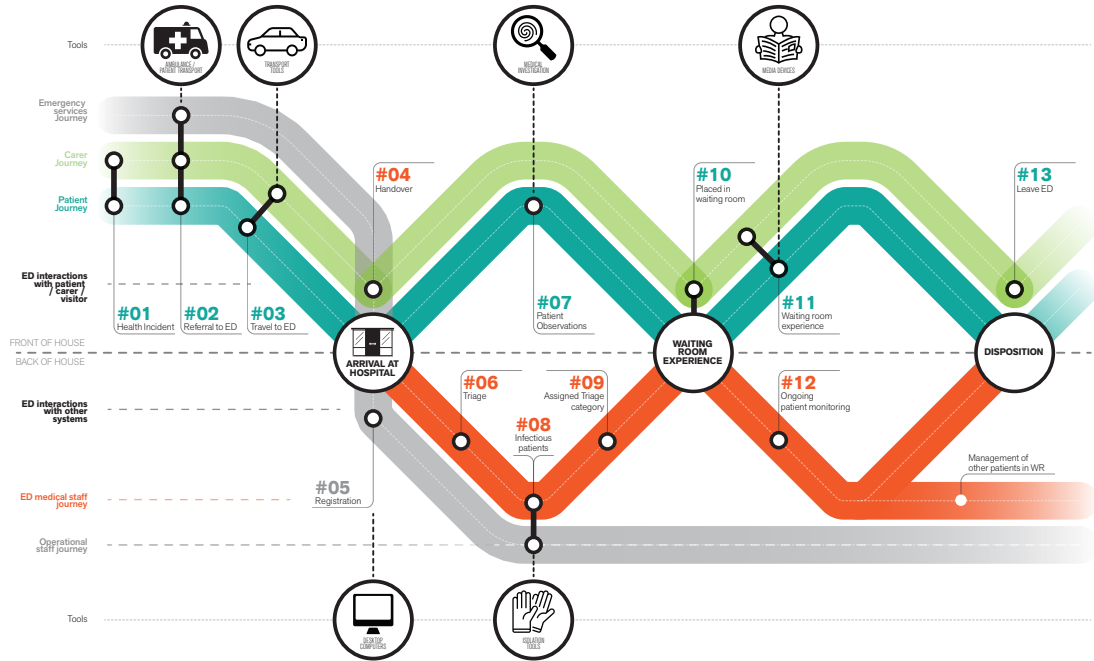
#15

Leave the ED

ASKLEPIOS manages the discharge of individuals from the department. ASKLEPIOS engages with other healthcare systems - both within and outside the hospital - to provide information about the individual patient that might be relevant to their ongoing care.

Patients are either admitted to a hospital ward, or discharged from the ED and return home, into supported accommodation or a correctional facility.

NOW



NEXT

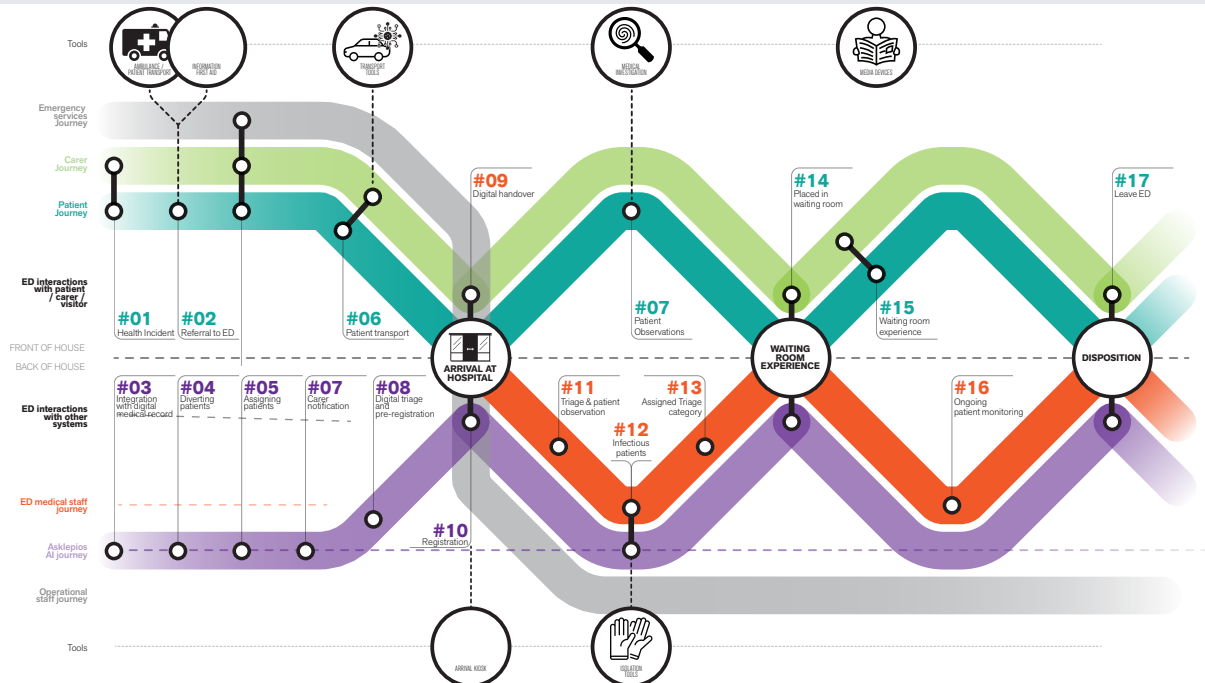


Figure 6.3
The speculative service blueprint, highlighting how the Asklepios AI construct might be integrated into ED operations.

Figure 6.4:
Visualisation
of Asklepios
registration kiosk



6.2 Speculative service blueprint: Asklepios and an alternative future for the waiting room

Figure 6.2 presents the speculative service design blueprint as an outcome from the experimentation described in Chapter 5. In this diagram, Asklepios becomes an integral component of overall operations and mediates interactions between human and non-human participants throughout the service journey, offering operational and experiential benefits to staff, patients and carers. In Figure 6.3, the blueprint of what exists today (NOW) is contrasted against this alternative (NEXT), where the Asklepios AI is omnipresent and made central to urgent-care activity. Figure 6.3 demonstrates how the choreography of interactions might be shifted through this speculation, with the purview of improving waiting experiences.

Figure 6.5
Waiting room illustration



6.2.1 Health incident

Silverberg (1967) writes that the concept of urgent care is as ancient as pain itself, with references to emergency care described in the Iliad and the Bible. While advances in public health and primary care might make critical injury less likely, the human proclivity for injury means that there will always be a need for urgent medical care. As is the case today, this speculative ED service journey commences when a patient is so acutely unwell that they need urgent medical care that cannot be provided by another medical provider.

6.2.2 Arrival

How a patient arrives at the ED – by private car, taxi, public transport or ambulance – has a significant impact on their overall waiting and ED experience. In helping patients connect with the ED before their physical arrival, Asklepios is accessible to members of the community via their smart devices. Asklepios helps patients navigate from their point of injury to the ED best equipped to deal with their illness – diverting patients away from busy EDs to less busy ones. Asklepios assists with route planning – providing real-time traffic advice for patients travelling by taxi, private car or public transport or on foot. Wherever possible, Asklepios connects with other AI systems to integrate user experiences across platforms to best help users, for example, connecting with a hypothetical 'Taxi AI' – see Kayde design fiction – to assist with route planning and prioritisation of their trip over those of other persons travelling for less critical reasons.



Figure 6.6
A visualisation of the Asklepios
chair device.

6.2.3 Registration and triage

Registering a patient into the ED system is an important process that draws together relevant data required for care – addressing their medical history, contact details, social security details and more. In this speculation, clerks and nurses – who are today seated behind a desk – are now ‘floating’ within the ED environment, supporting patients and carers as they interact with the automated system. Floating staff help users to place their hand on a kiosk and engage via text and speech with Asklepios, which then records, documents and synthesises relevant medical data. An array of sensors within the kiosk device record patient vital signs, for use as part of their medical care. This data is then available to ED staff via the electronic medical record and ED electronic whiteboard.

Triage of patients is now managed by Asklepios, but supervised by a human triage nurse. While Asklepios might synthesise medical data and data collected through patient observations with their chief complaint to make a judgement about the urgency and importance of their condition, a triage nurse remains in charge and approves the decisions made by the machine. Asklepios then prioritises work for clinical staff, where individuals with the most urgent needs are seen first. Ultimately, Asklepios is subservient and supports the duties of the triage nurse in initiating care for patients.

6.2.4 Waiting room and waiting experience

Even with AI-powered interventions such as Asklepios, when patient demand exceeds that of available supply in the ED, some patients will be required to wait in the EDWR. Asklepios measures vital signs and behaviours of patients through a raft of sensors embedded within the ED furniture. In the case of a deteriorating patient, Asklepios alerts ED staff, who can then directly manage that case.

For patients awaiting care, Asklepios provides a range of entertainment and media directly to individuals. Unlike the magazines and single television screens present in the ED of today, this experience enables the waiting room to be more responsive to individual preferences and ideas. Beyond just this form of distraction, Asklepios also provides information and feedback to individuals about their waiting experience – their place in the queue, how long they can expect to wait and what is likely to happen on their health journey. Unlike the printed material that are often found in waiting rooms of today, patients can engage with all of this information via Asklepios through a mixed-reality interface.

6.2.5 Disposition

Following the waiting room experience, patients who leave the ED do so either as an admission to hospital or are discharged from the ED with their own specific care plan. For reasons of scope, this speculation does not explicitly explore how Asklepios might interface with other parts of the hospital system once the patient leaves the ED, but leaves the door open for further exploration as to how different AI systems might interact with one another.

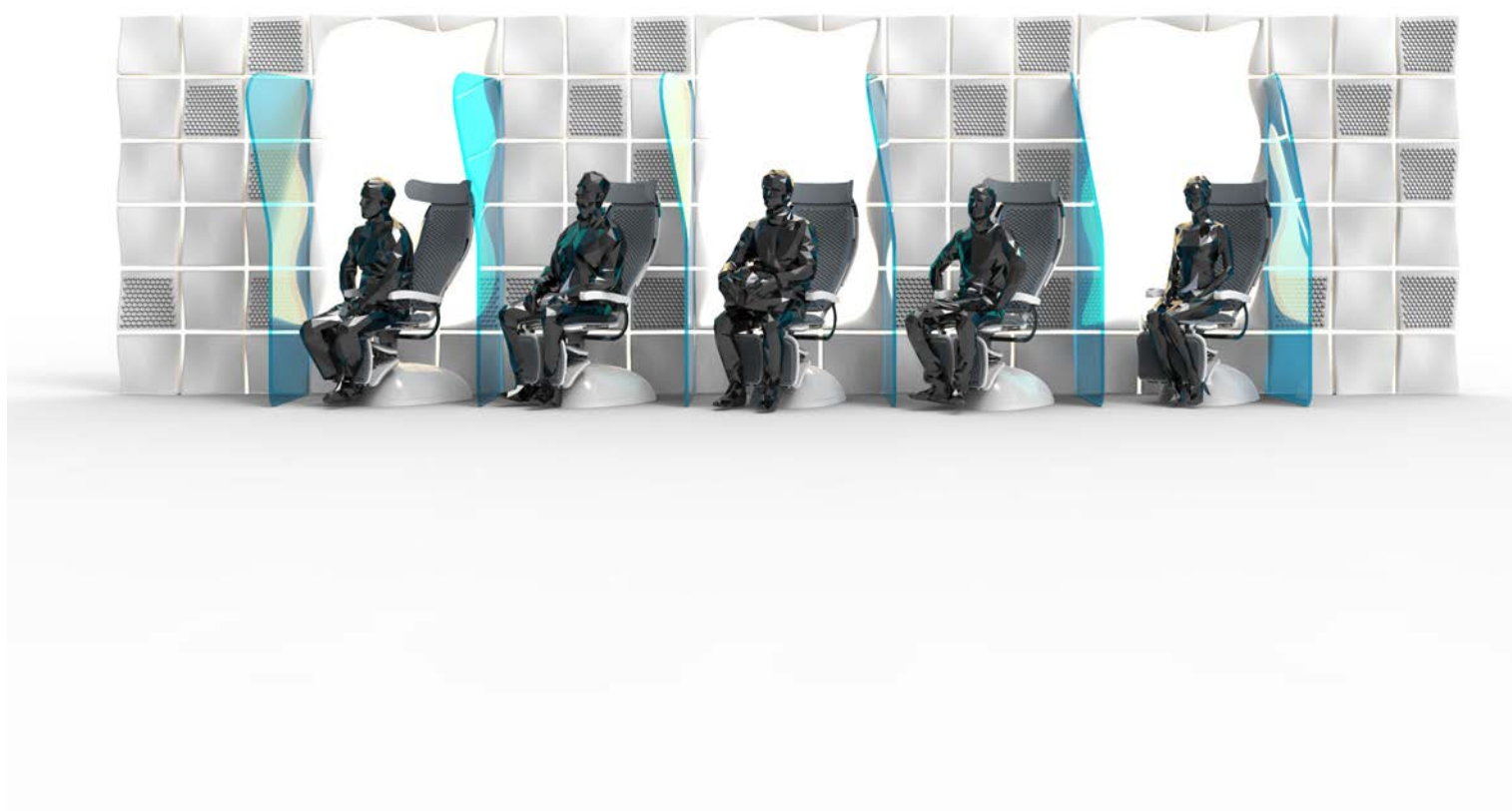


Figure 6.7:
A visualisation of the Asklepios chair
device and waiting room.

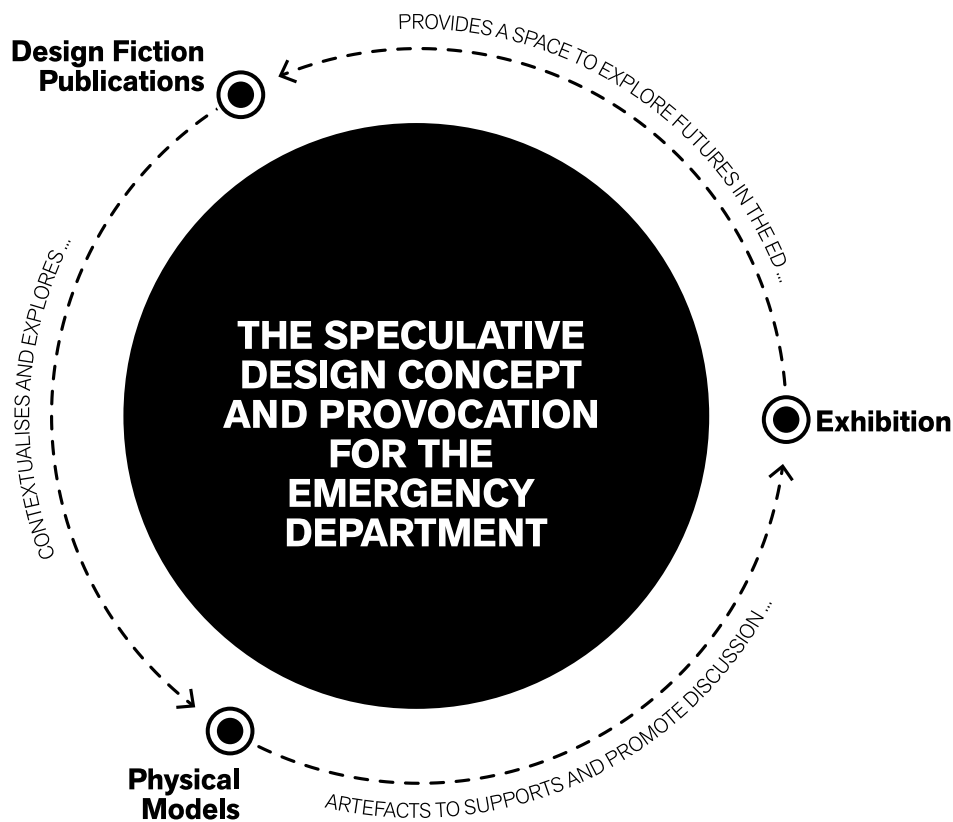


Figure 6.8:
A map of how the design concept and provocation is articulated through three modes of dissemination.

6.3 Articulations of the design practice

This contrast between what is 'now' (the status quo) and what is 'next' (a potential alternative future) in the form of these two service blueprints (Figure 6.3) provides high-level schematics for the speculation. This mode of articulation is useful and valuable as a high-level tool, but does not communicate or explore the overall intended, contextual, emotional and spatial-temporal richness of a real-life experience. To address this limitation, the design outcome is also articulated in the following modes:

1. A suite of designed objects that give form to the touchpoints in the speculative service journey. These objects are produced at a variety of scales and dimensions, and aim to make tangible the speculation and their possible impacts on user experience.
2. A suite of five design fiction publications that probe possible user scenarios within the ED of the future.
3. An exhibition-in-a-box a la Duchamp that draws together the creative work undertaken in this study. This box acts as a kind of 'theatre' for conversation upon the possible futures for the EDWR and acts as a tool, place and method to explore ED futures.

The following sections unpack each of these articulations in further detail.

Figure 6.9
Multiple views of the
Asklepios Chair for the ED
waiting room.



6.3.1 Designed objects and images

The future doesn't seem so far away anymore when you can pick it up off the shelf

— *Extrapolation Factory Operator's Manual*. (Montgomery and Woebken 2016, 65)

In support of the service blueprint, a series of visualisations and 3D artefacts help materialise the touchpoints that are present within this speculative service journey. Like 'totems' through which stories might be told, these objects are produced at a variety of sizes and scales to make tangible the speculation and their possible impacts on user experience (figure 6.8).

Figure 6.6, 6.7 and 6.7 presents a conceptual chair for the EDWR. The device is adjustable and configurable to the occupant's body and is digitally integrated into the Asklepios system. This figure also demonstrates the use of the blanket, which extrudes from the edge of the device to gently 'hug' the occupant, reinforcing the narrative of care and support. Figure 6.9 provides other detailed views, presenting how the device can recline and extend, as well as the cavity in the base of the device that opens for patients to store belongings.

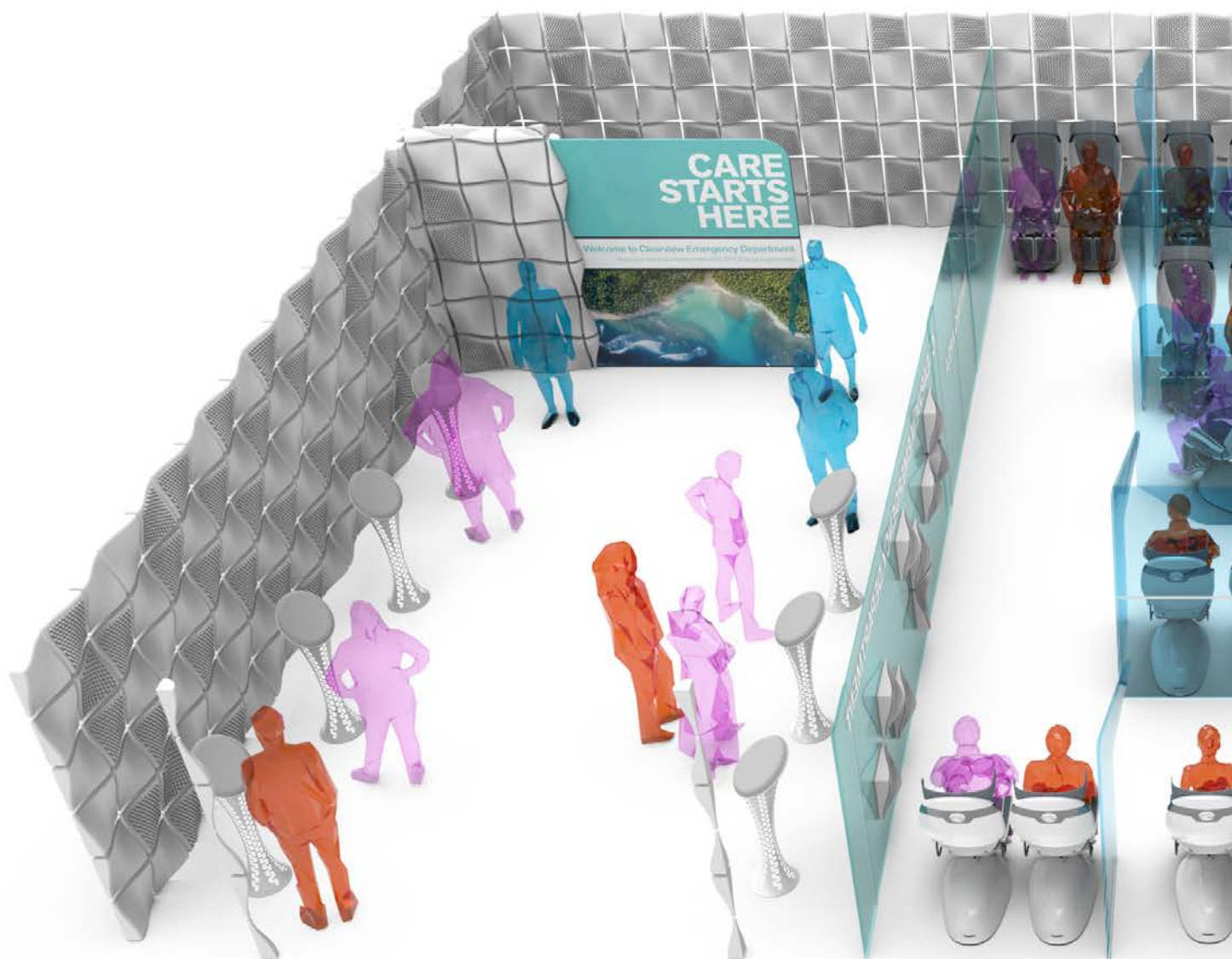


Figure 6.10:
Interior views of the EDWR and overall layout

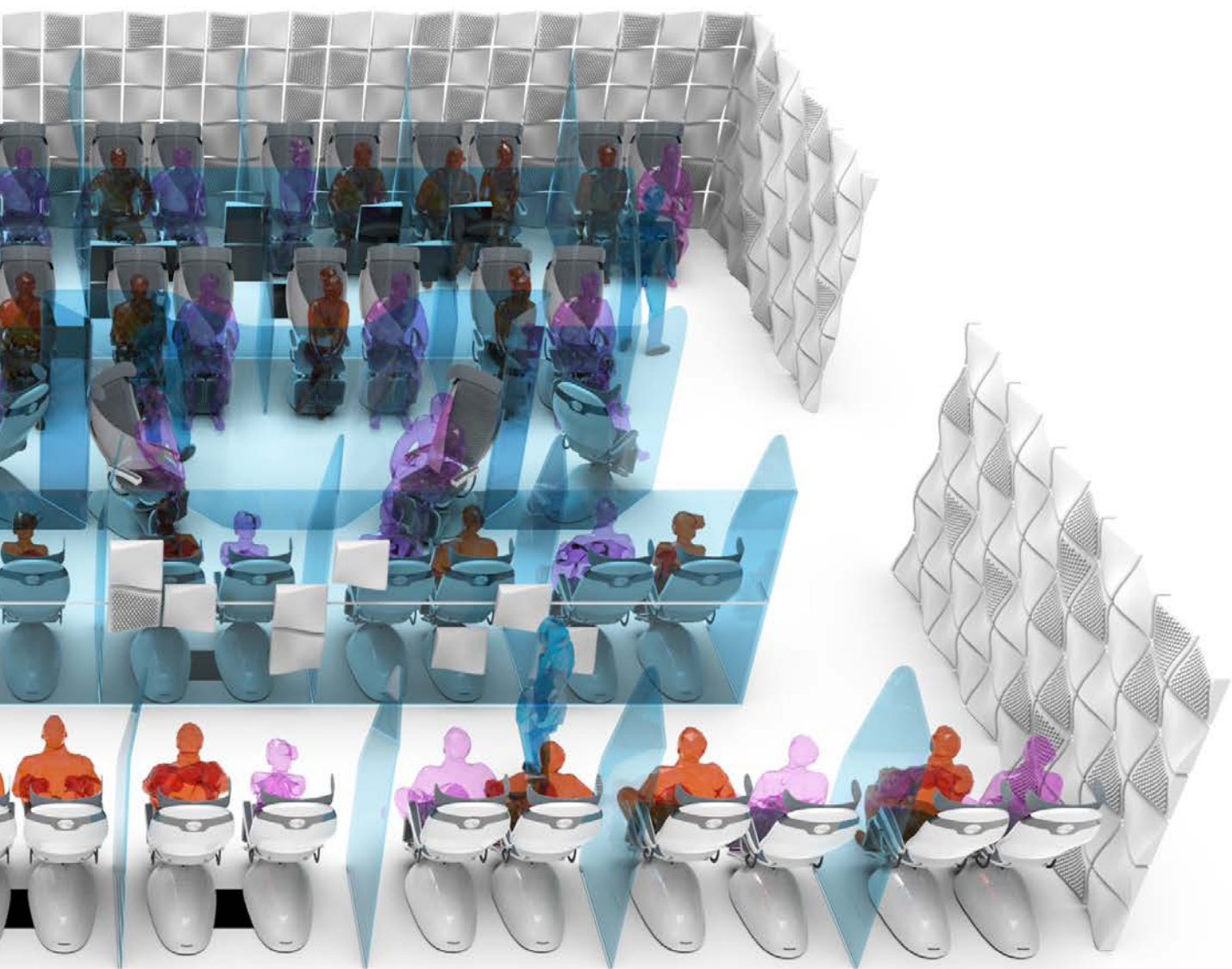


Figure 6.11:
Detail views of the
Asklepios Chair



Figure 6.7 and Figure 6.10 present how these chairs might be arranged in an actual waiting room configuration by providing an interior visualisation of a full waiting room space. In this visualisation, the placement of ED furniture, dividers between seats, signage and registration kiosks is visible.

The visualisations presented in these figures do not necessarily intend to predict the future – or provide an ‘optimal’ layout for triage, registration and the waiting room – but give one form to the speculation through designed objects. Components within this layout are deliberately designed as modular, so different or varying layouts might be developed through iteration with different components. Presenting the speculation in this manner, a future artifact in a contextualised environment, is an application of the ideas suggested by Elliot Montgomery and the Extrapolation Factory, as to how to engage people on a visceral level, allowing them to consider possible futures in concrete terms beyond the “aestheticised futures posited by Hollywood movies and corporate advertising campaigns” (p. 77). The contribution that this research makes is embodied within these objects; one articulation of many possibilities, and a platform for further design exploration and development.

Figures 6.12 and 6.13 present a concept of digital signage for inclusion in the ED and a hierarchy for the presentation of information, developing a style guide for how these visual elements manifest across screens and devices. Drawing upon the metaphor as discussed in Chapter 5 of slow-moving landscapes and water to ‘wash away’ intense emotion in the ED, these signs complement the other touchpoints and Asklepios by providing clear information. Digital signage means that information can be updated or changed by Asklepios in response to events within or outside the ED.

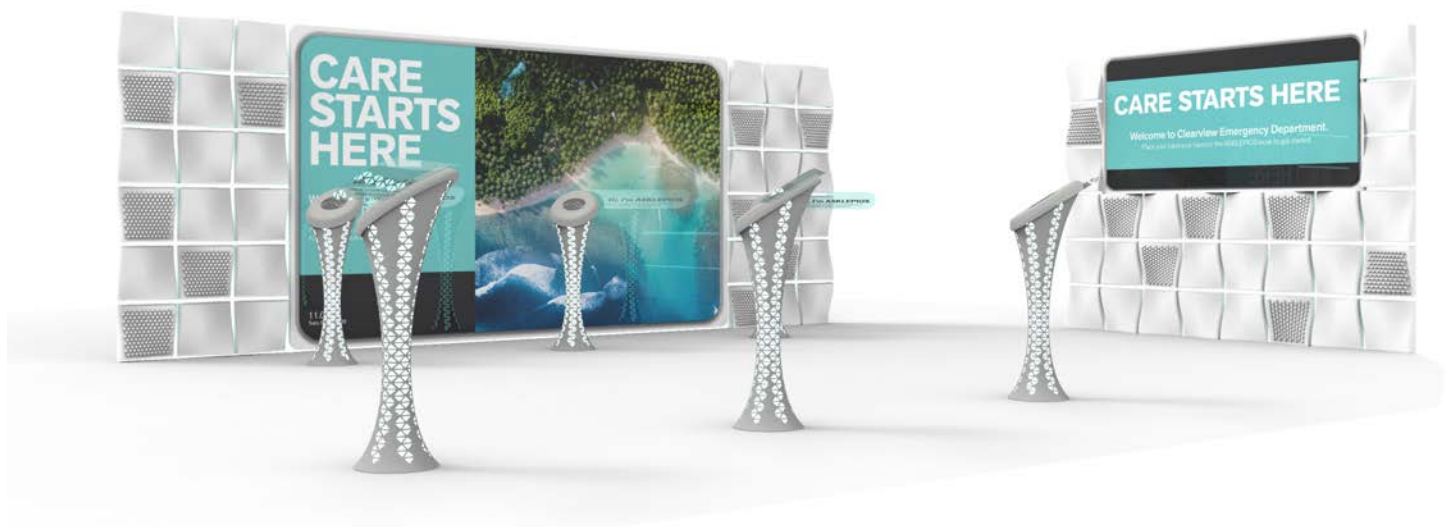


Figure 6.12:
A visualisation of the entry to the ED, triage
area and registration kiosk..

Figure 6.13:
Interior views
of the EDWR and signage

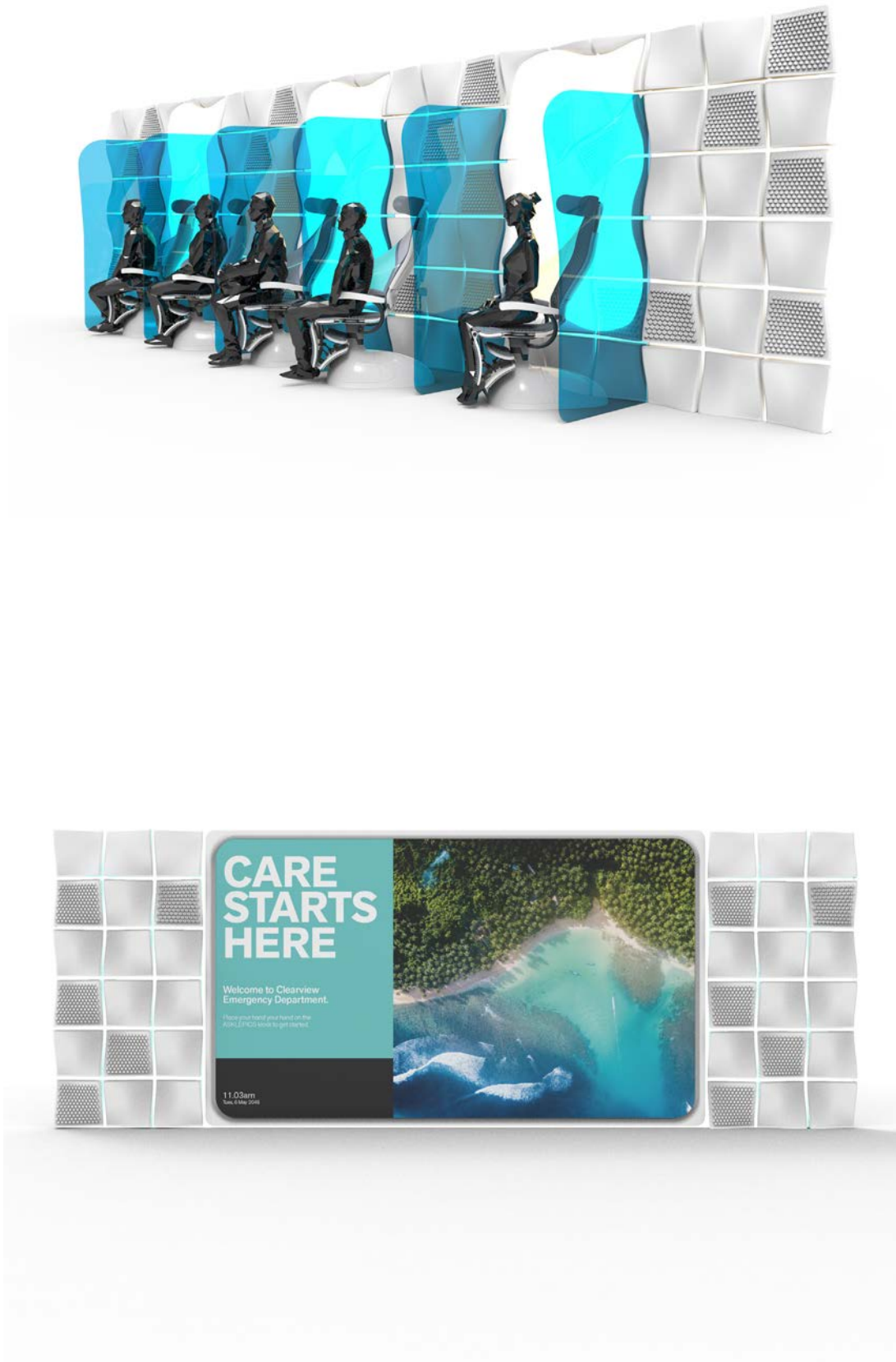


Figure 6.14:
Different
configurations
of EDWR signage



Figure 6.15:
EDWR triage
signage mockup

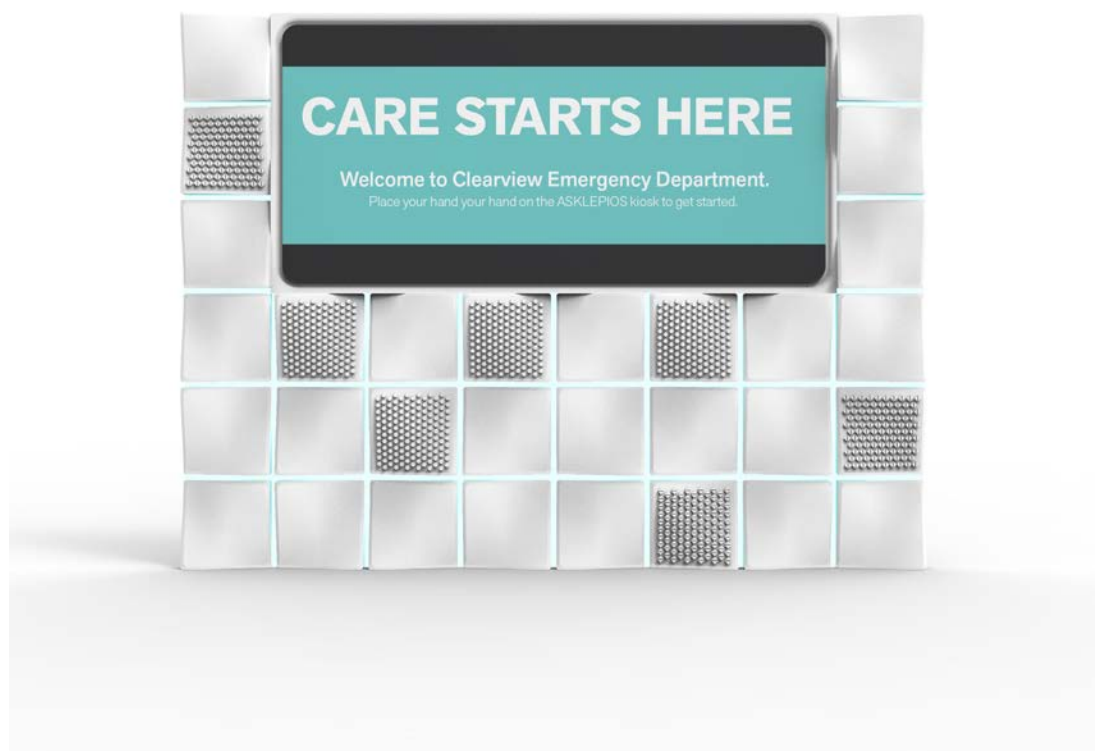




Figure 6.16:
Plastic prototypes
of the Asklepios chair
at 1:5 and 1:12 scales



Figure 6.17:
Plastic 3-D prototypes
of the touchpoints within
the service journey



Figure 6.18:
Plastic 3-D prototypes
of the registration kiosk at 1:12 scale

Figures 6.13 and 6.14 present some of the physical artefacts generated through this study, which are supported by abstracted maquettes of human forms. These objects are presented at two scales – 1:5 and 1:12 – and are intended to be handled, moved about and reconfigured. Unlike the ephemeral articulation of the service design, these objects make real the touchpoints and objects within the overall experience.

These visualisations and design outputs are faithful to a traditional set of industrial design principles: proportion, production, manufacture, quality and function (Malpass 2013). These are, however, subverted – where the contribution of this design lies not in their utility, but in the meaning within each object. Elements within these objects are left deliberately abstracted, enabling a viewer to project their own ideas onto the object. How the actual chair might be manufactured and the ergonomic benefits it might provide to the user are questions that these objects do not answer. Their value and contribution lie in the ideas they represent and in making the service experience tangible. As a piece of speculative and discursive design, this articulation of the design practice is concerned with exploring the complexities of human experience by opening up new conversations and debate – through designed artefacts. This kind of future-making is enabled by design.

6.3.2 Design fictions and Clearview Emergency Department

The design fictions are all hypothetical articulations of what the future in the ED might be like. They all involve the same fictional ED – Clearview Emergency Department – and explore the implications of the hypothetical SSD concept developed in this study. Each design fiction provides an exploration of a different aspect of the waiting experience in the ED and explores how the advent of technology like AskIpeios might impact on this experience. The stories of each 'edition' in the design fiction are grounded within the observations conducted at Cabrini ED as per study 1 in Chapter 4 and are themselves articulations of design practice. Individually and collectively, each edition extrapolates on a real experience from today and explores how that experience might unfold in this alternative future.

The comic style of the design fiction was chosen as the format for these narratives over other methods of communication – videos, theatrical presentations, websites – for their ease of creation. Unlike videos, the design fiction as a printed publication (Figure 6.15) makes the work more accessible, where no other medium or tool is required to interpret the fiction – such as a screen or PC. The low-fidelity nature of the sketches invites reflection upon the notion that the future is not yet fixed and open to multiple interpretations by different readers.

These design fictions aim to address the gap of articulating the real-world, spatial-temporal richness of real-life service experiences that cannot be captured within the schematic of a service blueprint. These fictions explore and probe potential service scenarios focused on individual lived experiences and provide an important platform for further design research and practice.

FIGURE 6.19:
Design fictions
presented as
a fold-out
'poster-zine'.



Each edition is presented as a stand-alone 'poster-zine', where one side depicts a comic narrative of a future ED experience and the reverse side exegetical prose to provide context to the project. Within this exegesis, the design fictions are presented as preludes to each chapter. This section briefly unpacks the narrative and key thematics presented within each design fiction.

Chapter Four // Edition #01: Kayde

The Narrative

16-year-old Kayde just scored his first goal in his football match, but was knocked over and has now hurt his leg. From what the other players and the coach can tell, it looks like it might be broken. The other players and the coach helps the injured Kayde off the field, and hails a car to take him and his mother to the nearest Emergency Department at Clearview Hospital.

Kayde and his mother arrive at Clearview ED and are now comfortable in the waiting room. However, they've just seen a flurry of activity and 6 different patients arrive by Ambulance accompanied by paramedics. Kayde and his mother have been waiting for almost an hour already, but neither are sure what's going to happen next ...

Key Thematic: Waiting is not always in your control

The waiting experience in an ED is not as simple as waiting in other analogous environments. For example, waiting in a queue at an airport is predicated on the ideas that: a) everyone has planned to go to the airport; b) no-one is experiencing physical or psychological pain; and c) the end outcome is clear and certain. The uniqueness of the ED context means that waiting here is not like in any other context; the physical and psychological stakes are higher – even if an AI is 'holding' your hand along the way.

In the first edition in this suite of design fictions, Kayde's journey through the ED presents a situation where waiting is outside of his own control. For Kayde – whose injury is serious enough he requires critical care, but not life-threatening – his waiting experience can be impacted on by a plethora of reasons that are outside his control and the control of the ED. Even with technological interventions like Asklepios, unpredictable factors can dramatically change the overall waiting experience. The feeling of 'not knowing where you are in the system' is reinforced when the comic ends before Kayde has been seen by a physician.

This design fiction also more explicitly explores the pre-hospital touchpoints that make up the ED journey and articulates one alternative future where a patient might be triaged and registered into the ED prior to physical arrival.

Chapter Five // Edition #02: Avery

The Narrative

Ivy is in the waiting room with a close friend, Avery, who WAS having a great birthday. Unfortunately for her, after dancing on a bar, she took a tumble and hurt her leg. As her friend, Ivy took her to the nearest Emergency Department – Clearview ED. Right now, it's the early hours of the morning and both Ivy and Avery are bored out of their minds.

Key Thematic: Dealing with boredom in the waiting room

Yoon and Sonneveld (2010) write in their study, concerning patient anxiety in the ED, about how feelings of uncertainty, confusion and annoyance are present among patients in the waiting room. For those of us who have attended an ED first-hand, we will remember many of the same feelings and more; many will recall the uncomfortable and anxiety-inducing elements within the ED: the smell – a mixture of cleaning chemicals and body odour – and loud and sudden noises. For patients who need to spend many hours in the waiting room, the initial adrenaline of the visit can wear away, leaving just feelings of boredom and fatigue.

This design fiction probes these typical feelings of fatigue, boredom and how they might be impacted on by technology. To what extent do media actually help distract individuals from the ED experience? Can we ever really be distracted from the reality of injury?

Chapter Six // Edition #03: Jeremey

The Narrative

74-year-old Jeremey, who was recently diagnosed with bladder cancer, is out for a walk on a Sunday morning with his daughter, when he starts to feel a sharp pain in his stomach and thinks he may need to go to hospital. As a result, the group quickly rush Jeremey to Clearview Hospital.

On his way to Clearview Hospital, Jeremey realises this will be his 10th visit to the Clearview ED this year. On arrival, the group are greeted by a Malaysian nurse. Jeremey has trouble understanding what she is saying, and then asks to speak with an “Australian nurse”. He becomes a little agitated, and then curses at her.

Key Thematic: Cultural competency in the waiting experience

Kimani et al. (2016) discuss some of the thorny legal, ethical and clinical complexities that racist patients present ED staff with in the context of urgent care. ED staff might be offended by the problematic behaviour of a patient, but know that the same patient might have a serious medical condition and that they cannot treat them against their will. These complexities and episodes can be painful, confusing and scarring for the professionals involved (Kimani et al. 2016). Under Australian law, healthcare staff have the right to a workplace without discrimination on the basis of protected attributes such as race, colour, religion, sex and national origin. Patients also have the same right to care, free of discrimination based upon protected attributes (ACEM 2010), but this can be made difficult for staff in practice when patients themselves act in a racist or discriminatory way – such as by the character Jeremey. ED staff must balance patients' interests with staff employment rights and the duty to treat injury (Kimani et al. 2016).

The challenge of cultural competency in the ED is a pertinent theme that emerged through studies discussed in Chapter 4 and is explored in this design fiction as it might relate to this technological future. This design fiction alludes to the capacity for technology such as Asklepios to both reinforce, and subvert, aspects of cultural competency in the ED as a question worthy of exploration. To what extent should technology hold an individual accountable for unacceptable comments? To what extent might a staff member deflect the patient to technology to avoid having direct contact? What are the overall implications for others in the waiting room who witness such an outburst? While patients and carers are central users of the waiting room, as we see in this design fiction ED staff also play an important but sometimes understated role in this experience.

Chapter Seven // Edition #04: Cameron

The Narrative

23-year-old Cameron is confused, frustrated and upset. He recently broke up with his girlfriend Victoria, and has just found out that she's very unwell, and has just visited the Emergency Department via a mutual friend. Cameron becomes increasingly emotional and panicked. In a frenzy, Cameron finds the nurse-in-charge and demands to know what's happening to his former partner. Growing ever more frantic, Cameron picks up a nearby kiosk and throws it at the nurse.

Key Thematic: Violence in the waiting room

The problem of violence in the ED, and particularly at the front of house, is a well-discussed problem in the literature. Some authors articulate that violence in the ED is exacerbated by drugs, mental illness and anxiety (ACEM 2014, 37) among patients and those accompanying them. Episodes of violence – or 'code greys' – are generally accepted in the literature as complex (Hogarth et al. 2016; Lau et al. 2004; Pich et al. 2010). While different toolkits have emerged with propositions to address this challenge (see Lenaghan et al. 2018; PearsonLloyd 2012), violence in the waiting room appears to be a pertinent issue that has yet to be resolved. How this challenge manifests in the future is a point worthy of further investigation.

This narrative probes how technology might manage – or in the case of this design fiction, fail to manage – episodes of violence and aggression in the waiting room. While the episode of violence depicted in this narrative could have been prevented with design features to 'protect and contain' episodes of violence, doing so might close off lines of visual and acoustic sight. Technology cannot completely ameliorate the challenge of violence in the ED and the challenge for design is to balance openness with security.

Chapter Eight // Edition #05: Agatha

The Narrative

It is the middle of the night when Clare is woken to the sound of her mobile phone. It's a nurse from Clearview Hospital – 200 km from where Clare is right now – who tells Clare that her 97-year-old mother, Agatha, has had a stroke. Agatha's condition is serious and it's unlikely that she is going to live much longer. Clare then gets in her car and begins the drive to Clearview ED.

It's a busy night at Clearview ED when Agatha peacefully passes away, with Clare and her brother at her bedside. There's another group in the private family room, so Clare and her extended family are huddled together in the waiting room while awaiting more information from the doctor. Right now, Clare and her family are wondering what's going to happen tomorrow.

Key Thematic: End of Life in the Emergency Department

The pragmatic reality of the ED is that many of us will likely spend some of our last hours in life visiting one. End-of-life care is an important service provided by the ED and it would be remiss of this project not to consider the perspective of those in the waiting room who do not necessarily have acute injuries, but are facing the difficult situation of losing a loved one while waiting within the ED.

In the last design fiction in this series, Clare and her brother must wait in the waiting room as another group occupies the designated family room. Clare and her brother must navigate the end-of-life care for their mother, Agatha, and deal with that experience in the waiting room. Conversations and decisions with next of kin of patients about resuscitation status, advance care plans, patient wishes and religious beliefs are difficult, but important – and how those interactions might be mediated through technology like Asklepios have not yet been explored.

6.3.3 'Exhibition-in-a-box'

With so many people thinking outside the box, thinking inside the box has become the new thinking outside the box
– Unknown

In order to draw together the design outcome and the many different articulations of design practice into a single piece of media that can be disseminated, the design outcome is distilled into an exhibition-in-a-box (Figure 6.16) which acts as a toolkit, place and method to provoke conversations about ED futures. Like the work of Marcel Duchamp and Chamberlain and Craig (2013) as discussed in Subsection 3.5.3, this outcome can be couriered to interested stakeholders, who might then unpack both the physical box and the meaning embedded within the objects and publications contained within.

Part of the value of this articulation is in the capacity to generate knowledge and insight through experimentation with these artefacts. This work might be interpreted as a kind of cultural probe – like the work of Gaver et al. (1999) – that aims to explore the intricacies of human experience. Within the box is a publication that contextualises the physical artefacts by providing context and a guide for evaluating the speculation. One side of the publication contextualises the project through text and the reverse provides a guide for evaluating the design concept. Participants are asked to critique the concept through a series of PEST (political, economic, social and technological) lenses and then map future consequences on the futures wheel as discussed in Chapter 3. This sheet also provides a kind of gameboard that participants might use to arrange and model their own EDWR at scale. Chapter 7 unpacks this point in more detail, describing a study where the box is shared directly with ED participants. Figures 6.20, 6.21 and 6.22 present photographs of the exhibition-in-a-box outcome developed within this study.



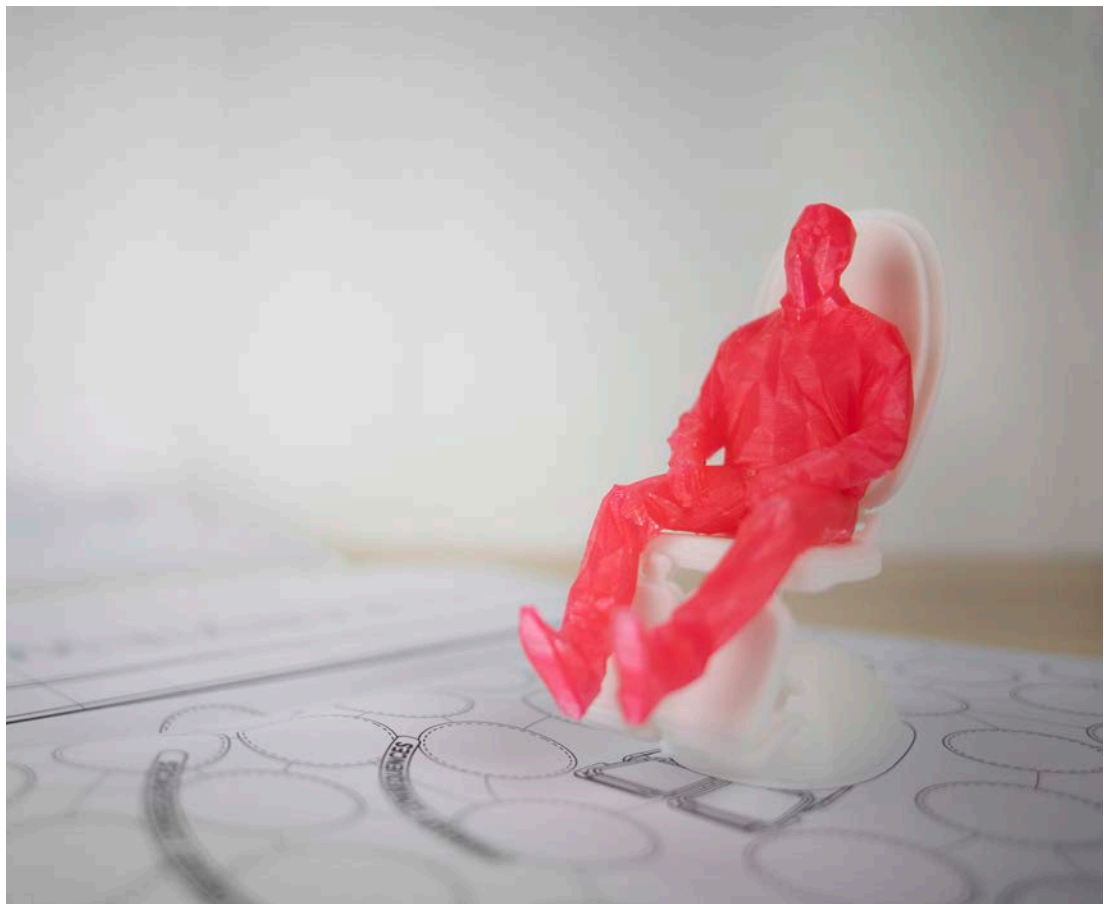
Figure 6.20:
'Exhibition in a box'
external views.



Figure 6.21:
'Exhibition in a box'
contents



Figure 6.22:
'Exhibition in a box'
publication and designed
interactivity with the
plastic prototypes.



6.4 Chapter conclusion

This chapter has outlined the outcome achieved through design experimentation, the major SSD concept that probes an alternative EDWR experience. The chapter has presented the role of Asklepios and the place of this construct within a speculative service blueprint, before presenting the touchpoints developed in the study. The chapter also showcases the different articulations of the design practice, from visualisations to the suite of design fictions, physical prototypes and the exhibition-in-a-box toolkit. Collectively, the speculative design outcome and the articulations of design practice form the 'design answers' ([Findeli 2010](#)) in this study, which are in turn generated by the design question: What if we leverage the power of emerging and not-yet-available technologies to enhance the experience of emergency department waiting rooms? These design answers generate new knowledge which contributes to the 'research answers' of this study, a finding to inform the future of waiting room experiences and the contribution of speculative design research and practice to inspire change towards preferable futures. These insights might then be used to complement planning and strategy for the development of future EDs and elucidate aspects of future user experiences for patients, carers and staff. The speculative design outcome, articulations of the design practice and broader research answers might be applied partially or entirely as part of the design process for new healthcare facilities.

Chapter — 07

Design, health, futures and the Emergency Department waiting room.

CHAPTER OVERVIEW —

Previous chapters have discussed the theoretical grounding of this study and presented the outcomes of speculative design practice. This chapter discusses the contribution of these outcomes as primarily a provocational device and provides a critical evaluation of the design outcome. In doing so, the chapter describes an evaluative study where participants used the speculative outcome to scaffold their own thinking about possible and preferable ED futures.

DESIGN FICTION SUMMARY —

CONTENT WARNING: Depictions of violence in the ED.

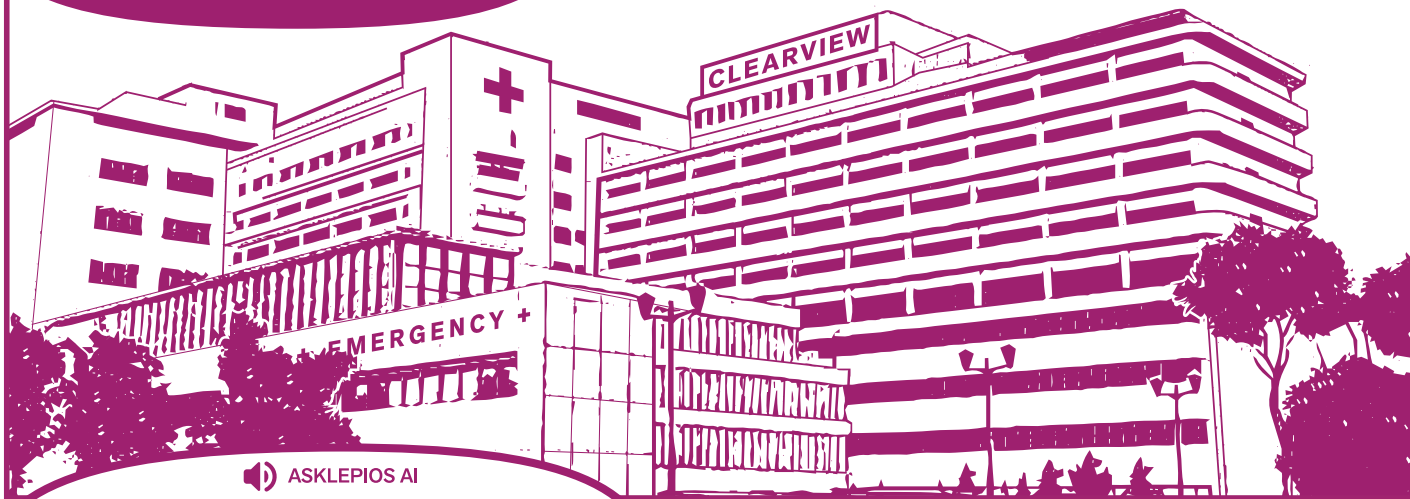
23-year-old Cameron is confused, frustrated and upset. He recently broke up with his girlfriend Victoria, and has just found out that she's very unwell, and has just visited the Emergency Department via a mutual friend. Cameron becomes increasingly emotional and panicked. In a frenzy, Cameron finds the nurse-in-charge and demands to know what's happening to his former partner. Growing ever more frantic, Cameron picks up a nearby kiosk and throws it at the nurse.

Key Thematic: Violence in the waiting room —

The problem of violence in the ED, and particularly at the front of house, is a well-discussed problem in the literature. Some authors articulate that violence in the ED is exacerbated by drugs, mental illness and anxiety (ACEM 2014, 37) among patients and those accompanying them. Episodes of violence – or 'code greys' – are generally accepted in the literature as complex (Hogarth et al. 2016; Lau et al. 2004; Pich et al. 2010). While different toolkits have emerged with propositions to address this challenge (see Lenaghan et al. 2018; PearsonLloyd 2012), violence in the waiting room appears to be a pertinent issue that has yet to be resolved. How this challenge manifests in the future is a point worthy of further investigation.

This narrative probes how technology might manage – or in the case of this design fiction, fail to manage – episodes of violence and aggression in the waiting room. While the episode of violence depicted in this narrative could have been prevented with design features to 'protect and contain' episodes of violence, doing so might close off lines of visual and acoustic sight. Technology cannot completely ameliorate the challenge of violence in the ED and the challenge for design is to balance openness with security.

_ PLEASE ARRANGE
400MG OF IBUPROFEN FOR
MR SMITH. ASKLEPIOS _



ASKLEPIOS AI

ACTIONING ... COMPLETE.
MR SMITH WILL RECEIVE THE
ANALGESIC VIA THE PHARMACY.

WE HAVE A NEW VISITOR APPROACHING
CLEARVIEW ED WHO IS EXPRESSING
PROBLEMATIC BEHAVIOUR.



CLEARVIEW EMERGENCY TRIAGE

One patient in the waiting
room requires attention

Three patients in the waiting
room have requested help.

URGENT

– Mr Smith states that his pain
level has increased. Mr Smith
rates his pain at a score of 8.

the

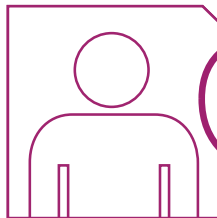
– Ms Chang has been in the
waiting room for 45 minutes. It's
time for someone to check in.



ENROUTE TO ED



MR. SMITH
UR 7613 8212



MR. GRAY
UR 1113 4512



MRS. ARGYLE
UR 7851 9871

IN WAITING ROOM



MR. RAE
UR 7854 1238



MR. ARTHURS
UR 7613 8311



MR. TOMOGI
UR 4521 2145

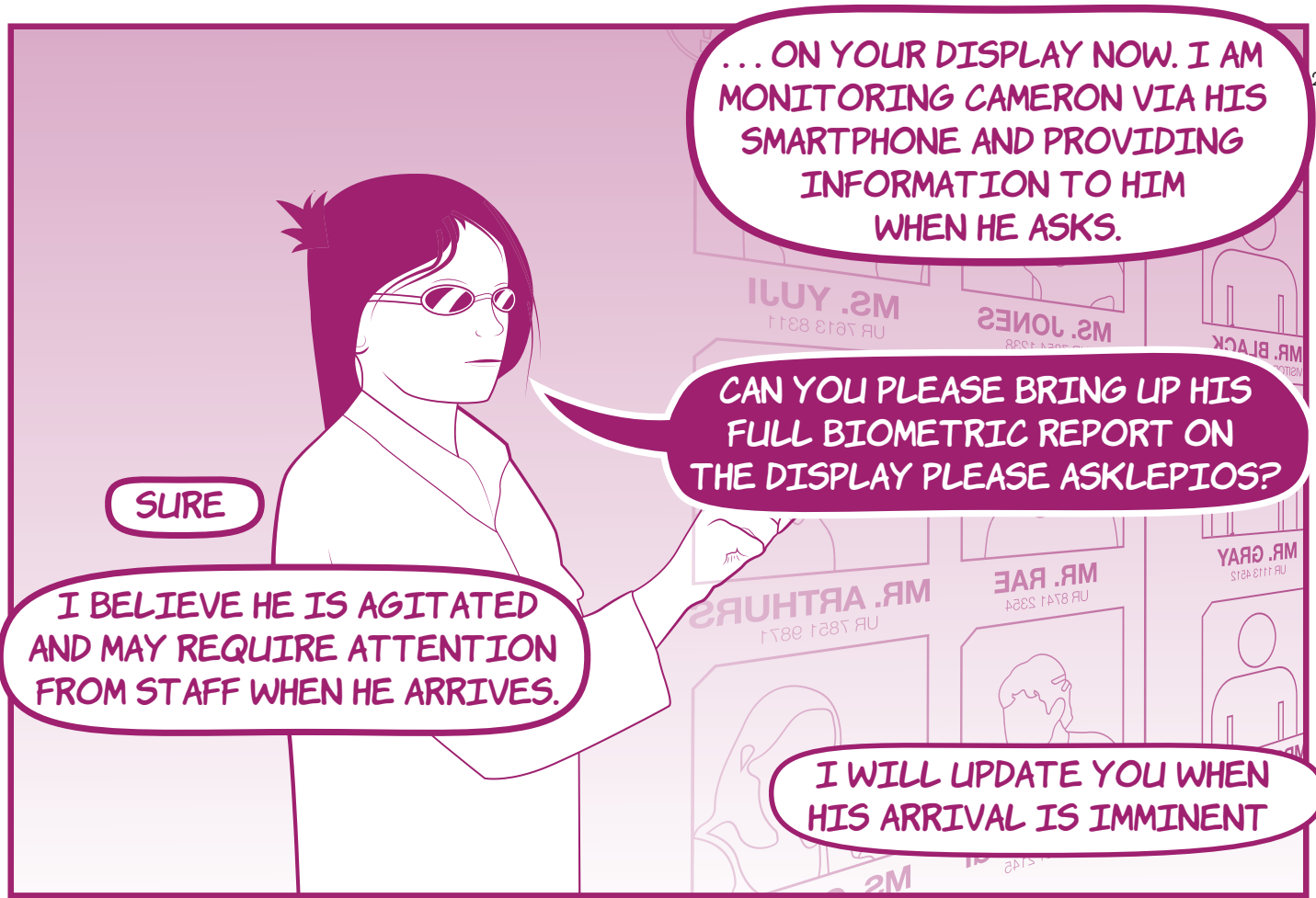


MS. CHANG
UR 7851 1445

HIS NAME IS CAMERON SMITH AND IS
THE BOYFRIEND OF VICTORIA WHO IS
IN OUR WAITING ROOM

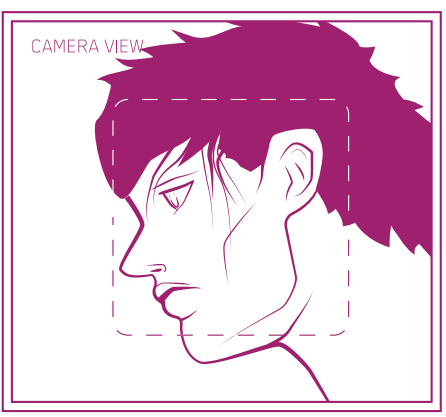
CAMERON EXPRESSED THAT HE
IS VERY ANXIOUS ABOUT
HER CONDITION

CAN YOU PULL UP HIS
REPORT ONTO THE MIXED
REALITY DISPLAY ASKLEPIOS?



THANKS ASKLEPIOS

ASKLEPIOS BIOMETRIC REPORT



PATIENT NAME: CAMERON BLACK

INFORMATION DISPLAY		
GENDER	MALE	
AGE	23	
ETHNICITY	EURASIAN	
RELIGION	AGNOSTIC	

EMOTIONAL STATE	FRUSTRATED	93%
HEALTH LITERACY	LOW	82%
SOCIAL RESPONSIBILITY	LOW	85%
INTROVERSION	AVERAGE	85%
AGGRESSIVENESS	MID-HIGH	75%
WEIRDNESS	AVERAGE	60%
EMOTIONAL STABILITY	LOW	98%

THIS RECORD IS CONFIDENTIAL >>>> CLEARVIEW HOSPITAL STAFF EYES ONLY

ASKLEPIOS AI

HI VICTORIA, YOU HAVE RECEIVED A REQUEST FOR A VISITOR, A MR. CAMERON BLACK. WOULD YOU LIKE TO SEE HIM?

VICTORIA MUJI

#UR 7613 8311

OH MY ...
PLEASE NO ASKLEPIOS,
CAMERON IS MY EX BOYFRIEND

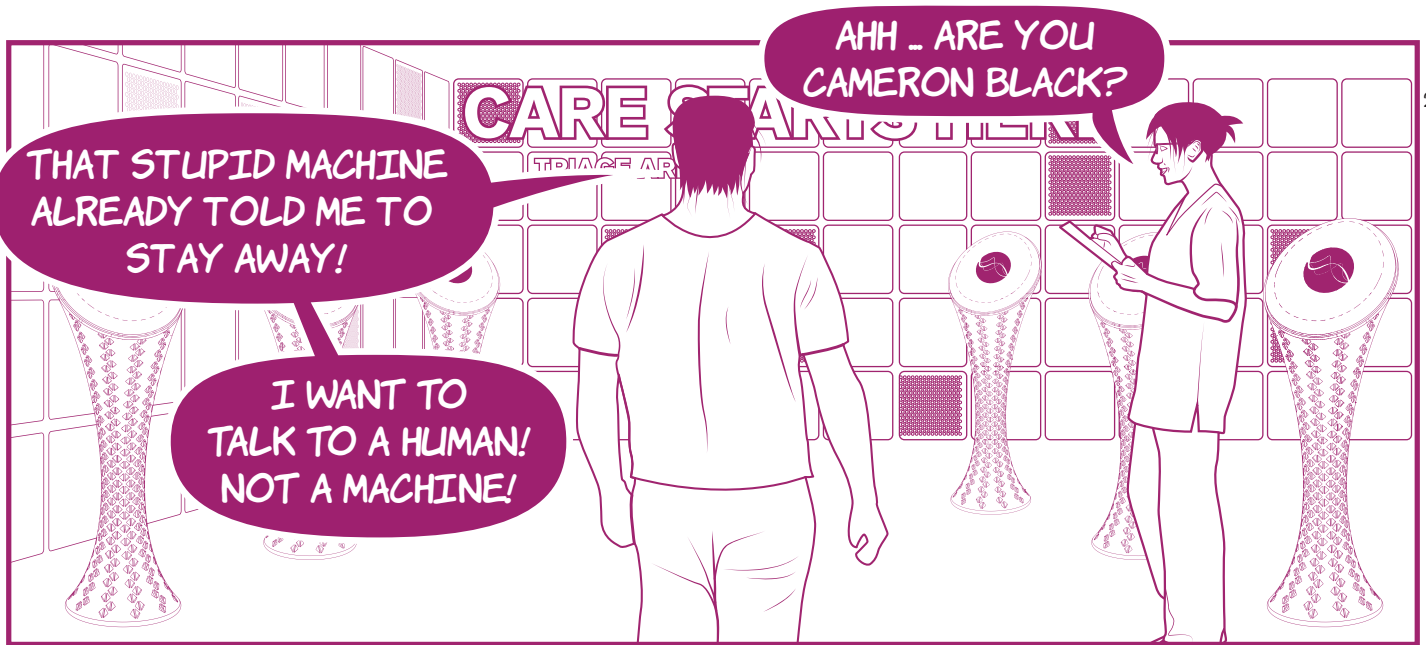
HE GET'S REALLY ANGRY ...
HE CAN'T BE HERE, I DON'T
WANT TO SEE HIM.

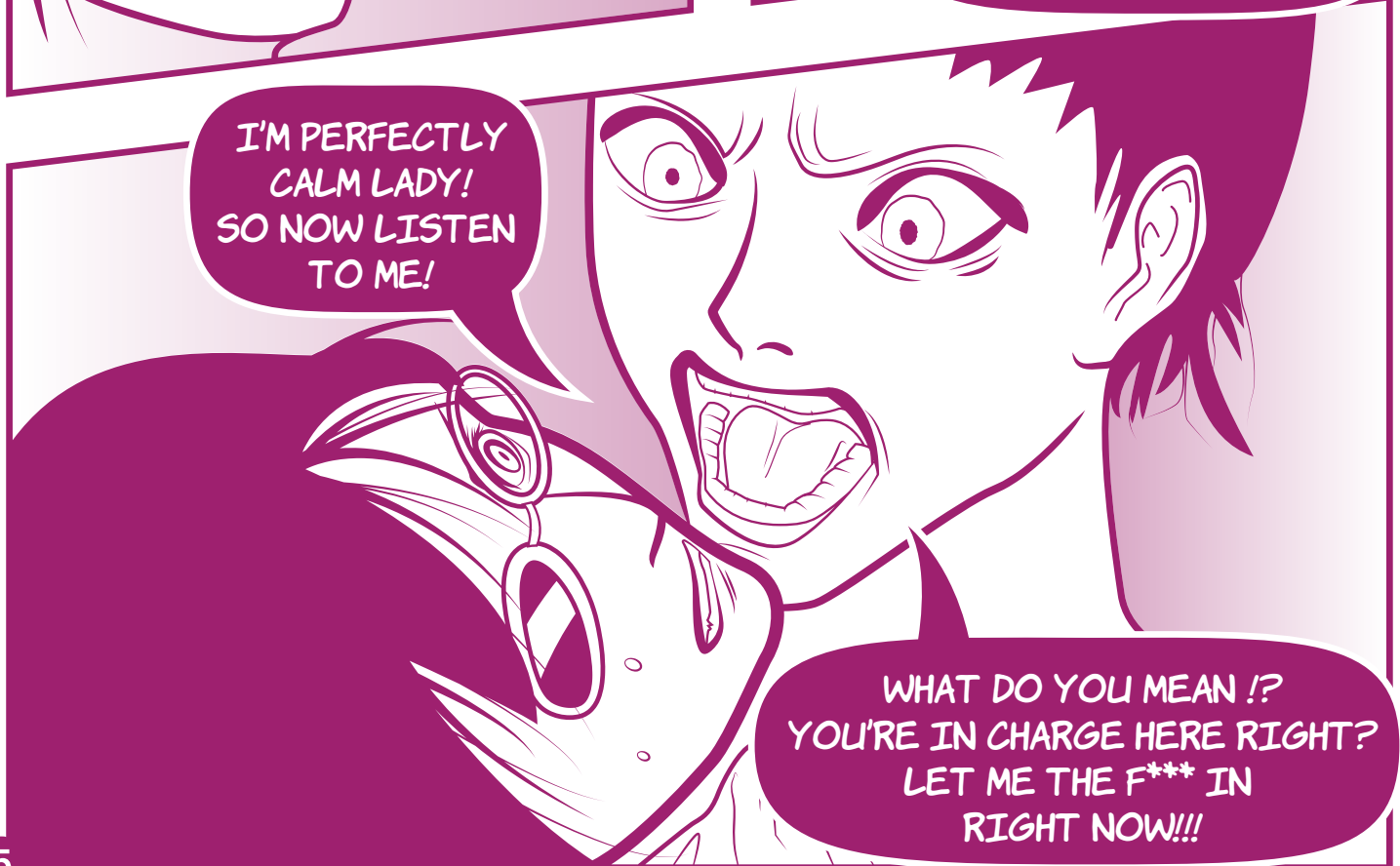
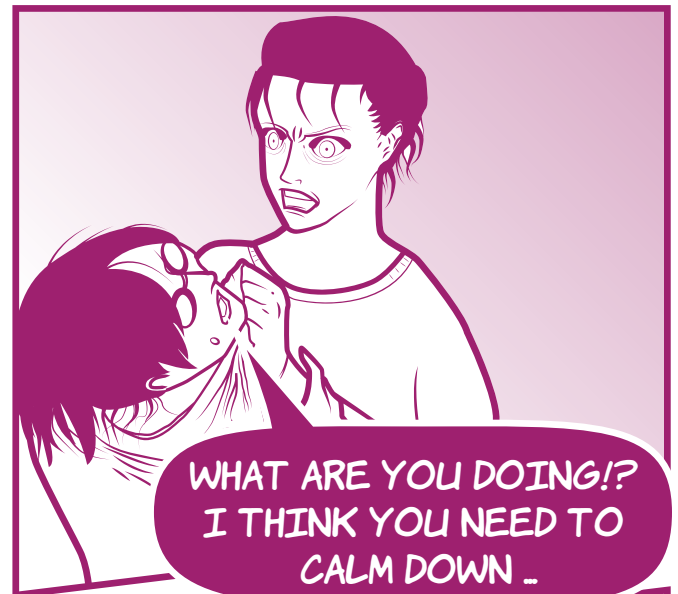
NOTED VICTORIA, WE WILL NOT
LET CAMERON INTO THE WAITING
AREA. IF HE DOES ARRIVE AT THE
ED, I WILL CONTACT SECURITY.

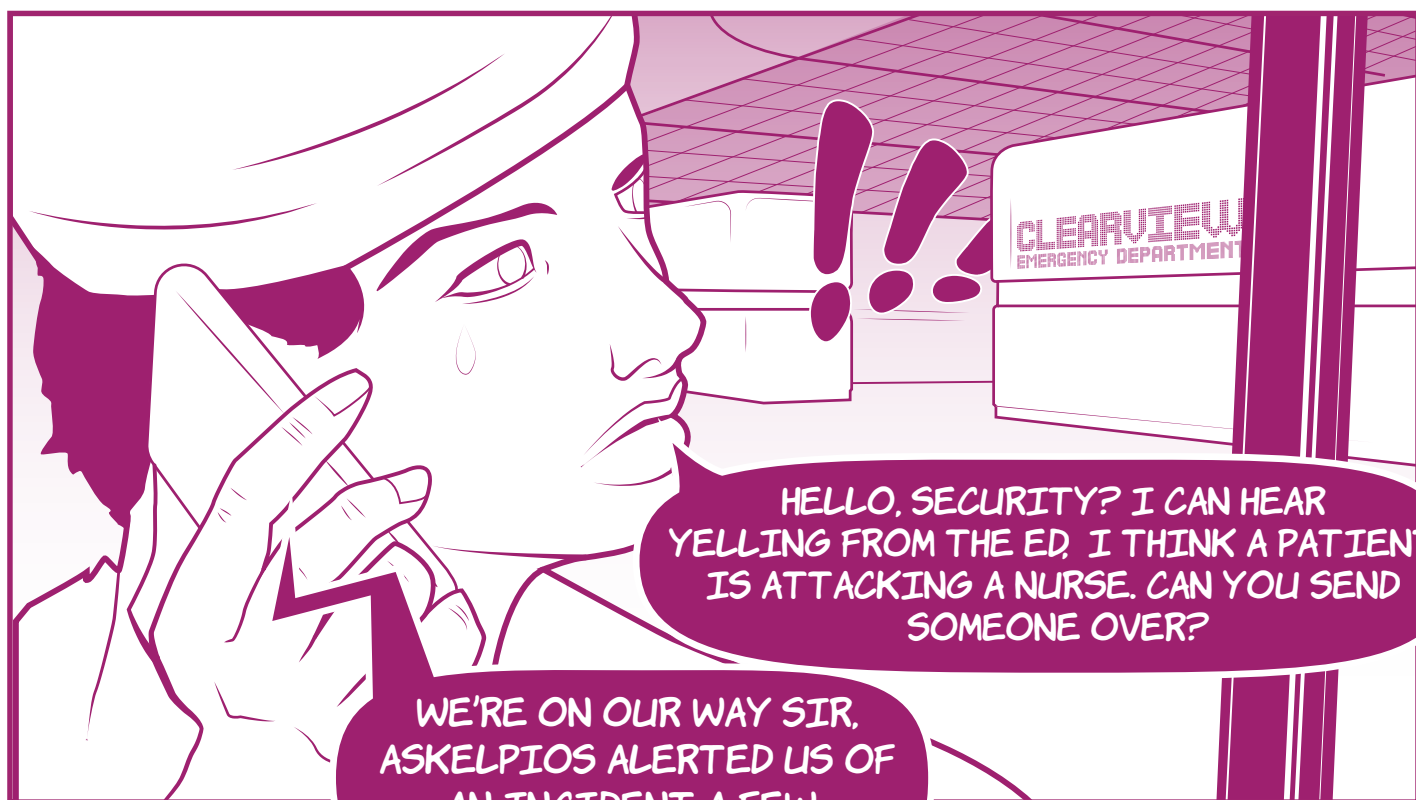
HI, I'M HERE TO
SEE A PATIENT IN THE
WAITING ROOM

20
MINUTES LATER

SURE! IF YOU TOUCH
THE KIOSK ASKLEPIOS
WILL HELP REGISTER YOU



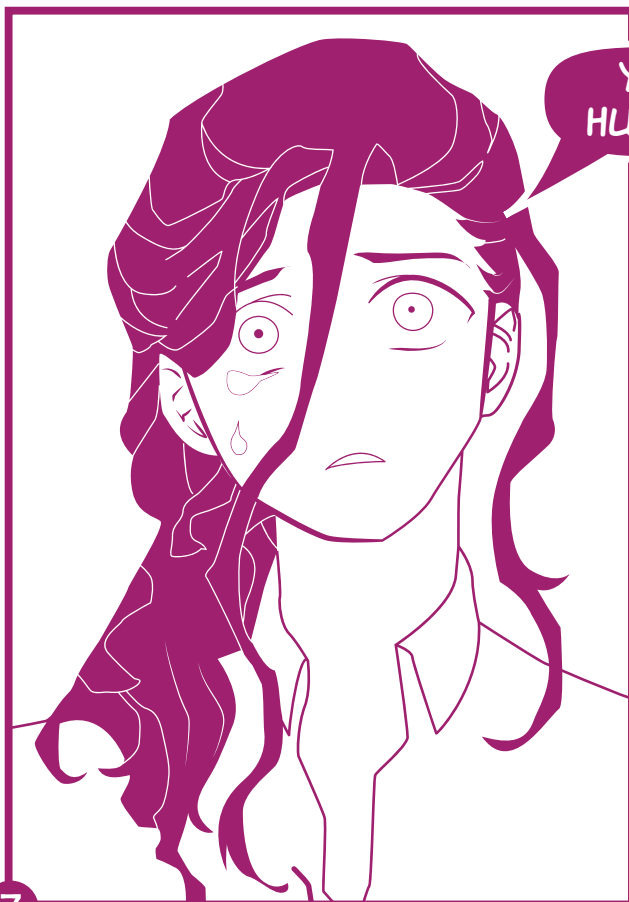
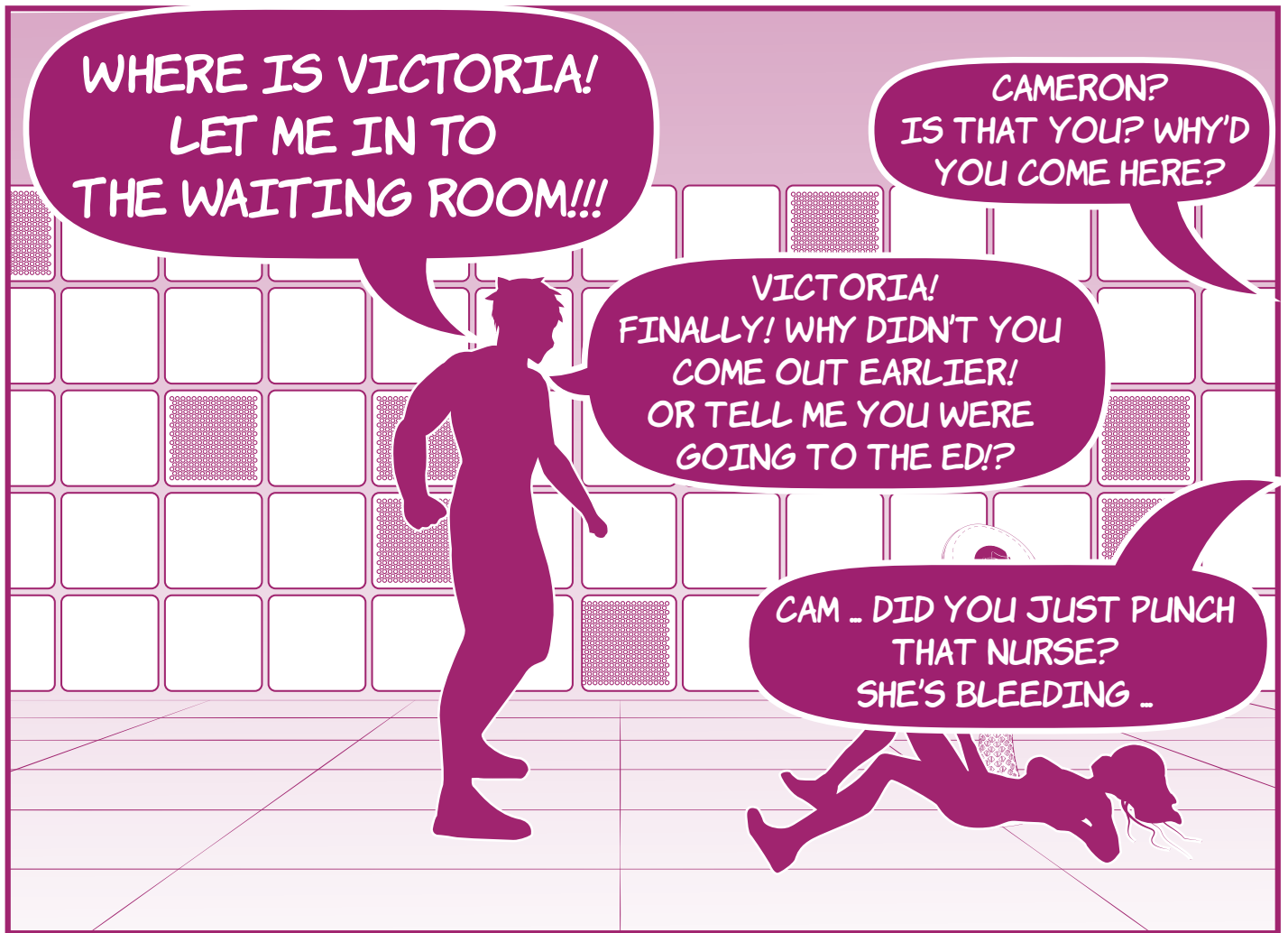


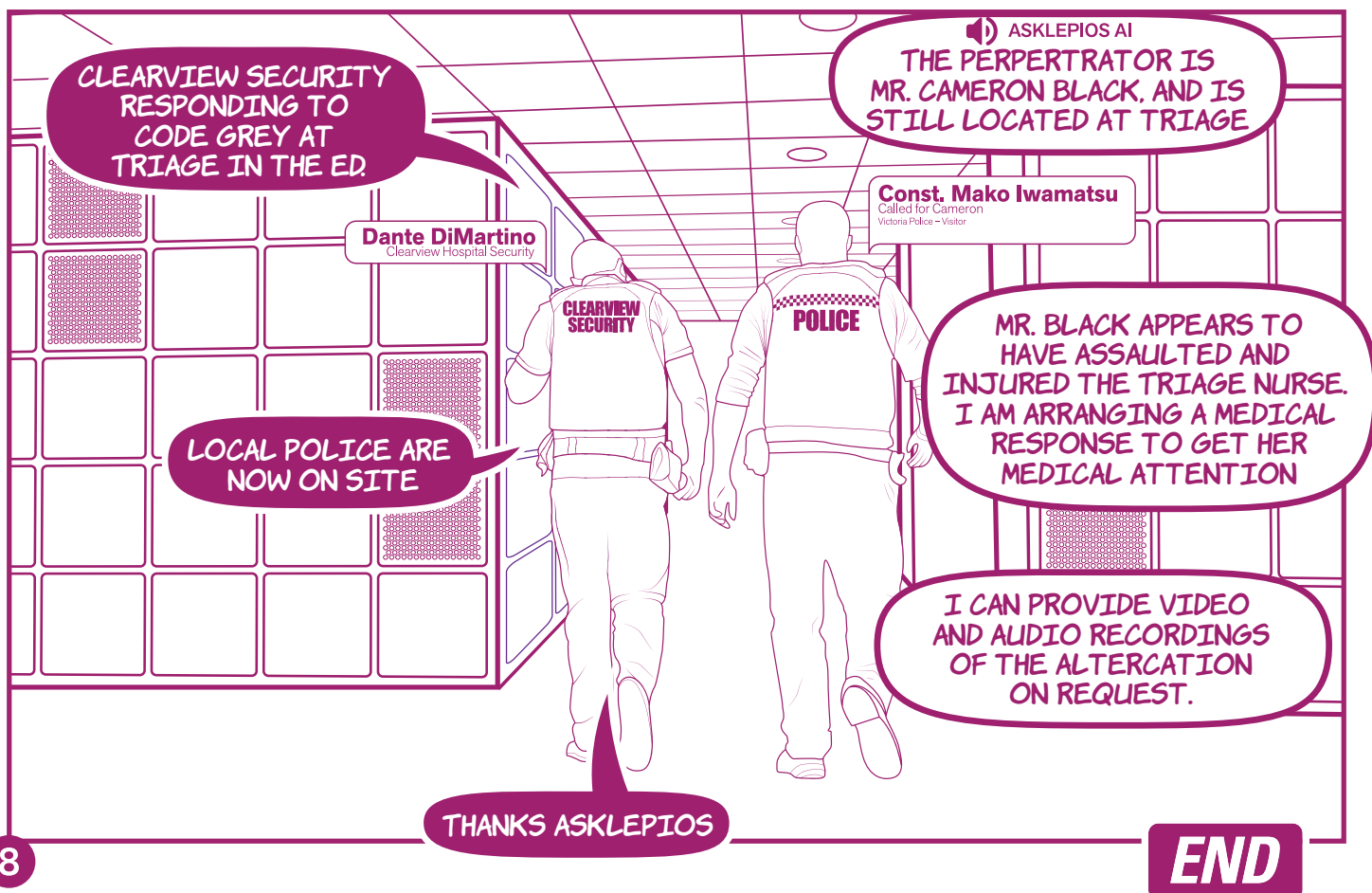
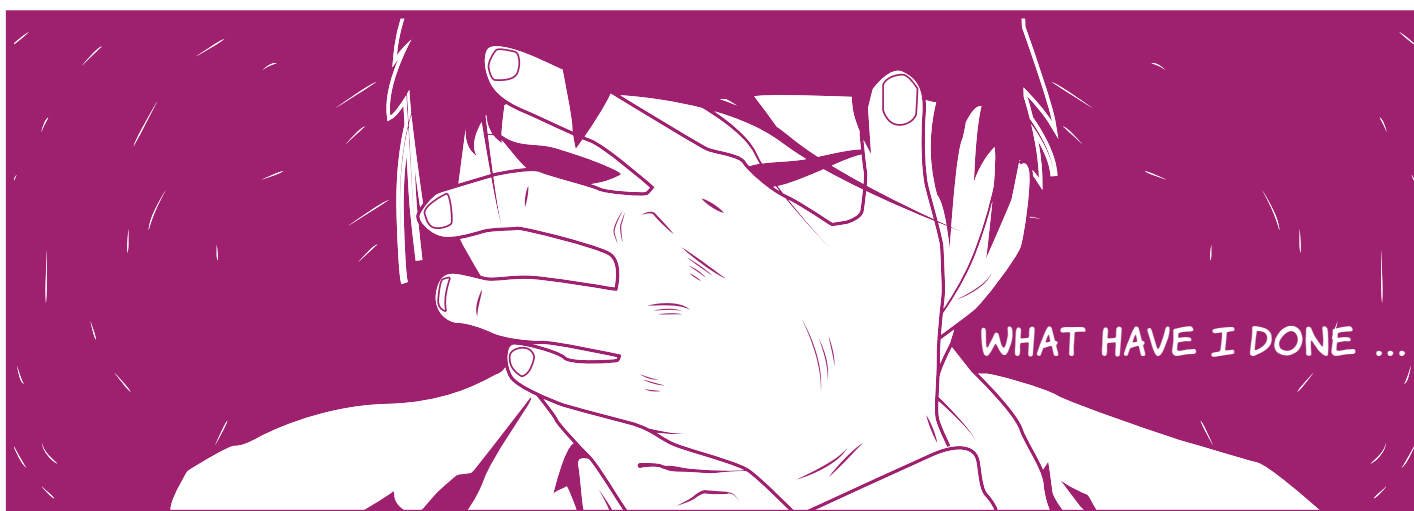


HELLO, SECURITY? I CAN HEAR
YELLING FROM THE ED. I THINK A PATIENT
IS ATTACKING A NURSE. CAN YOU SEND
SOMEONE OVER?

WE'RE ON OUR WAY SIR,
ASKELPIOS ALERTED US OF
AN INCIDENT A FEW
MINUTES AGO







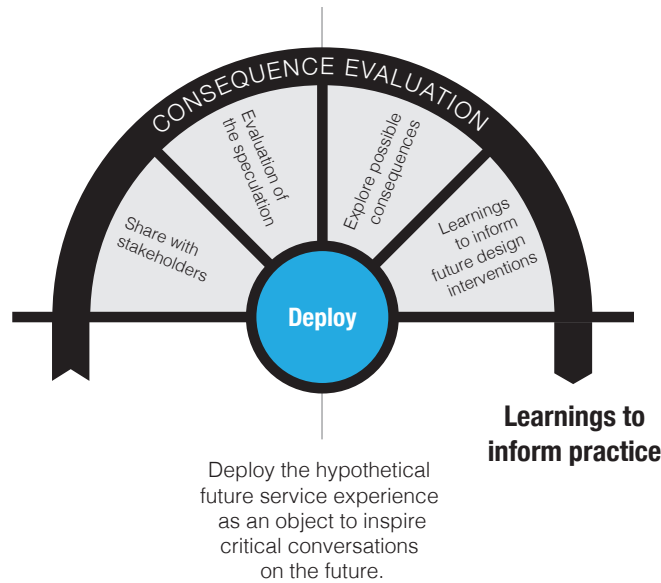


Figure 7.1:
The last arc of the
speculative service
design framework

7.0 Introduction

The future is unk(now)n.
— Unknown

Previous chapters have described the development and refinement of the provocational device, a speculative outcome that acts as a catalyst for conversations on ED futures. This chapter aims to capture some of these conversations and provide a preliminary analysis and evaluation of the kind of discussion this work elicits. To do this, the speculative outcome is shared with a range of ED users who examine and interrogate the design outcome through the exhibition-in-a-box tool, as described in Chapter 6. This chapter describes the conversations elicited by the work and the co-design engagements undertaken to collect them. In doing so, the chapter aims to validate the contributions to knowledge that this study makes of the speculative outcome as a tool to support the design process of new healthcare facilities.

This chapter highlights the many tensions that designers must deal with when considering how technology might be integrated into EDWRs of the future and highlights the value of this work in opening up conversations to inspire creativity in the ED. While the chapter stops short of providing design recommendations for healthcare facilities, it does demonstrate how this speculative outcome might be used as a vehicle to scaffold conversations about the attributes of preferable futures in the ED. This chapter tests this outcome with participants, collects these conversations to demonstrate how this tool might be used and highlights the contribution that this project might make to ED futures.

7.1 Scoping alternative futures for the Emergency Department

The sub-study discussed in this chapter presents another practical application of the SSD framework, of how we might deploy hypothetical service experiences into the world and use them as probes to illuminate unintended implications or consequences in order to identify learnings to inform future design interventions. As such, this study aims to activate alternative thinking and illuminate as-yet-unexplored opportunities for intervention in the EDWR. As a kind of provocational device, this work helps audiences to scaffold and make tangible conversation about future service experiences. Through sharing this work with participants in co-design engagements, this study has confirmed the notion that this work acts as both a tool and vehicle for discussion and debate on current problems in the ED, with the purview of developing insights to inform future design interventions that support (or hinder) waiting experiences in the ED. This section describes the sub-study that was undertaken to share the design outcome with participants, outlining the aims, method and qualitative data collected.

7.1.1: Aims of the evaluative study

This evaluative yet exploratory study aims to contribute to the discussion about what the preferable attributes are for ED futures, drawing upon the 'future cones' model by Voros (2003) and Montgomery and Woebken (2016) as a way to map the attributes and interrogate some of the tensions regarding what makes a preferable future for all in the ED. While everyone involved in emergency medicine arguably wants the same thing – to address acute illness – different people often have different views as to how this should be achieved. The different and sometimes competing perspectives of stakeholders – patients, carers and staff – mean that settling these tensions is not simple; as Jones (2013) articulates, the issue becomes ontological, a question upon the reality of what it means to provide urgent care. By sharing the outcome with a range of stakeholders, this study has attempted to reconcile these diverse viewpoints and set out to determine what are the attributes of a preferable future for the EDWR.

The very nature of this speculative study means that the investigation straddles some big issues. As such, this section does not aim to resolve any of these points in any great depth but, rather, to open up avenues for further enquiry. In contrast to the co-design engagements described in Chapter 4, which primarily focused on the experiences of ED staff, this chapter focuses on the patient and carer experience. While these people do not necessarily have specialist medical training, they do have real-world lived experiences with contemporary EDs and have a stake in what future EDs might look like. In this chapter, participants are framed as 'experts by experience', rather than 'experts by training' (Sanders and Stappers 2012). In doing so, the chapter aims to integrate the insights and viewpoints of patients and carers into the larger research project.

7.1.2: Methods of the evaluative study

The speculative design outcome was shared directly with participants via the exhibition-in-a-box, which due to the COVID-19 pandemic was delivered via courier mail to participants. As a kind of co-design engagement without a facilitator, participants were provided with instructions (Figure 7.3) and asked to roleplay different service scenarios. These exercises aimed to provoke thinking and conversations concerning alternative ED futures and elucidate some of the nuanced implications of technological proliferation in the ED.

Six participants were recruited to take part in this study, who all voluntarily registered to take part in a workshop concerning the design of future ED waiting rooms. One additional participant participated in the workshop, but requested that their contributions be removed from the study based upon the fact that they did not have any relevant or meaningful experience with the ED. After the participants had engaged with the exhibition-in-a-box research tool, participants were invited to a video call with the researchers to debrief on the experience, which generated approximately 3 hours of audio recording of conversations concerning ED futures. The conversations collected through this study are presented in this chapter as raw data points – quotations from interviews and written notes and images made by the participants themselves. This is accompanied by summaries to provide an overview of the kind of discussion this work generated.

Participants did not engage with the work in a gallery or exhibition space; rather, the homes of the participants became the surrounding context for the work, the kitchen bench, coffee table and lounge room framing the experience. In some cases, participants used objects and materials from around the home – including scrap cardboard and toys – to support the prototypes included in the exhibition box to further develop their model of a possible ED future. Figures 7.2 presents some snapshots of the creations developed by workshop participants.

Ethics approval was granted to this study by the Monash University Human Research Ethics Committee (MUHREC – 25622).

Figure 7.2:
Images of participants
using exhibition-in-a-box
in their own homes

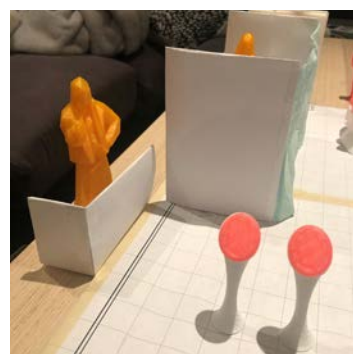




Figure 7.3:
An outline of the instructions provided to participants who participated in this study

WORKSHOP OUTLINE AND OVERVIEW

—
After volunteering to participate in this study, participants received the exhibition in a box kit via courier mail.

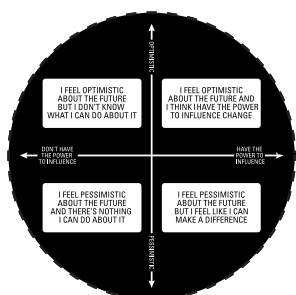
STEP ONE

—
Participants read through the material listed in this publication, and the design fictions contained within this box. Each edition of the design fiction depicts a future vision of an ED experience, probing different facets of how the ED might be experienced by different people. These design-fictions aim to kick start thinking about ED futures.

STEP TWO

—
Participants 'make' a future vision of the ED waiting room using the contained plastic prototypes, or other objects from around their home. The exhibition-box includes a printed 'gameboard' that frames this activity for participants, by providing boundaries and structure. Participants were asked to use the stories from the design fictions as a starting point, or build a new story based on their own personal experiences.





STEP THREE

Participants were asked to take a photo of the model they created using the props supplied in the box. Participants were then asked to send a copy of these images to the researchers.

Copies of the photos received by the researchers in this study are listed in figure 7.2

STEP FOUR

Participants were then asked to unpack the consequences and implications of the prototype model they have made through a PEST analysis. Participants were asked to evaluate their own speculative thinking in relation to strengths and weaknesses of a concept in relation to political, economic, social and technological forces. A template is provided to participants in the publication provided to them.

STEP FIVE

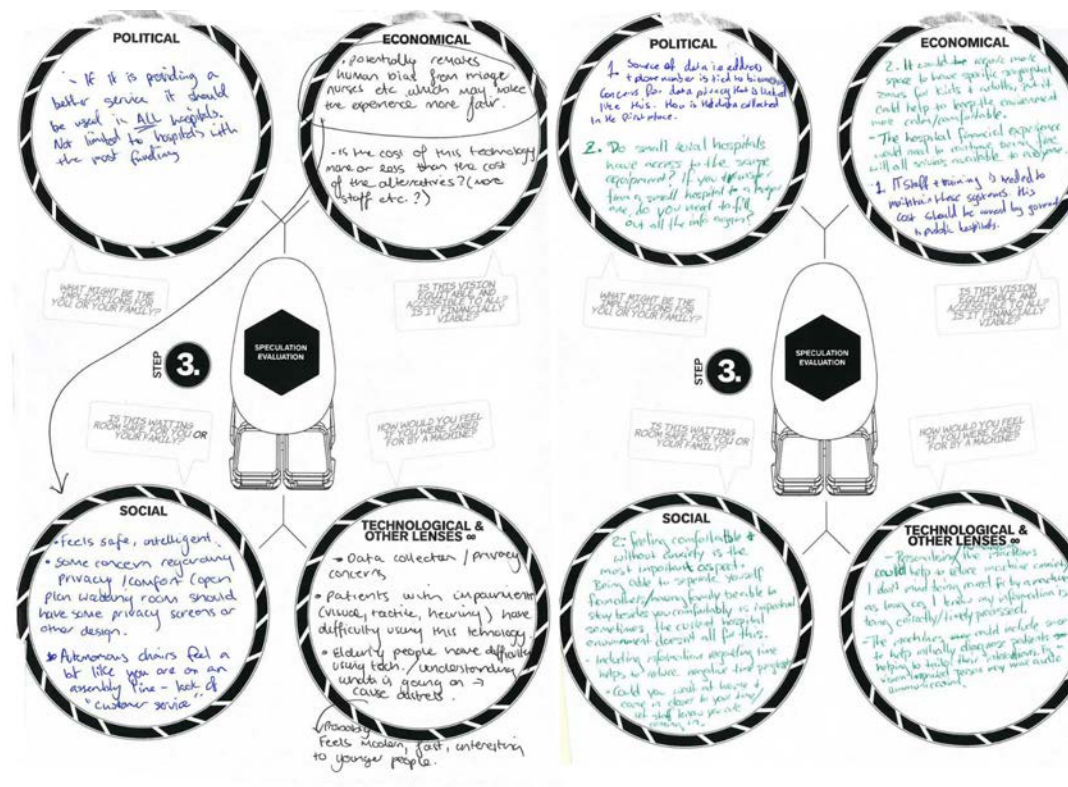
Building upon the PEST analysis, participants were then asked to map potential consequences of their speculation onto a 'futures wheel' template. This wheel, redrawn from (Montgomery & Woebken, 2016), aims to interrogate the possible immediate, secondary and tertiary consequences of a given trend or event. A scenario in question – in this case, the speculative model created by participants – is placed at the centre of the wheel, and then possibilities are mapped around the initial event like spokes on a wheel creating a web-like map of the implications that a future might present.

STEP SIX

In closing, participants were asked to map their relationship to ED futures using the 'Polak game', redrawn from (Hayward & Candy, 2017). The 'game' creates four categories of personal belief about the future – things are getting better/worse; and people can/can't do something about the future. A template is provided to participants in the publication provided to them

STEP SEVEN

Participants then return the exhibition-in-a-box via return mail, and participate in a zoom-call debrief with the researchers to discuss and reflect on their experience.



7.2 The results: A PEST analysis

But, yeah, I just feel like there's just so many interesting conversations around this sort of topic. I think it's definitely worth having them. I think there were other ones where you really made it, the system personalized, more humanized, which I think is the right step towards the future. So, I'd be happy trusting the machine. It's just that reassurance that the information is going through to the right people and machines often don't reassure you

— Participant #03

Participants in this study confirmed the validity of this speculative work as a vehicle for conversations on potential ED futures, as the work provided a scaffold for conversations on future ED waiting scenarios but also a focus for reflection on their own experiences. Figure 7.6 at the end of this section collects the broad range of insights, thoughts and comments made by participants in response to the speculative outcome, while Figures 7.4 and 7.5 present a sample of some of the written notes made by participants. These insights are organised using the PEST model – evaluating the strengths and weaknesses of a concept in relation to political, economic, social and technological forces. While broad themes, the points raised by participants in this study articulate some of the many tensions, questions and challenges that need to be addressed in the design of future EDWRs. True to the purpose of the speculative outcome, this work acted as a platform to open up discussions on the future of health and healthcare.

The physical props supported participants in their thinking by enabling them to anchor their ideas to something tangible. Unlike a questionnaire, worksheet or video presentation, the 3D physical reality of these parts – supported by imagery and printed publications – enriched the speculative thinking undertaken by participants. As with the use of props as discussed in Chapter 4, the speculative outcome became a 'thing to think with' (Papert 1980), and enabled ideas to emerge that would not have otherwise. As we will see in this section, the speculative thinking that this work elicited did not answer many questions; rather, it amplified them. These questions provide a platform for further enquiry into ED futures and point towards opportunities for further research.

7.2.1 Political lens

If you're in really serious pain, you don't want to deal with a computer necessarily, or you just need that option to talk to a real person
 — Participant #06

Participants articulated concern and delight about how technological integration might create new models for the ED workforce and how existing staff roles might shift due to automation. Participants probed questions such as what roles might be augmented, supported or replaced by AI like Asklepios? Could clerks be replaced by machines? Or retrained to more actively fulfil 'caring' roles for patients in the ED, while highly specialised nurses – such as triage nurses – were redeployed to other critical areas within the ED? Others questioned the extent to which Asklepios is capable of care. If an AI system just collects information, provides information and prioritises work tasks – is it actually 'caring'? Or just an administrative tool? If it supports the dispensing of medication or takes an active role in medical procedures, is it 'caring' then? If Asklepios causes harm – physical or psychological – who is to blame? Could Asklepios diffuse blame, even for those who might actually be at fault? Are people going to be more or less forgiving of technology like this? Misconceptions about the capability of Asklepios could be potentially dangerous, as expectations around the technology cause both patients and staff to place too much, or too little, trust in the digital system.

Participants hypothesised that by using automation to replicate process-driven tasks, Asklepios might free up the capacity for humans who were once burdened by administrative tasks to more actively participate in the caring process. Literature commenting on the current state of the medical workforce flags that support roles are needed in clinical practice to support a workforce that is thinly spread across a strained sector experiencing growing demand (Brooks, Lapsley and Butt 2003; Markwell and Wainer 2009). Perhaps these support roles might be replaced not by humans in new roles, but by non-human digital actors that automate process-driven tasks.

Participants also raised issues of equity: what happens to those who cannot access or engage with Asklepios for reasons of disability, accessibility or desire? Would patients or carers be disadvantaged or marginalised if they chose not, or could not, engage with the 'caring' technology? Could patients opt out of using Asklepios and still receive the same level of care in the ED? What happens if not all hospitals can deploy such AI-powered technology? Would this then create a new

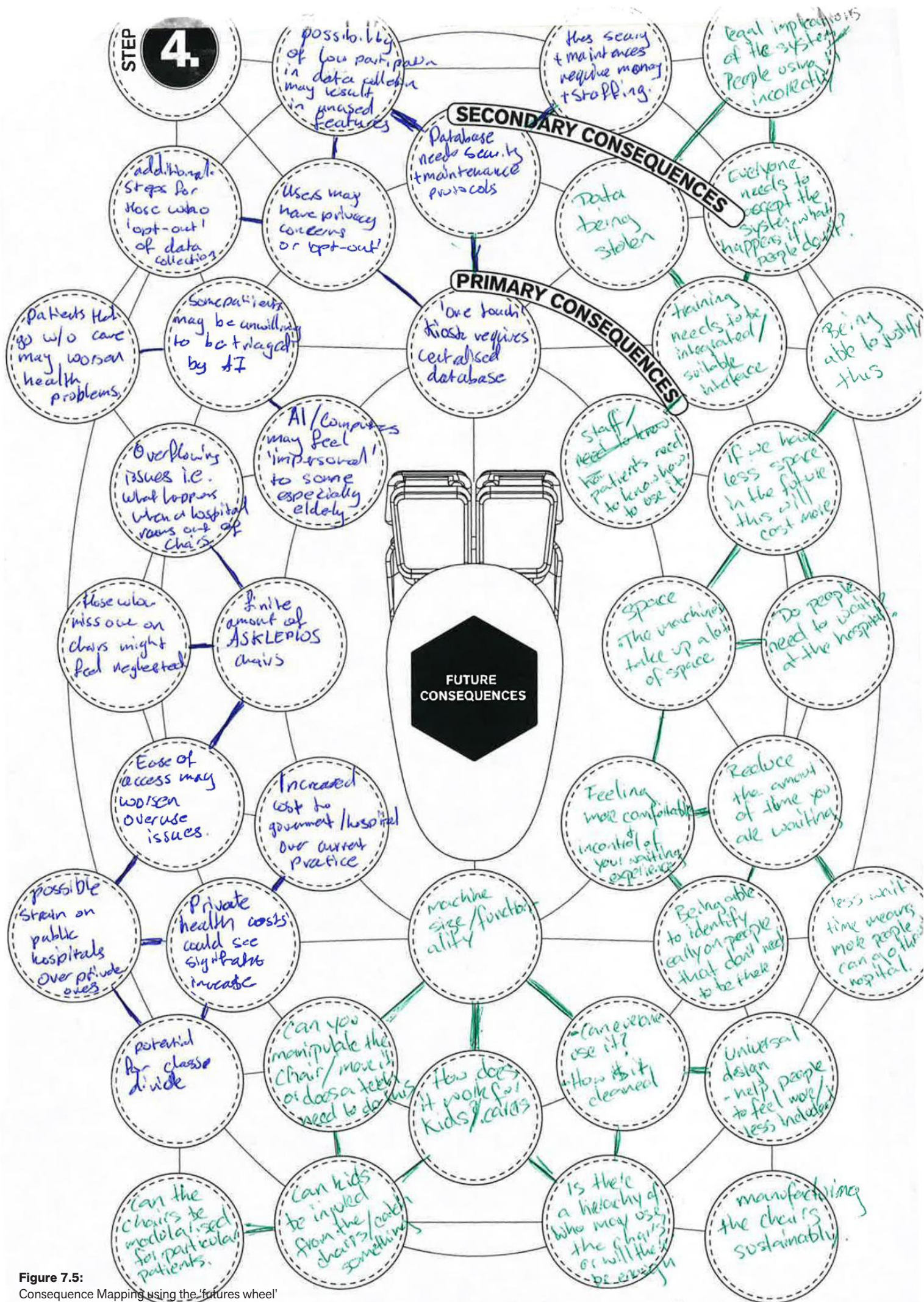


Figure 7.5:
Consequence Mapping using the 'futures wheel'
by a participant in a workshop

hierarchy between AI-powered hospitals and those without, a new class of healthcare for the rich and poor? The issue of equity in the ED among participants might be distilled into the question of who are the unimagined users, the users in the margins, who are not involved in the feedback loop of design iteration and how might they be integrated into the design process? As Oregila and Ling (2018) articulate, these kinds of users are not just marginal users, but users that were not even imagined in the design process.

7.2.2 Economic lens: in the margins

What about hospitals that aren't as smart. If you're coming from overseas or even rural hospitals that don't have a lot of money, would they be able to afford systems like this? And if they don't have those systems integrated, um, if you get put into a small hospital and then you get transferred across to a larger one, what happens?

— Participant #03

Participants in this study recognised that the kind of technology described in this speculation is expensive and again articulated an issue of equity as to what happens when this technology is available to some but not all. As was signalled in the last section, participants questioned whether this kind of technology might fortify a culture where only 'the rich' might benefit and others marginalised. How to bridge this economic divide was of concern to participants; as one articulated:

It's expensive to implement, [...] you can't just implement it in a couple of hospitals that are at the rich end of town that can afford it. It should be something that's everywhere. Like everyone should be able to have access to it no matter what kind of area you live in and how wealthy that area is.

— Participant #01

Others, however, articulated that this was a 'mute' point;

Well, so I think money's a bit of a mute point sometimes when it comes to health. It's one of the major things we will pay any amount of money for, to be healthy and live and not die.

— Participant #06

The conversation of participants about the economic trade-off in the implementation of this kind of technology fits into the larger discourse of how AI might disrupt or displace current workers. While Asklepios presents a potentially large upfront capital cost, and then a new operational cost for the hospital in terms of unavoidable maintenance, it could potentially present a saving for EDs, as staff are made redundant through the automation of processes. Given that the largest operational cost of a hospital is staff salaries (AIHW 2019), this saving could be an attractive trade-off for healthcare leadership who are required to do more with less due to ongoing austerity and increasing demand (Burkett et al. 2017; Skinner 2020).

7.2.3 Social lens: the 'atomised' society

Sometimes you just want to talk to a person. So we felt like it was good to just provide options in terms of there was at least one real person in close vicinity if you really were in a dire situation.

— Participant #06

Participants confirmed that waiting in an ED is a highly social activity and that carers – friends, partners or immediate family members – play an important role in patient experience, whether they can be physically at the side of the patient or not. Zygmunt Bauman writes in *Liquid modernity* that we have become a society of individuals. Society has become 'atomised': made up of a collection of people who are self-interested and largely self-sufficient. People move about more, people work where work is available, travel to study and live away from their families (Bauman 2000). This has direct implications for how we experience healthcare; as more people are spread out throughout a city, country or indeed the world, it is likely that the waiting experience in the ED will be spent alone. Participants recognised that telehealth technologies like Asklepios can dissolve barriers of distance, but they have not yet replicated physical presence and, as some participants argued, are incapable of demonstrating empathy in care – both important factors for positive patient experiences in the ED:

I think just for that initial emotional response to being undergoing a trauma, I think just our biology means we need to connect with somebody [...] we're social people, we're social creatures, it's pretty innate that we want to have that support and that connection to a living person, if you're going through those experiences, I think.

— Participant #06

But it is hard for a machine to show empathy. And I think that's something you seek out when you are in pain [...] Sometimes people just want a real, fleshy person.

— Participant #06

Participants used the example of Asklepios to reflect on how they might feel if they were cared for by such a machine and articulated that machines are incapable of empathy, but can reflect a pre-programmed response to give the illusion of empathy. In this scenario, Asklepios is not actually empathetic, it just feels as such because of the response it might elicit in individuals. Participants articulated the challenge for AI in the ED is how to further replicate empathy in the interactions, which is made complex by the ED context and the 'pain' of waiting. How Asklepios, or any kind of technology, might demonstrate empathy and create 'tele-presence', to connect people and communities separated by distance virtually, is key to mitigating feelings of loneliness in the waiting room.

7.2.4 Technological lens: Technoethics and the ED

If you're in really serious pain, you don't want to deal with a computer necessarily, or you just need that option to talk to a real person. But in terms of diagnostics and the actual surgeries and things, I think AI is the future anyway, but it can't replace that initial, I think, effect of calming you down.

— Participant #05

Participants articulated the many opportunities and pitfalls that technology like Asklepios might present for care in the ED. Participants engaged with Asklepios not as a 'wrapper' or 'shell' for technology, but as a new actor in the ED with the potential to reframe user experience. This new technology is different from any other kind of technology in the ED already – from the scalpel to the MRI machine – as it is not just static, but has the opportunity to adapt and learn. Asklepios has the capacity to be updated, to better support the needs of users – both patients and staff. This shift from products to product-service systems is one of broader concern for all design. As Tonkinwise (2019) articulates, there is a fundamental change to the ontology of product-design; products are now a new category of 'thing' which is neither the 'thing' of a prototype or the 'thing' of a finished product, but that of a 'minimum viable product' (MVP). Smartphones and computers – like Asklepios – might change overnight with a new update, bringing with them new value for their users. Tonkinwise uses the example of autonomous cars, which according to him are not products but place-based ecosystems. Likewise, the Asklepios concept described in this design outcome should not be thought of as a 'product' but, rather, a technological ecosystem, grounded within the ED architecture, that connects and mediates care between patients and providers in the ED. As Tonkinwise argues, this fundamental and radical change to how products exist in our world, and how designers design them, requires new ethics to guide technological development.

Recently, principles to guide the development of AI have emerged – such as the Google AI design principles (Google 2018) and OECD principles on AI (Organisation for Economic Co-operation and Development (OECD) 2019) – which provide high-level ethical principles to guide both policy and research. These new principles sit within a broad discourse of research into the ethical consequences of AI which is reflected by the many outputs across academia, policy and the media (Ryan and Carsten Stahl 2020). The current discourse and high-level ethical declarations and principles are useful to guide the overall field, but lack nuance (Coldicutt 2018) as to how they should be applied in specific industries and sectors. As Ryan and Carsten Stahl (2020) articulate, 'As a consequence, it is difficult for individuals involved in the development or use of AI to determine which ethical issues they should be aware of, how these can present themselves and how they may be addressed'. As participants discussed in this study, the ethics and morals are interconnected with the technology that we introduce into the waiting room. New research opportunities abound to both determine and address the technoethical dilemmas present when technology is integrated into the ED and the future hospital. Further research is required to develop a robust understanding of how AI might be applied to benefit all ED users and not just a minority.

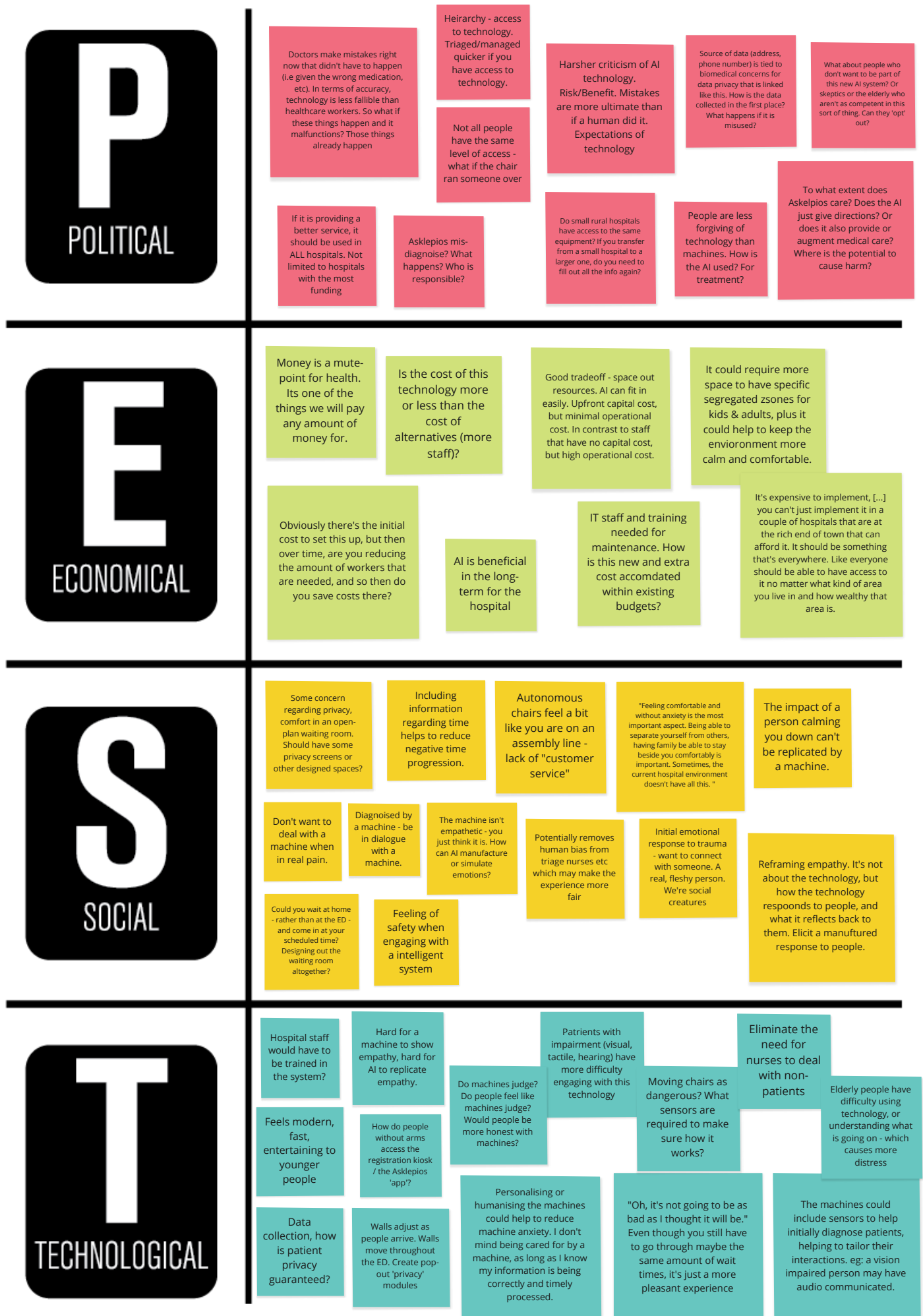
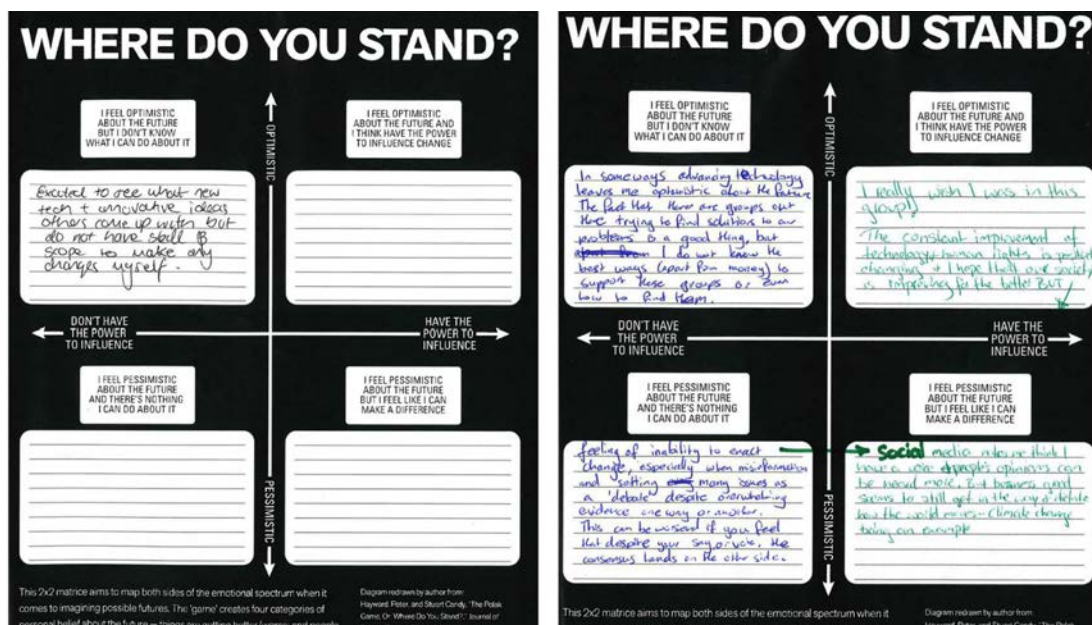


Figure 7.6:
PEST analysis of participant thoughts and conversations regarding possible ED futures

Figure 7.7:

Notes made by some of the workshop participants, regarding their position with respect to ED futures



7.3 Where do you stand on ED futures?

The Polak game, as introduced in Chapter 3 and adapted from the work of Hayward and Candy (2017), was applied as a tool to track responses from workshop participants – ED users with lived experiences – about how they feel about the ED of the future. Figures 7.7 and 7.8 capture some of the many insights articulated by participants in this study. Insights and conversations from participants are presented here as raw data points and demonstrate the diversity of viewpoints that participants have on the future of the ED. What seemed to be common across all participants – regardless of their feelings of optimism or agency – was that the world, and the ED, are in a state of transition:

I think we're in a very interesting time with this technology, I think we're on the cusp of all AI exploding and I think it will come with, I like to think at least it will come with it a lot of good changes. And I think the hospital systems themselves are changing in terms of the diversity, I suppose, in views and approaches. Certainly I've seen that through my work, and the sorts of people that come through the system, a lot of old school, white conservative men, where for a long time the ones that ran it and I don't think that's true anymore. So yeah, I think that's why I'm optimistic. I think I like to think it would always continue to approve with these little incremental changes. It'd be pretty dire if it got worse and worse, but it could.

— Participant #06

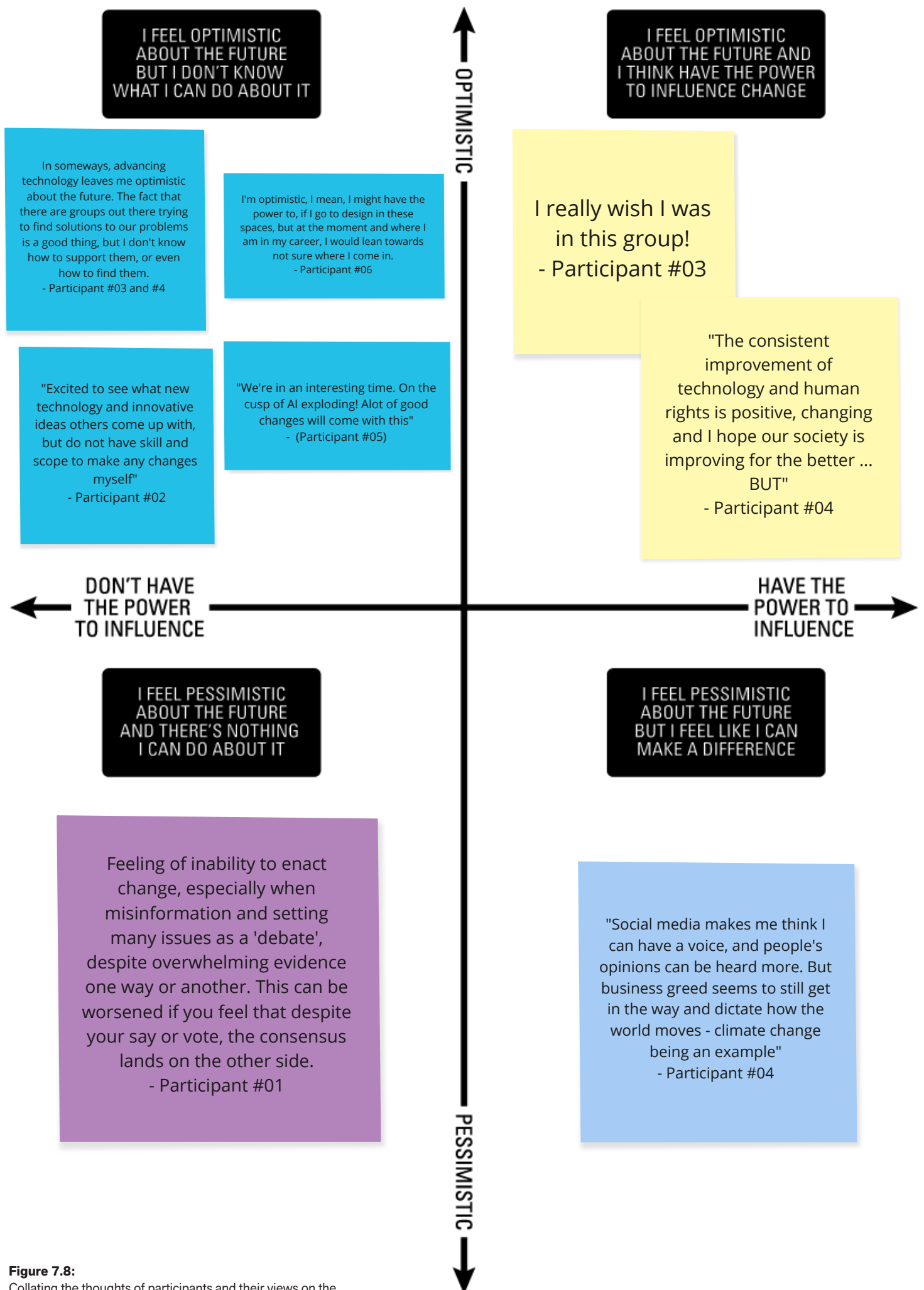


Figure 7.8:

Collating the thoughts of participants and their views on the ED future, using the Polak Game model.

Interestingly, some participants articulated that engaging with this project, they had become more optimistic about the future of the ED. One participant who had formerly worked within ED's in a regulatory capacity, articulated that in her experience, design was often excluded from the conversation of new ED facilities. As they articulated;

But also I think your project is part of what has made me optimistic. I don't remember design ever coming into any of these discussions when I worked for [...]. Even though it had design in the title, no designers or architects were really involved. Architects occasionally, but their needs were more around what the doctor needed, it was never about the patient.

—Participant #05

Others wrote while they hoped individual voices would be heard and valued, and that grounded situations like the EDWR might change in the future, they felt pessimistic in the face of seemingly insurmountable global challenges such as the rise of 'big business', 'climate change' and rising inequality between the rich and poor. As one articulated:

Basically I think the difference between when I feel pessimistic versus optimistic is whether the issue is something that depends on the scale of the issue. So, basically my pessimism comes from really big issues that call it that people need to come to a consensus on or agree on. And I feel like that's really hard to do.

— Participant #04

The diversity of viewpoints that participants brought to this study, which are grounded in their lived experiences with the existing ED, demonstrate an inherent uncertainty about the future of the ED. The challenge – and topic of future research – is how to translate uncertainty into presentday choices. The diversity of viewpoints concerning ED futures indicates that the future is contentious and more work is required to reconcile the many viewpoints of different stakeholders. As Hayward and Candy (2017) explain, by bringing the hidden dimensions of agency and optimism to light, a sense of what 'our' future could be starts to emerge.

7.4 Chapter conclusion

In any design process, part of the challenge lies in translating findings gathered through research into actionable design insight. This chapter has stopped short of providing such insights in the form of formal recommendations for design, in part due to the complexity surrounding how new ED facilities are made. In contrast, this sub-study and chapter make a contribution to our overall understanding of key areas which designers should be concerned with when designing technology into ED environments. Understanding where potential end-users – patients and carers – stand in relation to ED futures is perhaps the first step in integrating their needs, dreams and aspirations into future healthcare facilities.

The co-design engagements described in this chapter demonstrate a fundamental shift in the kind of speculation achieved by ED participants compared to that described in Chapter 4. While this sub-study focused more on ED patients and carers than staff and was contextualised within the home rather than the hospital, it does demonstrate how the use of designed artefacts and design fictions can provide the framework for collaborative and speculative thinking on ED futures. The approach described in this chapter builds upon those discussed in Chapter 4, where these approaches were useful for different aspects of the design process. The designed artefacts developed and tested through this sub-study enabled nuanced, focused and unique conversations on the particular implications of technological futures.

This chapter set out to identify the attributes of a preferable future for the EDWR by sharing the design outcome as a provocational tool with potential end-users. The diversity of opinions collected in this study, which were elicited through engagement with the speculative outcome, demonstrate how this aim was achieved and perhaps again highlight how contentious the nature of healthcare futures can be. Resolving these points of difference is not simple and developing best practice for the inclusion of AI into the ED would be a topic worthy of its own PhD study. In conclusion, this sub-study presents a platform for future work, where these insights might be expanded upon in a new study, where these speculative visions might be translated into strategic vision and where the findings of this study might be used partially or entirely to shape how the EDWR will be experienced by patients, carers and staff into the future.

DESIGN FICTION SUMMARY —

CONTENT WARNING: Depictions of end-of-life event.

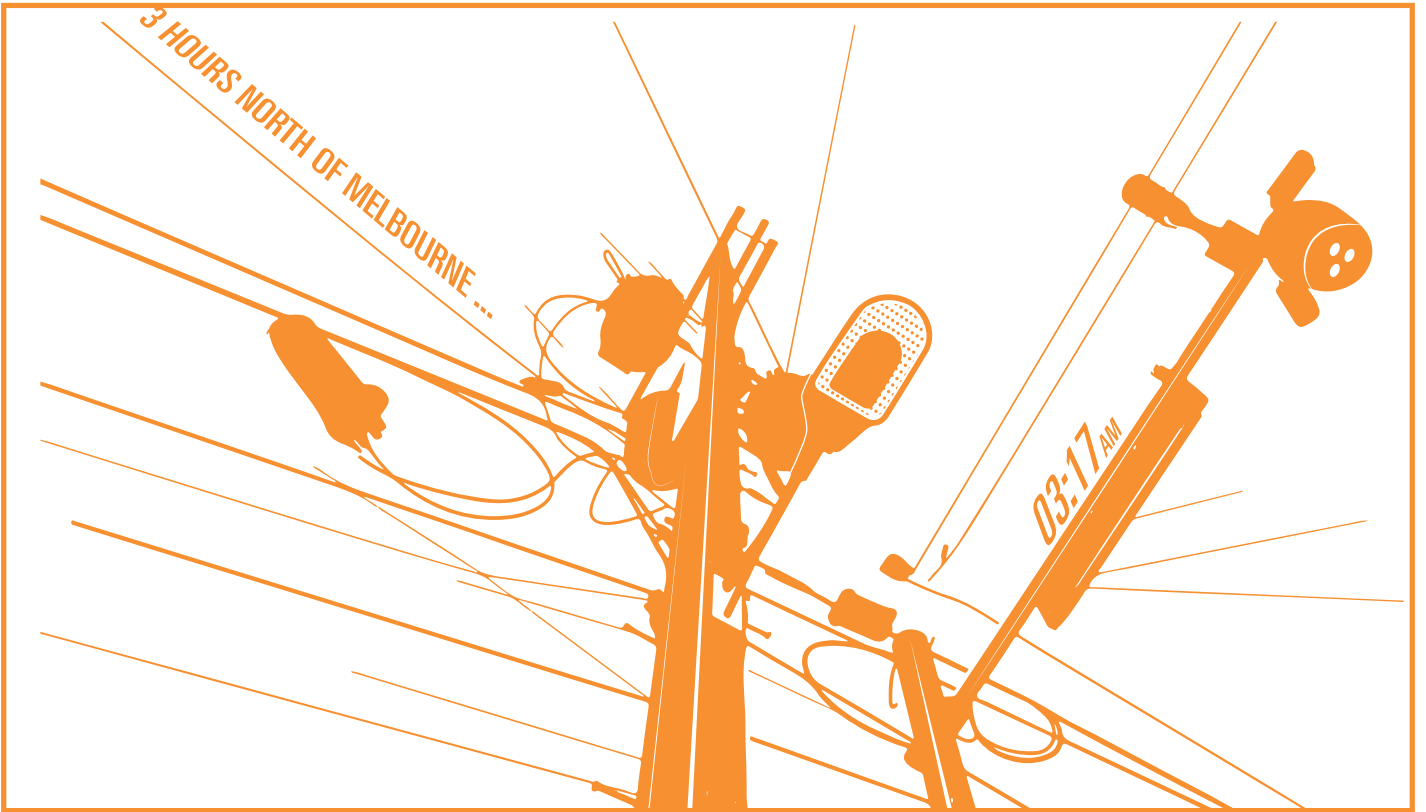
It's the middle of the night when Clare is woken to the sound of her mobile phone. It's a nurse from Clearview Hospital – 200km from where Clare is right now – who tells Clare that her 97-year-old mother, Agatha, has had a stroke. The nurse tells Clare that Agatha's condition is serious, and it's unlikely that she is going to live much longer. Clare then gets in her car, and begins the drive to Clearview ED.

It's a busy night at Clearview ED when Agatha peacefully passes away with Clare at her bedside. There's another group in the private family room, so Clare and her extended family are huddled together in the waiting room while waiting for more information from the doctor. Right now, Clare and her family are wondering what's going to happen tomorrow.

Key Thematic: End of Life in the Emergency Department —

The pragmatic reality of the ED is that many of us will likely spend some of our last hours in life visiting one. End-of-life care is an important service provided by the ED and it would be remiss of this project not to consider the perspective of those in the waiting room who do not necessarily have acute injuries, but are facing the difficult situation of losing a loved one while waiting within the ED.

In the last design fiction in this series, Clare and her brother must wait in the waiting room as another group occupies the designated family room. Clare and her brother must navigate the end-of-life care for their mother, Agatha, and deal with that experience in the waiting room. Conversations and decisions with next of kin of patients about resuscitation status, advance care plans, patient wishes and religious beliefs are difficult, but important – and how those interactions might be mediated through technology like Asklepios have not yet been explored.



ASKLEPIOS AI

HELLO THERE,
THIS IS ASKLEPIOS FROM
CLEARVIEW EMERGENCY
DEPARTMENT.

AM I
SPEAKING
WITH CLARE
PEYTON?

... HELLO. YEP,
I'M CLARE ...

SORRY I
WAS ASLEEP

THAT'S OKAY CLARE.
I'M CALLING IN REGARD
TO YOUR MOTHER,
AGATHA PEYTON.

AGATHA CALLED AN
AMBULANCE BECAUSE OF
A PAIN IN HER CHEST
AND SOME SHORTNESS
OF BREATH

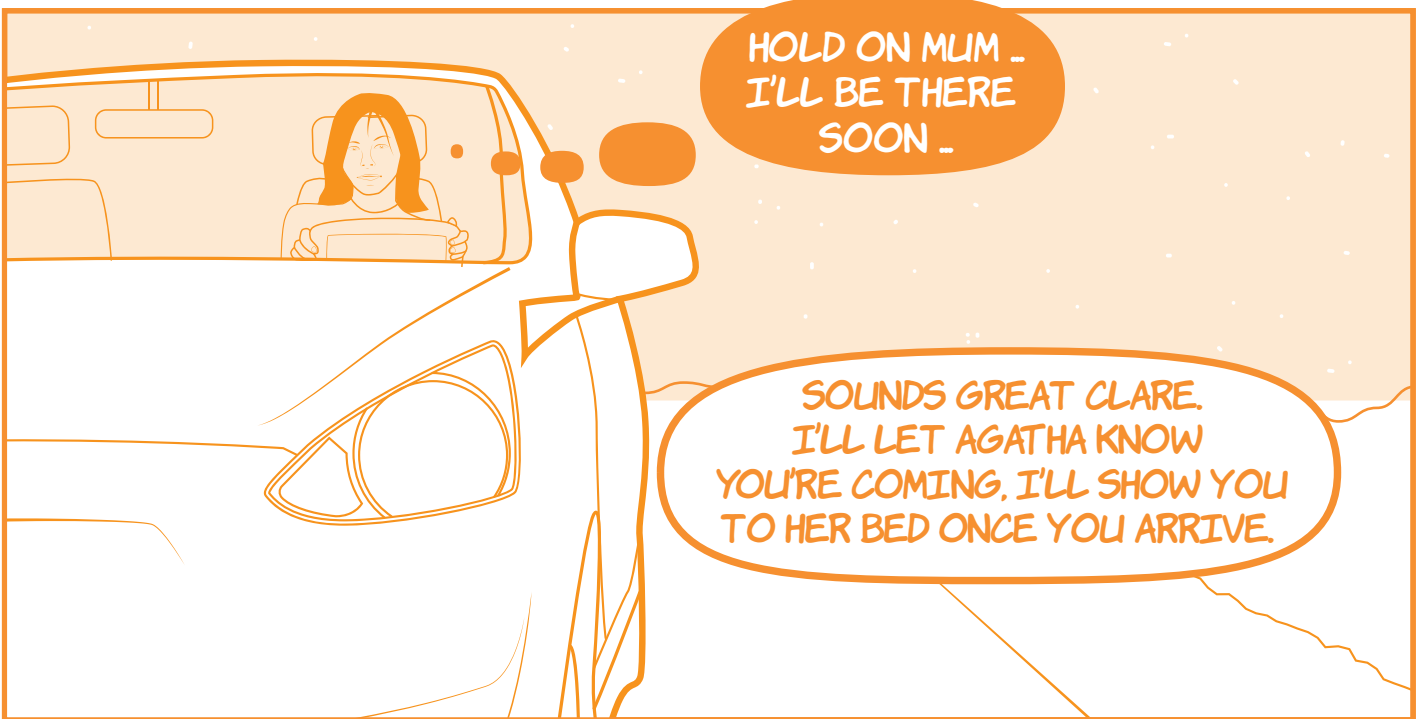
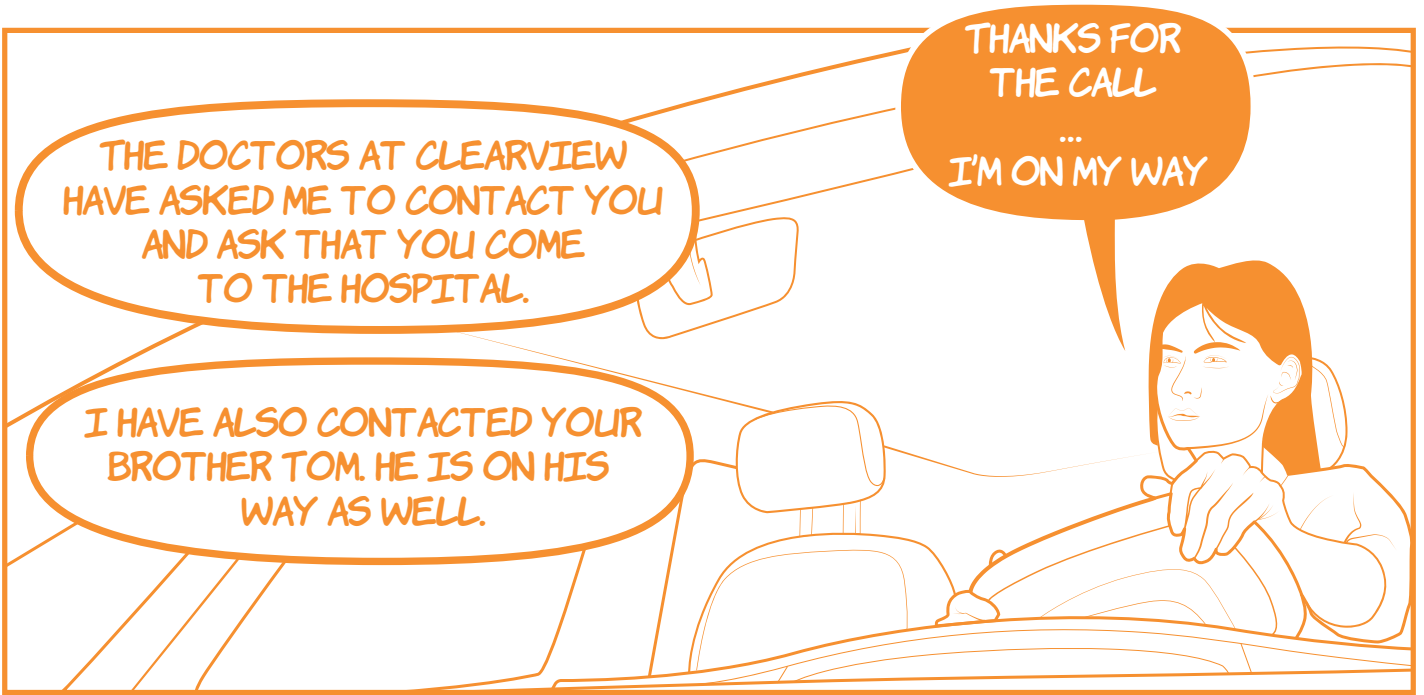
EMERGENCY AMBULANCE

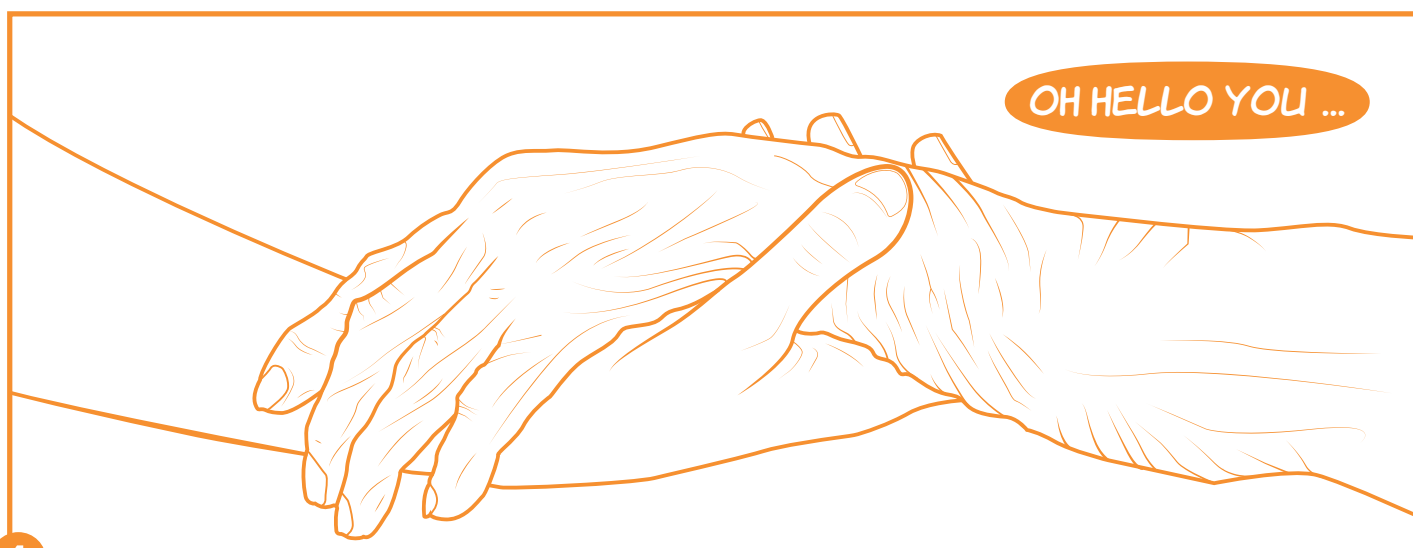
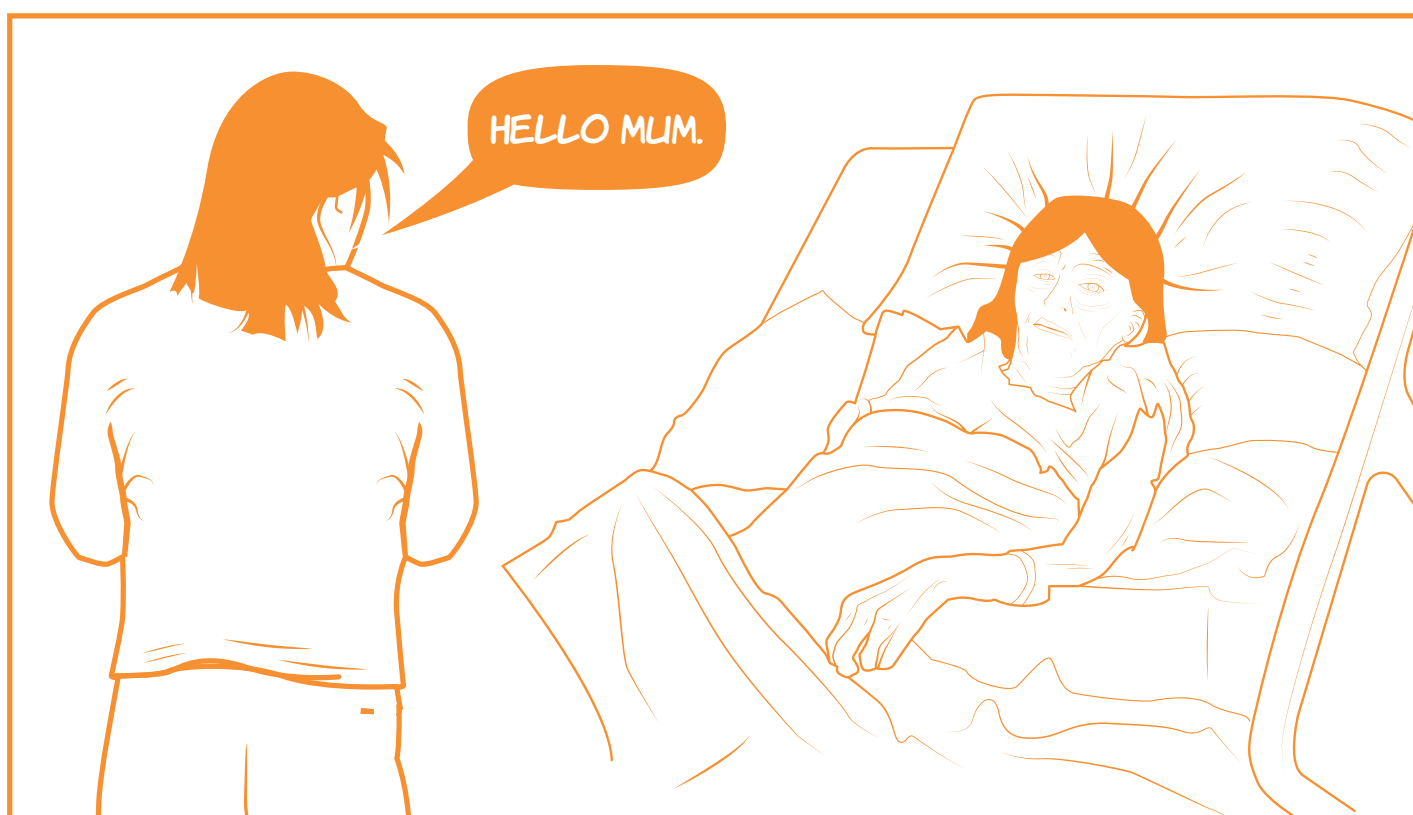
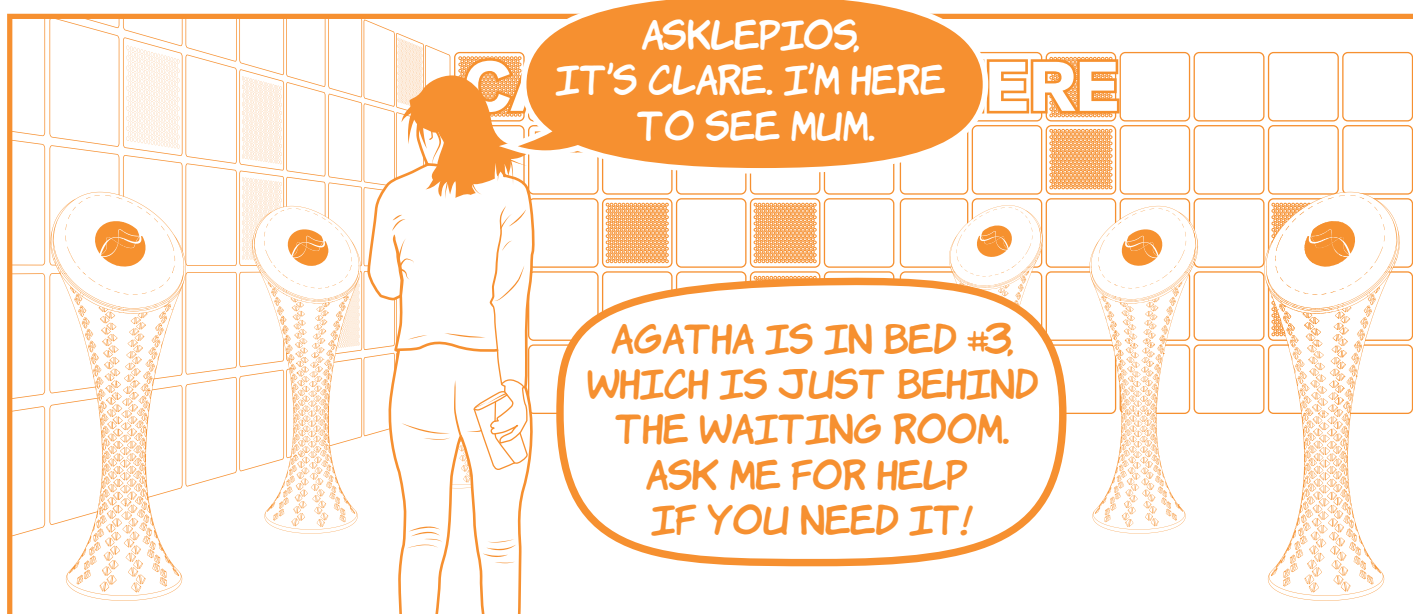
SHE IS NOW AT CLEARVIEW
EMERGENCY DEPARTMENT.
WE BELIEVE THAT AGATHA IS
EXPERIENCING VENTRICULAR
FIBRILLATION

DO YOU MEAN LIKE
A HEART ATTACK?

KIND OF.
I WILL SEND A LINK
TO YOUR PHONE WITH
MORE INFORMATION
ON HER CONDITION.

AGATHA IS BEING
TREATED BY OUR DOCTORS,
BUT SHE IS IN A CRITICAL
CONDITION.





2hrs
LATER

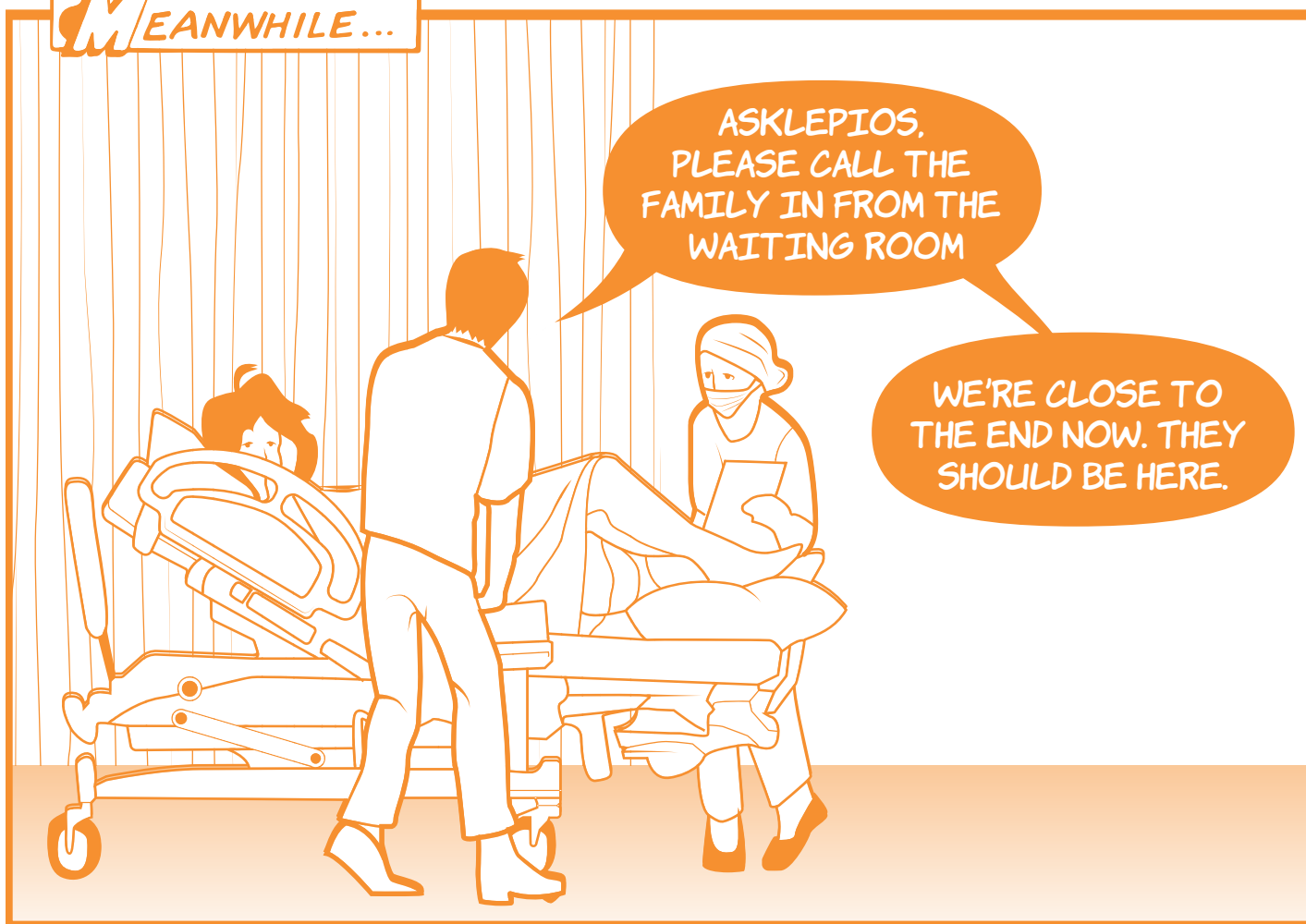
IT'S NICE TO SEE
YOU TOM

YOU TOO, SIS.

I'M GLAD YOU'RE HERE ...
I DON'T THINK I COULD
COPE ... JUST ME AND
ASKLEPIOS ...

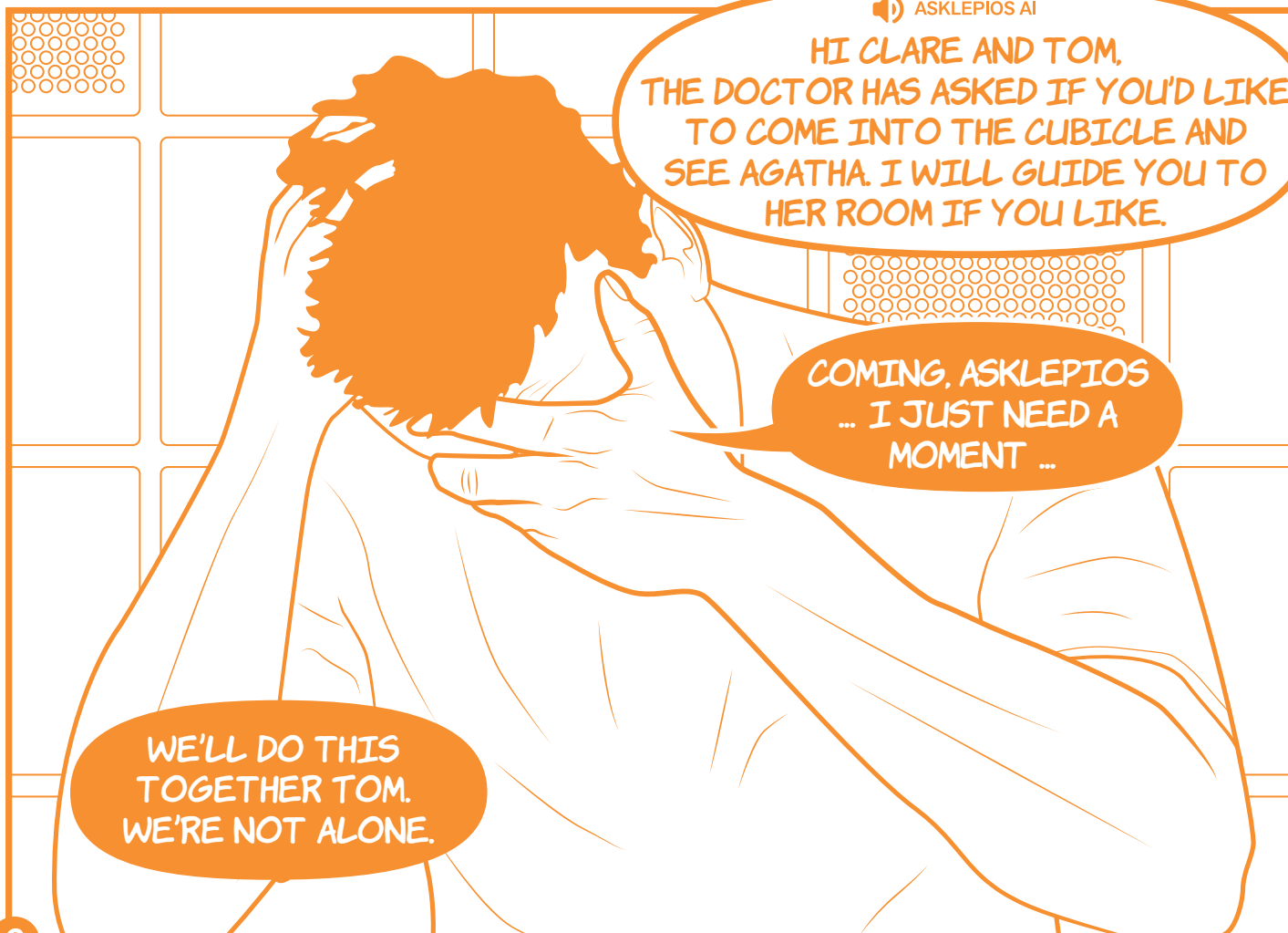
THE DOCTOR SAID
IT'S BAD ... BUT WE
COULD BE HERE A FEW
MORE HOURS AT
LEAST ...

WE'LL GET THROUGH
THIS TOGETHER
TOM, WHATEVER HAPPENS.



ASKLEPIOS,
PLEASE CALL THE
FAMILY IN FROM THE
WAITING ROOM

WE'RE CLOSE TO
THE END NOW. THEY
SHOULD BE HERE.



ASKLEPIOS AI

HI CLARE AND TOM,
THE DOCTOR HAS ASKED IF YOU'D LIKE
TO COME INTO THE CUBICLE AND
SEE AGATHA. I WILL GUIDE YOU TO
HER ROOM IF YOU LIKE.

COMING, ASKLEPIOS
... I JUST NEED A
MOMENT ...

WE'LL DO THIS
TOGETHER TOM.
WE'RE NOT ALONE.

THE NEXT FEW HOURS
BLURRED TOGETHER

WHILE WE WAITED, WE FELT
HOPELESS. BUT AT LEAST WE
HAD EACH OTHER.

BOTH OF US COULDN'T
IMAGINE A WORLD
WITHOUT MUM

WHAT WAS GOING TO
HAPPEN NEXT?

WE SAT WITH MUM
UNTIL THE VERY END.

WHEN I THINK
BACK TO THAT NIGHT
AT CLEARVIEW ED ...
I'M GLAD AGATHA HAD
A GOOD DEATH.

I'M HAPPY TOM AND I
MANAGED TO SEE
HER ONE LAST TIME ...



BED 3
RESUSCITATION CUBICLE

ASKLEPIOS, CAN YOU
PLEASE UPDATE AGATHA'S
RECORD WITH HER TIME
OF DEATH AND MANAGE ANY
FAMILY YET TO ARRIVE.

ASKLEPIOS AI
YES DOCTOR.

AGATHA IS WITH GOD NOW ...
SHE'S IN A BETTER PLACE

END

8.0 Introduction

The only way of discovering the limits of the possible is to venture a little way past them into the impossible.

— *Hazards of prophecy: The failure of imagination*. Arthur C. Clarke (1962)

This chapter concludes the exegesis, summarises how this work has addressed the knowledge gaps as set out in Chapter 2 and outlines the contributions to knowledge that this study makes. It summarises how this research has answered the research question: *How might speculative design research and practice inspire change for the problems facing the emergency department waiting room of the future?* and brings new insights generated through this research together with existing theory. In doing so, this research establishes the capacity for SSD research and practice to meaningfully contribute to the design of future EDWRs. The chapter then briefly identifies several research limitations and outlines opportunities for future research.

This study set out to explore the central ED experience of waiting as an activity that precedes, accompanies and follows clinical action. While waiting, and the EDWR, can and do have a profound impact on overall patient experiences, little other design research or practice has set out to improve this aspect of healthcare provision. While a number of interrelated factors are exacerbating wait times, an investigation into how these spaces and experiences might be designed in the future makes for a timely research endeavour. This study has then applied speculative design practice as a tool to articulate and examine future, alternative visions of the ED.

The primary contribution of this research is through the speculative design outcome, which probes an alternative waiting experience in the ED and explores the role that technology might have in supporting user experience and clinical workflow. This outcome is grounded within data – narratives of contemporary lived experiences – gathered within this study as discussed in Chapter 4 and the participatory, exhibition in a box activities as discussed in Chapter 7. This contribution is not a definitive, summative designed outcome, but a platform for further speculation and research which can be used partially or entirely to inform the design of new healthcare facilities. A secondary contribution to knowledge arising from this study lies in the methodological approach – the SSD framework; see Chapter 3 – that bridges the methodological discrepancies between service design (Stickdorn et al. 2018) and speculative design (Dunne and Raby 2013) discourses by drawing upon the research philosophies and epistemologies of both. The speculative design outcome presented in this thesis demonstrates a practical application of this methodological approach. These contributions provide an example of how speculative design research and practice can inform ED waiting experiences and, in doing so, demonstrate how the research question in this study has been addressed.

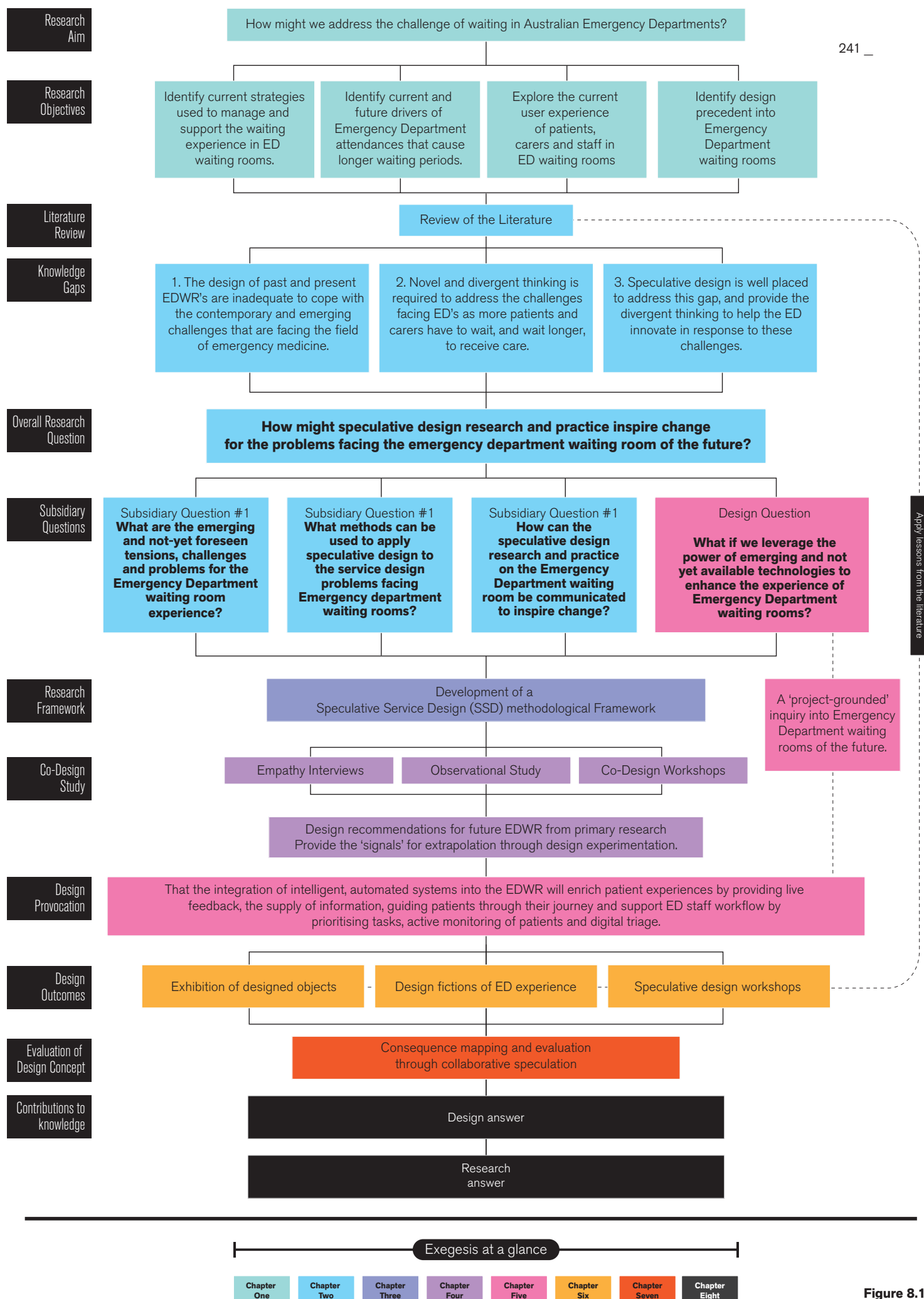


Figure 8.1:
Research framework

8.1: Exegesis in review

This study has straddled the broad domains of design, futures and emergency medicine. These macro-arenas are too broad to cover in a single PhD study; however, as Manzini (1989, 58) states, it is incumbent upon designers to collectively consider the macroscopic ('broad and coherent social scenarios') while zoning in on the microscopic ('giving form to plans and propositions') in order to deliver relevant design proposals. On the macro-level, the project has provided the platform to touch on some big issues in need of transformation: the proliferation of technology (namely AI and ML) in the ED, the implications of automation for care experiences, the future of work in the ED, how the waiting experience might be manipulated and managed, and the role of speculative design in imagining the ED of the future. Each of these areas has wide scope for further design research and practice, and this study points to the possibility of further projects worthy of discovery and investigation. On the microscopic level, this project provides one articulation of how technology might be implemented in the ED to improve care delivery and waiting experience. Designers, architects, clinicians and healthcare administrators might apply these findings partially or entirely when building, designing or making decisions about technology in new EDWRs and front-of-house ED systems.

Figure 8.1 provides a diagrammatic overview of the research project and map of this exegesis, and Table 8.1 provides a summary of the research questions, methods and outcomes. Beginning with the aim of addressing the challenge of waiting in Australian EDs, Chapter 1 highlighted a raft of interrelated, systemic and wicked challenges that are facing the ED. Increasing patient attendances (AIHW 2016; Burkett et al. 2017), an ageing population with complex comorbidities (Glasby 2003; Skinner 2020), growing costs in the provision of urgent care (Garling 2008; IHPA 2020) and increased frequency of climate change disasters (ACEM 2019) are all exacerbating wait times in the ED. When demand for ED services outstrips available supply, more patients must wait to receive care. While a wide discourse of literature and a plethora of government reports (Tracey and Briggs 2019; Garling 2008; Walker 2004) have advocated for change for more than a decade in light of these challenges, the challenges persist. Change in the ED is hard and what the ED needs is alternatives: visions of novel approaches that provoke, foster and scaffold conversations, cooperation and collaboration to materialise new futures.

A review of the literature in Chapter 2 highlighted some of the emerging challenges facing the ED and the inadequacy in both design precedents and supporting design guidelines to address these challenges. This review revealed that EDWRs have not received any significant design attention since the first 'modern' hospitals of the 19th century, where examples from the late 19th and early 20th century indicate essentially the same service experience found in modern times. Building upon this and other knowledge gaps, the study then proposed a novel methodological framework — speculative service design (SSD), as detailed in Chapter 3 — to both generate new design precedent and resolve some of the methodological discrepancies that arise from the union of speculative design and service design. The efficacy of this framework was then demonstrated through the development (Chapters 5

Table 8.1:

A table of the subsidiary research questions, methods and findings

Subsidiary research questions	Research methods	Research outcomes
What are the emerging and not-yet foreseen tensions, challenges and problems for the Emergency Department waiting room experience?	<ul style="list-style-type: none"> ▪ Review of the literature (Chapter 2) ▪ Co-Design engagements and observations 	<ul style="list-style-type: none"> ▪ The EDWR has received little design attention since ▪ A lack of comprehensive design precedent concerned with waiting experiences in the ED.
What methods can be used to apply speculative design to the service design problems facing Emergency department waiting rooms?	<ul style="list-style-type: none"> ▪ Review of the literature (Chapter 3) ▪ Practical application and testing of an experimental methodological framework through design practice 	<ul style="list-style-type: none"> ▪ Development of the Speculative service design framework
How can the speculative design research and practice on the Emergency Department waiting room be communicated to inspire change?	<ul style="list-style-type: none"> ▪ Design Fictions ▪ Suite of designed objects ▪ 'Exhibition-in-a-box' 	<ul style="list-style-type: none"> ▪ Co-Design data and principles for designing waiting experiences. ▪ Speculative design outcome
Design question		
What if we leverage the power of emerging and not-yet-available technologies to enhance the service delivery and experience of emergency department waiting rooms?	<ul style="list-style-type: none"> ▪ 'Project-grounded', speculative service concept ideation, iteration and refinement 	<ul style="list-style-type: none"> ▪ Speculative service design outcome, including: <ul style="list-style-type: none"> ▪ Service blueprint ▪ Suite of five design fictions ▪ Suite of designed objects at variety of scales ▪ 'Exhibition-in-a-box'

and 6) and evaluation (Chapter 7) of the speculative outcome, which acts as both a design precedent and a platform for ongoing speculation, where a variety of stakeholders might use the findings from this project to inform the conception of future healthcare facilities. It is also hoped that this framework might resonate further afield and be of interest to designers who seek to investigate complex, multi-stakeholder service experiences in other sectors.

The highly speculative nature of this study entails that the results should be interpreted as theoretical and not market-ready ideas worthy of immediate implementation. The design outcome is formative – not summative – and its value as a contribution lies in its capacity to complement existing design ideology about what a preferable future is for EDWRs. As in the open-design and open-source movements, findings from this study might be applied like a seed from which further development and speculation grow. The outcomes arising from this study are not deterministic of the future, but a proposal that invites discussion, reflection and debate as to what the future of waiting in the ED might be like. The door is left open for future analysis of the design concept where it might be used as part of the design process of new healthcare facilities.

8.2: Research questions answered and contributions to knowledge

This section demonstrates how the research questions, as set out in the study, have been addressed and draws together the core contributions to knowledge that this project makes. The 'research answers' (Findeli 2010) have emerged through the 'design answers', which were formulated through a 'project-grounded' research approach. These answers form a contribution of designerly knowledge to the field of emergency medicine, a provocational concept and series of objects that evoke debate and reflection to inform the conception of new futures. This is in contrast to what Dunne and Raby (2013, vii) articulate as 'affirmative design' from commercial design practice, which presents artefacts of design practice in pursuit of a solution to a problem.

Instead of a series of implementable innovations, this speculative design outcome should be used as a conversational prompt between all ED stakeholders – patients, carers, ED staff, designers, architects and physicians – to identify and resolve the preferable attributes of ED futures. These insights, in turn, can be used to inform and influence the creation of new waiting areas and healthcare facilities. Stakeholders might apply the speculative outcome and findings from this study partially or entirely as part of their design process.

The speculative and practice-based nature of this study also presents the opportunity to reflect on the contribution of design to the field of emergency medicine, which is only now starting to emerge as an area of research. As contended by Buchanan (1992, 5), 'no single definition of design, or branches of professionalized practice such as industrial or graphic design, adequately covers the diversity of ideas and methods gathered together under the label'. Part of the contribution of this study lies in the contribution of designerly knowledge to the ED, where novel methodological approaches – such as the SSD framework – can be used as a unique approach to the challenges faced by the field. As Chamberlain and Craig (2017) underscore, the suggestion that design and health are somehow separate would be a misnomer; design is all around us in the ED. Such development of design research methodologies might be observed as both the object of current academic research and philosophical speculation for further research.

8.2.1 Future waiting user experience(s) finding contribution

The central contribution to knowledge that this study makes is to our understanding of future waiting room experiences for ED patients, carers and staff. As discussed in Chapter 2, 'technology' will not just appear in the ED on the shoulders of patients and physicians like a wise owl, but will be built – component by component. This technology will need to be 'domesticated' and 'tamed' before it is ready to make a meaningful impact upon user experience. Emerging – or not-yet-developed – technologies are increasingly hard to prototype and test (Ahmadpour et al. 2019), particularly interactive elements in high-stakes environments such as the ED. Speculation as to how such technology might manifest in the ED requires a starting point – a seed that invites stakeholder reflection and opens discussion about what 'could be', instead of what 'is' or 'should be'. In contrast to a deterministic solution that closes down possibilities, the speculative outcome generated in this research makes a contribution to our understanding of future ED experiences by generating future visions through design practice. While the speculative outcome is fictional and exploratory, the design outcome is grounded within the real-life lived experiences of ED stakeholders and close enough to reality that it might be applied to enrich future strategic foresight work in the context of emergency medicine.

The speculative concept is represented through a series of designed objects, which included:

1. A suite of designed objects at a variety of scales and dimensions. These physical objects provide a material grounding for the touchpoints in the service journey. These artefacts act as totems through which stories about future alternative experiences might be told.
2. A series of five design fiction 'comiczines', where each edition probes a different part of the waiting experience in the ED. While the stories are fictional, each is an extrapolation upon data gathered from the co-design engagements as described in Chapter 4.
3. An exhibition-in-a-box concept, which draws together the design outcomes into a medium which can be posted or delivered to stakeholders without the need for an audience to attend a physical gallery. In doing so, the box acts as a 'theatre for conversation' and as both a method and a place for conversations on ED futures.

This user experience finding enables collaborators and stakeholders to envisage users' possible lived experiences in ED; using articulations of the design practice as a platform, tool and vehicle for further speculation into ED futures. The value of speculative design thinking, when applied to this context, is to examine these advanced interactive technologies and gain an understanding of prospective design ideas, and the needs and values that might be associated with it. These insights into user experiences might be used to bring design further upstream in the trajectories of technological development for next generation ED's.

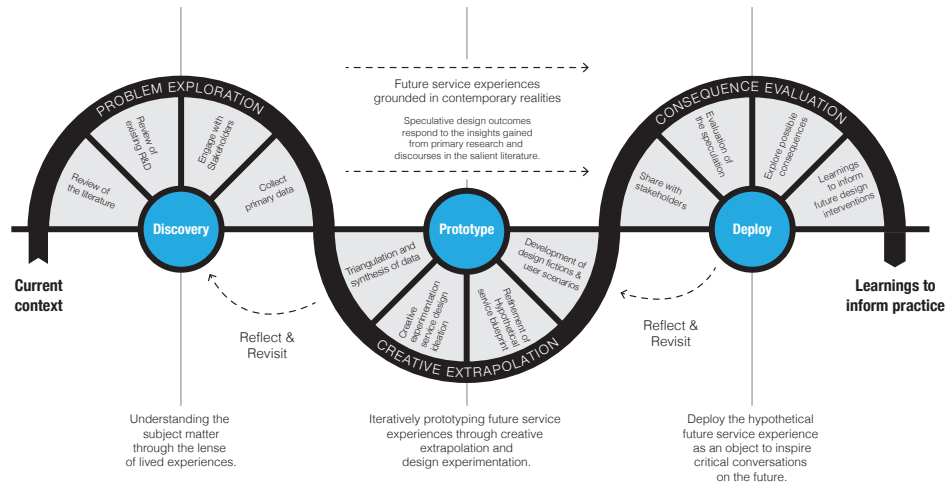


Figure 8.3:
The Speculative Service
Design methodological
framework.

8.2.2 Methodological contribution to design research and practice in the ED

The practice-based component of this research has demonstrated the application of a novel methodological approach – the SSD framework (Figure 8.2). In the unique context of the ED, this approach addresses the current inadequacy of current ED design guidelines discussed in the literature review, namely the ACEM (2014) and AHIA (2019) documents, which provide little support for conducting strategic foresight work within ED environments. This framework addresses this gap by drawing upon the epistemologies from both service design (Stickdorn et al. 2018) and speculative design (Dunne and Raby 2013) discourses.

The novelty of the SSD framework is in how it reconciles some of the methodological discrepancies between speculative and service design practices, at both epistemological and operational levels. Service design has adapted approaches to wrap around the complexity of the corporate environment and multichannel organisations, with meta-methods of agile workflow and facilitation techniques (Shostack 1982, 1984; Stickdorn et al. 2018). Service design is well equipped with structured, user-centred processes to understand specific ecosystems. In contrast, general principles of speculative design seem such that each practitioner-researcher adapts different tools and techniques to suit their own way of working in order to articulate future visions. The role of designers as authors in speculative projects (rather than facilitators, as in service design) enabled this practice to develop without the same formal methods of service design. While others have articulated benefits of more explicit integration of speculative and service design discourses (Iadarola and Starnino 2018; Qian 2020), there is a paucity of frameworks which bridge this methodological gap. The SSD framework draws together these tools and techniques to provide a methodology which then might be applied to a research project.

This study has discussed and demonstrated the efficacy of the SSD framework and it is likely that the SSD framework will have resonance beyond just this project and further afield than healthcare. Other designers or practitioner-researchers might adapt the SSD framework, either partially or entirely, when they are tasked with conducting strategic foresight work in complex, multi-stakeholder service environments.=

8.3 Limitations of the research

Within any single research project, there are a number of important limitations to acknowledge within both the design practice and the wider research project. Different aspects of this study have included their own limitations, which have been discussed elsewhere within the exegesis. This section summarises some of the prominent limitations faced within the study and details how these limitations – where possible – were mitigated. This section acknowledges that these limitations pose potential avenues for further design research and practice, as outlined in Section 8.4.

Part of this PhD-study was undertaken during the COVID-19 global pandemic. The continuing restrictions applied by Australian governments in response to the health crisis had direct implications upon the original research plan for this study. The workshops described in Chapter 7, which were undertaken throughout 2020, were originally intended as face-to-face engagements and intended to involve the same cohorts of ED staff that had contributed to the project in 2018, as described in Chapter 4. As such engagements were not possible during the pandemic, these engagements were reframed into the exhibition-in-a-box research tool to facilitate co-design at a distance. While ongoing restrictions and the legacy of COVID-19 might prevent such face-to-face activities from happening anytime soon, there is scope for future work to be undertaken with the purview of supporting the development of next-generation ED's in a post-COVID-19 world.

A significant limitation of this study relates to the challenge of the research sample size and the engagement of patients at only one ED in Melbourne. While a small sample size when compared against the scale of the ED sector, this study does present a combined total of more than 30 participants in the co-design engagements described in Chapters 4 and 7. Many of these participants spoke about experiences working at other EDs in Australia and abroad, as well as their own experiences as patients or carers in moments of ill health. This has helped address this limitation of how few patients participated in this investigation.

It appears that these limitations and challenges are not unique to this project, however, and many other design researchers from around the world report this same challenge. Groeneveld et al. (2018), in a series of workshops with a total of 39 design researchers, report that these kinds of challenges are common in design for health projects. This perhaps reinforces the notion that the field of design is still sidelined by the field of emergency medicine and the broader challenge of how design research is perceived in relation to the contribution it might make to the clinical sciences.

It is also pertinent to note that this study was based on participants whose experiences lie largely in Euro-centric Australian contexts. While the study attempted to include a culturally diverse group of participants, the cultural characteristics of conducting a study in Australia may have resulted in an overview that is not exhaustively representative of non-Western practice. As

this section has discussed, this limitation could only be mitigated with a larger, multi-site study in collaboration with EDs within Australia and abroad. Doing so was beyond the scope of this project. Findings from this study should not necessarily be generalised to international contexts.

8.4 Future work

The 'research answers' (Findeli 2010) which this chapter underscores collectively represent an original contribution to knowledge and culture through the development of a speculative alternative for the EDWR. Indeed, as this study demonstrates, the contribution that speculative design research and practice can make to ED futures is novel and a broad array of new and further research opportunities abound, lying equally in the domains of design, futures, IT, healthcare and emergency medicine.

The notion that technology will 'fix' the problems in the healthcare system is a dream in need of revision and a great deal more work will be required before we see the likes of Asklepios impacting on the ED. Competing definitions of value and conflicting versions of success make innovation and planning for the future difficult in the ED. This study has advocated for the value of design-led strategy through SSD to thrive amidst this ambiguity. Future research and design practice could explore how this toolkit might actually be applied within the design process of constructing a new ED – an activity that would take significant investment and time. As Huddy (2016) articulates, the trajectory from planning a new ED to caring for the first patient can span decades, so such an activity would be beyond just this PhD study.

The inductive nature of design practice implies that another researcher repeating this study may not achieve the same results or outcomes as articulated in the pages of this exegesis. Indeed, the contributions declared here continue to evolve through design practice and in understanding the use of the methodological SSD framework. Using this design outcome as a starting point, further work and speculation could explore other aspects of the ED environment, from physician workflow to discharge experience. Additionally, this project might be expanded upon through the involvement of those who currently commission and design urgent care environments, such as architects, government employees or healthcare leadership. While outside the scope of this study, such an investigation would be beneficial for the ongoing development of next generation ED's. Moreover, this same speculative approach might be applied to other healthcare contexts to explore how those sectors might be affected by the advent of technology such as mental health, pharmacy and primary medical practice, to name but a few.

Outside healthcare, future work could continue to apply the SSD framework to other sectors and other scenarios in order to explore, extrapolate and evaluate future service experiences. Through this application of the SSD framework, wider contributions to knowledge and culture to other fields might be made. Future work might use this framework partially or entirely as part of future studies.

Finally, while the design outcome in this project is highly speculative and the scope of this project was to never provide implementable products or solutions, partial elements or sections of the design could be prototyped and trialled within a real ED of today or the near future. The results, findings and contributions to knowledge from this study should be interpreted as exploratory and as points for discussion and debate, intended to complement the anticipatory decision-making approaches that are typically used in healthcare administration. Indeed, however, elements of the speculative outcome might be developed further into implementable product-service solutions. Doing so would be the topic of a new study and require interdisciplinary collaboration across design, healthcare, robotics and IT to build, iterate and test the design concepts that are presented in low fidelity in this study. Future work could explore what aspects of this design outcome could be trialled and implemented, and then test parts of the concept to explore its efficacy.

8.5 Chapter and exegesis conclusion

This study has made a contribution to our understanding of future ED waiting experiences in response to the deficiencies identified in the literature, through the origination of the SSD framework, and a series of design fiction scenarios based on imagined probable technologies centred around EDWR experiences. This contribution is embodied within both the material (printed publications, plastic prototypes) and immaterial (service blueprints) artefacts of speculative design practice and provides the necessary scaffolding to guide discussion and discourse concerning ED futures. In doing so, this study demonstrates how design might be mobilised to inspire speculation into the future of emergency medicine and sits within a growing discourse of knowledge as to how future healthcare facilities might materialise.

This contribution is significant and timely in light of growing ED attendances throughout Australia and the increasing rate of technological adoption in healthcare. Understanding the implications and consequences of how technology might help or hinder those waiting in pain is the first step in meeting the needs and dreams of those users. The collaborative conversations elicited by this work help to determine the attributes of preferable ED futures for all, from patients at the very worst moments of their lives and concerned family members and carers to ED staff, architects and designers.

Bibliography

- Ahmadpour, Naseem, Sonja Pedell, Angeline Mayasari, and Jeanie Beh. "Co-creating and assessing future wellbeing technology using design fiction." *She Ji: The Journal of Design, Economics, and Innovation* 5, no. 3 (2019): 209-230.
- Akama, Yoko, Sarah Pink and Shanti Sumartojo. 2018. *Uncertainty and possibility: New approaches to future making in design anthropology*. London: Bloomsbury Publishing.
- Apple. 1984. *Macintosh user manual*. Cupertino, California: Apple Computer, Inc.
- Archer, B. 1979. "Design as a discipline." *Design Studies* 1, no. 1: 17-20.
- Ariel, Galit. 2017. *Augmenting Alice: The future of identity, experience and reality*. Amsterdam: BIS Publishers.
- Attride-Stirling, Jennifer. 2001. "Thematic networks: An analytic tool for qualitative research." *Qualitative Research* 1, no. 3: 385-405.
- Auger, James. 2010. "Alternative presents and speculative futures: Designing fictions through the extrapolation and evasion of product lineages." *Negotiating Futures – Design Fiction* 6: 42-57.
- Auger, James. 2012. "Why robot? Speculative design, the domestication of technology and the considered future". PhD diss., Royal College of Art.
- Auger, James. 2013. "Speculative design: Crafting the speculation." *Digital Creativity* 24, no. 1: 11-35.
- Australasian College of Emergency Medicine (ACEM). 2010. "Statement on culturally-competent care and cultural safety in emergency medicine." ACEM. Accessed 15 July 2020. https://acem.org.au/getmedia/bc703912-38e8-47ec-86e5-7117439535ca/S63_culturally_competent_care_in_EM_02_Mar_15.aspx
- Australasian College of Emergency Medicine (ACEM). 2014. "Emergency department design guidelines" (version 3.0, October 2014). Accessed 3 March 2020. https://acem.org.au/getmedia/faf63c3b-c896-4a7e-aa1f-226b49d62f94/G15_v03_ED_Design_Guidelines_Dec-14.aspx
- Australasian College of Emergency Medicine (ACEM). 2018. "ACEM's journey to today: A timeline to celebrate our 35 year anniversary." ACEM. Accessed 3 March 2020. <https://cdn.acem.org.au/timeline/>.
- Australasian College of Emergency Medicine (ACEM). 2019. "Action Needed on Climate Emergency Health Impacts." 2019. ACEM. December 15. Accessed 3rd October 2020. <https://acem.org.au/News/December-2019/Action-needed-on-climate-emergency-health-impacts>.
- Australasian Health Infrastructure Alliance (AHIA). 2019. "Australasian health facility guidelines Part B – Health facility briefing and planning HPU 300 emergency unit" (revision 7.0, May 2019). Accessed 3 March 2020. https://aushfg-prod-com-au.s3.amazonaws.com/HPU_B.0300_7_1.pdf
- Australian Institute of Health and Welfare (AIHW). 2019. "Health expenditure Australia 2017-18." Health and Welfare Expenditure Series no.65. Cat. no. HWE 77. Canberra: AIHW.
- Australian Institute of Health and Welfare 2016. *Australia's health 2016*. Australia's health series no. 15. Cat. no. AUS 199. Canberra: AIHW.
- Barthes, Roland. 1977. *Image-music-text. The death of the author*. London: Macmillan.
- Bate, Paul. and Robert, G. 2007. *Bringing User Experience to Healthcare Improvement: The Concepts, Methods and Practices of Experience-based Design*. Oxford: Radcliffe Publishing
- Bauman, Zygmunt. 2000. *Liquid Modernity*. New Jersey: Blackwell Publishing.

- Bell, Anthony, Ghasem-Sam Toloo, Julia Crilly, John Burke, Ged Williams, Bridie McCann, and Gerry FitzGerald. 2019. "Emergency department models of care in Queensland: a multisite cross-sectional study." *Australian Health Review* 43, no. 4 (2019): 363–370.
- Bennett, Christine C. 2009. "A healthier future for all Australians: an overview of the final report of the National Health and Hospitals Reform Commission." *Medical journal of Australia* 191, no. 7: 383–387.
- Berker, Thomas. Maren Hartmann, Yves Punie and Katie Ward. 2005. *Domestication of media and technology*. Maidenhead: McGraw-Hill Education (UK).
- Bisantz, Ann M., Priyadarshini R. Pennathur, Theresa K. Guarrera, Rollin J. Fairbanks, Shawna J. Perry, Frank Zwemer, and Robert L. Wears. 2010. "Emergency department status boards: A case study in information systems transition." *Journal of Cognitive Engineering and Decision Making* 4, no. 1 (2010): 39–68.
- Bitner, Mary Jo. 1992. "Servicescapes: The impact of physical surroundings on customers and employees." *Journal of marketing* 56, no. 2: 57–71.
- Bleecker, Julian. 2009. Design Fiction: A short essay on design, science, fact and fiction. Near Future Laboratory, 29. Accessed 8 December 2019. <https://tinyurl.com/qhcfm2m>
- Blythe, Mark, and Enrique Encinas. 2016. "The Co-ordinates of design fiction: Extrapolation, irony, ambiguity and magic." In Proceedings of the 19th international conference on supporting group work, pp. 345–354.
- Blythe, Mark, Jamie Steane, Jenny Roe, and Caroline Oliver. 2015. "Solutionism, the game: design fictions for positive aging." In Proceedings of the 33rd annual ACM conference on human factors in computing systems, pp. 3849–3858.
- Blythe, Mark A., and Peter C. Wright. 2006. "Pastiche scenarios: Fiction as a resource for user centred design." *Interacting with computers* 18, no. 5: 1139–1164.
- Bot MD. "Bot MD – Your A.I. Clinical Assistant". 2020. Accessed 3 March 2020. www.botmd.com/en/about.html
- Bowen, Simon, Andy Dearden, Peter Wright, Daniel Wolstenholme, and Mark Cobb. 2010. "Participatory healthcare service design and innovation." In Proceedings of the 11th Biennial Participatory Design Conference, pp. 155–158.
- Brooks, Peter M., Helen M. Lapsley, and David B. Butt. 2003. "Medical workforce issues in Australia:" tomorrow's doctors-too few, too far". *Medical Journal of Australia* 179, no. 4: 206–208.
- Brown, Hannah. 2012. "Hospital domestics: care work in a Kenyan hospital." *Space and Culture* 15, no. 1: 18–30.
- Buchanan, Richard. 1992. "Wicked problems in design thinking." *Design Issues* 8, no. 2: 5–21.
- Bunge, Mario. 1977 "Towards a technoethics." *The Monist* 60, no. 1: 96–107.
- Burkett, Ellen, Melinda G. Martin Khan, and Leonard C. Gray. 2017. "Quality indicators in the care of older persons in the emergency department: a systematic review of the literature." *Australasian Journal on Ageing* 36, no. 4: 286–298.
- Canadian Institute for Health Information (CIHI). 2012. "Health Care in Canada, 2012: A focus on wait times." Accessed 6th July 2020. https://secure.cihi.ca/free_products/HCIC2012-FullReport-ENweb.pdf
- Candy, Stuart. 2010. "The Futures of Everyday Life: Politics and the Design of Experiential Scenarios." PhD diss., University of Hawai'i at Mānoa
- Candy, Stuart, and Cher Potter. 2019. "Introduction to the Special Issue: Design and Futures (Vol. II)." *Journal of Futures Studies* 23, no. 4: 1–2.

- Carrington, Damian. 2018. "Climate Change Already a Health Emergency, Say Experts." The Guardian. Guardian News and Media. November 28. Accessed 10th February 2020. <https://www.theguardian.com/environment/2018/nov/28/climate-change-already-a-health-emergency-say-experts>.
- Carter, Denise. 2020. "Regulation and ethics in artificial intelligence and machine learning technologies: Where are we now? Who is responsible? Can the information professional play a role?." *Business Information Review* 37, no. 2: 60-68
- Carter, Eileen J., Stephanie M. Pouch, and Elaine L. Larson. 2014. "The relationship between emergency department crowding and patient outcomes: a systematic review." *Journal of Nursing Scholarship* 46, no. 2: 106-115.
- Chamberlain, Paul, and Alaster Yoxall. 2012. "'Of Mice and Men': The Role of Interactive Exhibitions as Research Tools for Inclusive Design." *The Design Journal* 15, no. 1: 57-78.
- Chamberlain, Paul, and Claire Craig. 2013. "Engaging design—methods for collective creativity." In *International Conference on Human-Computer Interaction*, pp. 22-31. Springer, Berlin, Heidelberg.
- Chamberlain, Paul, and Claire Craig. 2017. "Design for health: reflections from the editors." *Design For Health*: 3-7.
- Chamberlain, Paul, and Claire Craig. 2017b. "HOSPITaLe: Critical design and the domestication of healthcare." In: *Proceedings of the 3rd Biennial Research Through Design Conference*, 22-24 March 2017, Edinburgh, UK. pp. 114-130.
- Charmaz, Kathy. 2006. *Constructing grounded theory: A practical guide through qualitative analysis*. London: SAGE Publications.
- Clarke, Arthur C. 1962. "Hazards of prophecy: The failure of imagination." *Profiles of the Future* 6: 36.
- Coldicutt, Rachel. 2018. "Tech ethics, who are they good for?" Accessed 12 December 2019. <https://medium.com/doteveryone/tech-ethics-who-are-they-good-for-4afedcf105c3>
- College of Emergency Nursing Australasia. About CENA. n.d. Accessed 23 May 2020. <https://www.cena.org.au/about/about-cena/>
- Convertino, Victor A., Greg Grudic, Jane Mulligan, and Steve Moulton. 2013. "Estimation of individual-specific progression to impending cardiovascular instability using arterial waveforms." *Journal of Applied Physiology* 115, no. 8: 1196-1202.
- Dafoe, Allan. 2015. "On technological determinism: A typology, scope conditions, and a mechanism." *Science, Technology, & Human Values* 40, no. 6: 1047-1076.
- Daykin, Norma, Ellie Byrne, Tony Soteriou, and Susan O'Connor. 2008. "The impact of art, design and environment in mental healthcare: a systematic review of the literature." *Journal of the Royal Society for the Promotion of Health* 128, no. 2: 85-94.
- Deleuze, Gilles. 1988. *Spinoza: Practical Philosophy*. Translated by Robert Hurley. San Francisco, CA: City Lights Books.
- Department of Prime Minister and Cabinet (Australia). 2008. "Australia 2020 Summit: final report". Accessed 15 September 2020. <https://apo.org.au/node/15061>
- Doos, Lucy, Claire Packer, Derek Ward, Sue Simpson, and Andrew Stevens. 2016. "Past speculations of the future: a review of the methods used for forecasting emerging health technologies." *BMJ open* 6, no. 3: e010479.
- Dourish, P., & Bell, G. 2014. "Resistance is futile": reading science fiction alongside ubiquitous computing." *Personal and Ubiquitous Computing*, 18(4), 769-778
- Downe, Lou. 2020. *Good Services: How to Design Services that Work*. Amsterdam: BIS Publishers

- Duchamp, Marcel. "Boite en valise' or 'suitcase box' by Marcel Duchamp (1935-41)". Accessed online 4th October 2020. <https://www.moma.org/collection/works/80890> [picture]
- Dunne, Anthony and Fiona Raby. 2013. *Speculative everything: design, fiction, and social dreaming*. Cambridge: MIT press.
- Dunne, Anthony and Fiona Raby. 2009. "A/B, a manifesto."
- Duwalage, Kalpani I., Ellen Burkett, Gentry White, Andy Wong, and Mery H. Thompson. 2020. "Forecasting daily counts of patient presentations in Australian emergency departments using statistical models with time-varying predictors." *Emergency Medicine Australasia*
- ExtrapolationFactory (2016). 'Alternative Unknowns Method'. Accessed 8 July 2020 <https://extrapolationfactory.com/Alternative-Unknowns-Method>
- Fadyl, Joanna K., Helen Cunningham, Ivana Nakarada-Kordic, Stephen Reay, Tineke Waters, Kate Waterworth, and Barbara E. Gibson. 2020. "Settled and unsettling: design and flows of affect in a hospital waiting area." *Design for Health* 4, no. 1: 63–81.
- Feldman, Martha S., and Wanda J. Orlikowski. (2011) "Theorizing practice and practicing theory." *Organization science* 22, no. 5 (2011): 1240–1253.
- Findeli, Alain. 2010. "Searching for design research questions: some conceptual clarifications." *Questions, Hypotheses & Conjectures: discussions on projects by early stage and senior design researchers*. 286–303.
- Flick, Uwe. 2004. "Triangulation in qualitative research." *A companion to qualitative research* 3: 178–183.
- Friedman, Ken. 2008. "Research into, by and for design." *Journal of Visual Art Practice* 7, no. 2: 153–160.
- Foucault, Michel. 1963. *The birth of the clinic. An archaeology of medical perception. Naissance de la Clinique*. First published 1963 by Presses Universitaires de France. First published by Routledge Classics (2003). Abingdon: Routledge.
- Fong, Allan, and Raj M. Ratwani. 2018. "Understanding emergency medicine physicians multitasking behaviors around interruptions." *Academic Emergency Medicine* 25, no. 10: 1164–1168.
- Forero, Roberto, Sally McCarthy, and Ken Hillman. 2011. "Access block and emergency department overcrowding." In *Annual Update in Intensive Care and Emergency Medicine*, pp. 720–728. Springer, Berlin, Heidelberg, 2011.
- Fottler, Myron D., Robert C. Ford, Velma Roberts, and Eric W. Ford. 2000. "Creating a Healing Environment: The Importance of the Service Setting in the New Consumer Oriented Healthcare System." *Journal of Healthcare Management* 45, no. 2: 91–106
- Fowler, Lyle, Commercial Photographic Co., Photographer, and Stephenson & Turner Architect. 1945. "Royal Melbourne Hospital - Interior Views" [picture].
- Fox, Nick J. 1997. "Space, sterility and surgery: circuits of hygiene in the operating theatre." *Social Science & Medicine* 45, no. 5: 649–657.
- Frayling, Christopher. 1993. "Research in art and design.": 1–5.
- Garrett, Martha J. 1999. *Health futures: a handbook for health professionals*. New York: World Health Organization.
- Gardner, John ; Cribb, Alan. 2016. "The dispositions of things: The non-human dimension of power and ethics in patient-centred medicine." *Sociology of Health and Illness*; Vol. 38, No. 7. pp. 1043–1057.

- Garling, Peter. 2008. *"Special commission of inquiry into acute care services in New South Wales public hospitals: Inquiry into the circumstances of the appointment of Graeme Reeves by the former Southern Area Health Service."* Sydney: NSW Department of Premier and Cabinet.
- Gaver, Bill, Tony Dunne, and Elena Pacenti. 1999. "Design: cultural probes." *Interactions* 6, no. 1: 21–29.
- Glasby, Jon. 2003. "Admission avoidable? Jon Glasby reports on research from Scotland that examines how avoidable admissions of older people to hospital may be prevented." *Nursing older people* 15, no. 8: 6–7.
- Gostelow, Philip 2019. "Perth Children's Hospital Emergency Department, ground floor, 12 March 2019" [picture].
- Google, 2018. "Artificial Intelligence at Google: Our Principles." Accessed 12th December 2019 at <https://ai.google/>
- Google PAIR. 2019. People + AI Guidebook. Published May 8, 2019. Accessed 3rd October 2020. <https://pair.withgoogle.com/guidebook/>
- Gray, B. (1989). *Collaborating: Finding common ground for multiparty problems*. San Francisco, CA: Jossey Bass
- Greenhalgh, Trisha, Joe Wherton, Paul Sugarhood, Sue Hinder, Rob Procter, and Rob Stones. 2013. "What matters to older people with assisted living needs? A phenomenological analysis of the use and non-use of telehealth and telecare." *Social science & medicine* 93: 86–94.
- Groeneveld, Bob, Tessa Dekkers, Boudewijn Boon, and Patrizia D'Olivo. 2018. "Challenges for design researchers in healthcare." *Design for Health* 2, no. 2: 305–326.
- Gutenstein, Marc. 2019. "Daring to be wise: We are black boxes, and artificial intelligence will be the solution." *Emergency Medicine Australasia* 31, no. 5: 891–892.
- Hackett, Edward J., Olga Amsterdamska, Michael Lynch, and Judy Wajcman. 2008. *The handbook of science and technology studies*. Cambridge: MIT Press.
- Hanington, Bruce, and Bella Martin. 2012. *Universal methods of design: 100 ways to research complex problems, develop innovative ideas, and design effective solutions*. Beverly: Rockport Publishers.
- Hanson, Vicki L. 2010. "Influencing technology adoption by older adults." *Interacting with Computers* 22, no. 6: 502–509.
- Hayward, Peter, and Stuart Candy. 2017. "The Polak Game, Or: Where Do You Stand?." *Journal of Futures Studies* 22, no. 2: 5–14.
- Heidegger, Martin. 2010. *Being and time*. Albany: Suny Press.
- Hockstein, N. G., Gourin, C. G., Faust, R. A., & Terris, D. J. 2007. "A history of robots: from science fiction to surgical robotics." *Journal of robotic surgery*, 1(2), 113–118.
- Hogarth, Kathryn M., Jill Beattie, and Julia Morphet. 2016. "Nurses' attitudes towards the reporting of violence in the emergency department." *Australasian emergency nursing journal* 19, no. 2: 75–81.
- Huddy, Jon. 2016. *Emergency department design: a practical guide to planning for the future. Second Edition*. Dallas: American College Emergency Physicians.
- Hui, M.K., Tse, D.K., 1996. "What to tell consumers in waits of different lengths: An integrative model of service evaluation." *Journal of Marketing* 60, 81–90.

- Iadarola, Antonio Cesare. Antonio Starnino. 2018. "Speculative Design and Service Design: A False Dichotomy - Two examples of workshops applying speculative service method". *Touchpoint*. Vol. 10 No. 2
- IDEO. 2015. *The field guide to human-centered design: Design Kit*. New York: Ideo.org
- Iedema, Rick, Earmon Merrick, Donella Piper and J Walsh. 2008. *"Emergency Department Co-Design Stage 1 Evaluation – Report to Health Services Performance Improvement Branch, NSW Health"*. Sydney: Centre for Health Communication, University of Technology Sydney.
- Independent Hospital Pricing Authority Ihpa. 2020. "National Hospital Cost Data Collection Report, Public Sector, Round 22 (Financial Year 2017-18)." February 11, 2020. Accessed 2nd March 2020. <https://www.ihpa.gov.au/publications/national-hospital-cost-data-collection-report-public-sector-round-22-financial-year>.
- Institute of Professional Editors. 2019. Accessed 3rd October 2020. <http://iped-editors.org/>
- Ishii, Hiroshi, and Brygg Ullmer. 1997. "Tangible bits: towards seamless interfaces between people, bits and atoms." In *Proceedings of the ACM SIGCHI Conference on Human factors in computing systems*, pp. 234–241.
- Iversen, Anne Kristine Servais, Michael Kristensen, Rebecca Monett Østervig, Lars Køber, György Sölétormos, Jakob Lundager Forberg, Jesper Eugen-Olsen, Lars Simon Rasmussen, Morten Schou, and Kasper Karmark Iversen. 2019. "A simple clinical assessment is superior to systematic triage in prediction of mortality in the emergency department." *Emergency Medicine Journal* 36, no. 2: 66–71.
- Jensen, Casper Bruun. *Ontologies for developing things*. Rotterdam, The Netherlands: Sense Publishers (2010).
- Jones, Peter. 2013. *Design for care: Innovating healthcare experience*. New York: Rosenfeld Media.
- Kanter, Rosabeth Moss. 1994. "Collaborative advantage: The art of alliances." *Harvard Business Review*, 72(4), 96–108.
- Keld Bødker and Peter Carstensen. 2004. "Development and Use of Web-Based Information Systems: Special Issue Editorial," *Scandinavian Journal of Information Systems* 16: 5–12.
- Kerridge, Tobie. 2015. "Designing Debate: The entanglement of speculative design and upstream engagement." PhD diss., Goldsmiths College (University of London).
- Kim, Youngjun, Hannah Kim, and Yong Oock Kim. 2017. "Virtual reality and augmented reality in plastic surgery: a review." *Archives of plastic surgery* 44, no. 3: 179.
- Kimani, Paul-Emile. Alexander K. Smith, Bernard Lo, and Alicia Fernández. 2016. "Dealing with racist patients." *New England Journal of Medicine*. 374: 708.
- Kirby, David. 2010. "The future is now: Diegetic prototypes and the role of popular films in generating real-world technological development." *Social Studies of Science*, 40(1), 41–70.
- Kirkpatrick, C. James, Sabine Fuchs, Kirsten Peters, Christoph Brochhausen, M. Iris Hermanns, and Ronald E. Unger. 2006. "Visions for regenerative medicine: interface between scientific fact and science fiction." *Artificial organs* 30, no. 10: 822–827.
- Kline, R. R. 2001. *Technological Determinism.* In *International Encyclopedia of the Social and Behavioral Sciences*, 3rd ed., edited by Smelser, N. J., Baltes, P. B. 15495–98. Amsterdam, the Netherlands: Elsevier.
- Klugman, C. M. 2001. "From cyborg fiction to medical reality". *Literature and medicine*, 20(1), 39–54.

- Kuniavsky, Mike. 2003. *Observing the user experience: a practitioner's guide to user research*. na: Elsevier.
- Lau, Jacqui BC, Judy Magarey, and Helen McCutcheon. 2004. "Violence in the emergency department: a literature review." *Australian Emergency Nursing Journal* 7, no. 2: 27–37.
- Lee, Seunghae, Sibel Seda Dazkir, Hae Sun Paik, and Aykut Coskun. 2014. "Comprehensibility of universal healthcare symbols for wayfinding in healthcare facilities." *Applied ergonomics* 45, no. 4: 878–885.
- Lenaghan, Patricia A., Nicole M. Cirrincione, and Steven Henrich. 2018. "Preventing emergency department violence through design." *Journal of emergency nursing* 44, no. 1: 7–12.
- Levin, Scott, Matthew Toerper, Eric Hamrock, Jeremiah S. Hinson, Sean Barnes, Heather Gardner, Andrea Dugas, Bob Linton, Tom Kirsch, and Gabor Kelen. 2018. "Machine-learning-based electronic triage more accurately differentiates patients with respect to clinical outcomes compared with the emergency severity index." *Annals of emergency medicine* 71, no. 5: 565–574.
- Lin, Blossom Yen-Ju, Wen-Jye Leu, Gerald-Mark Breen, and Wen-Hung Lin. 2008. "Servicescape: Physical environment of hospital pharmacies and hospital pharmacists' work outcomes." *Health Care Management Review* 33, no. 2: 156–168.
- Löwgren, Jonas, and Erik Stolterman. 1999. "Methods & tools: design methodology and design practice." *interactions* 6, no. 1: 13–20.
- Lowthian, Judy A., Andrea J. Curtis, Peter A. Cameron, Johannes U. Stoelwinder, Matthew W. Cooke, and John J. McNeil. 2011. "Systematic review of trends in emergency department attendances: an Australian perspective." *Emergency Medicine Journal* 28, no. 5: 373–377.
- MacAllister, Lorissa, Craig Zimring, and Erica Ryherd. 2016. "Environmental variables that influence patient satisfaction: A review of the literature." *HERD: Health Environments Research & Design Journal* 10, no. 1: 155–169.
- Mackenzie, D., Wajcman, J.. 1999. *The Social Shaping of Technology*. 2nd ed. Buckingham, UK: Open University Press.
- Maister, David H. 1984. *The psychology of waiting lines*. Boston, MA: Harvard Business School.
- Malpass, Matt. 2013. "Between Wit and reason: defining associative, speculative, and critical design in practice." *Design and Culture* 5, no. 3: 333–356.
- Malpass, Matt. 2017. *Critical design in context: History, theory, and practices*. London: Bloomsbury Publishing.
- Maniya, Omar, Zach Jarou and Hannah Hughes. "Year 2068: The Next 50 Years in Emergency Medicine." ACEP Now, January 14, 2019. Accessed 2 March 2020. www.acepnow.com/article/year-2068-the-next-50-years-in-emergency-medicine/?singlepage=1&theme=print-friendly.
- Manzini, Ezio. 1989. *The material of invention*. Originally published under the title: "La Materia Dell Invenzione". MIT Press Edition
- Markwell, Alexandra L., and Zoe Wainer. 2009. "The health and wellbeing of junior doctors: insights from a national survey." *Medical Journal of Australia* 191, no. 8: 441–444.
- Marvel Comics. 1977. "What if Spider-Man had joined the Fantastic Four?" (based on *The Amazing Spider-Man #1*). *What if, Vol 1*. New York: Marvel Comics.
- Miller, Tom. "The 1894 House of Relief – Nos. 67–69 Hudson St. January 1, 1970." Published online Tuesday, 18 June 2013. Accessed 28 February 2020. <http://daytoninmanhattan.blogspot.com/2013/06/the-1894-house-of-relief-nos-67-69.html>

- Mitrović, I., & Šuran, O. 2016. "Speculative – Post-Design Practice or New Utopia". Ministry of Culture of the Republic of Croatia & Croatian Designers Association.
- Montgomery, Elliott P., and Chris Woebken. 2016. *Extrapolation Factory Operator's Manual*. New York: Extrapolationfactory.com.
- Monkaresi, Hamed, Rafael A. Calvo, and Hong Yan. 2013. "A machine learning approach to improve contactless heart rate monitoring using a webcam." *IEEE journal of biomedical and health informatics* 18, no. 4: 1153-1160.
- Morley, Claire, Maria Unwin, Gregory M. Peterson, Jim Stankovich, and Leigh Kinsman. 2018. "Emergency department crowding: A systematic review of causes, consequences and solutions." *PloS one* 13, no. 8: e0203316.
- Mullen, Brian, Tina Champagne, Sundar Krishnamurty, Debra Dickson, and Robert X. Gao. 2008. "Exploring the safety and therapeutic effects of deep pressure stimulation using a weighted blanket." *Occupational Therapy in Mental Health* 24, no. 1: 65–89.
- Munzer, Brendan William, Mohammad Mairaj Khan, Barbara Shipman, and Prashant Mahajan. 2019. "Augmented reality in emergency medicine: a scoping review." *Journal of medical Internet research* 21, no. 4: e12368.
- Nanda, Upali, C. Chanaud, M. Nelson, X. Zhu, R. Bajema, and B. H. Jansen. 2011. "Impact of visual art on waiting behavior in the emergency department." *The Center for Health Design's Research Coalition*.
- Newman, Andrew J. 2007. "Uncovering dimensionality in the servicescape: Towards legibility." *The Service Industries Journal* 27, no. 1: 15-28.
- Norman, Donald. 2009. "Designing waits that work". *MIT Sloan Management Review*. Accessed 4th October 2020. <https://sloanreview.mit.edu/article/designing-waits-that-work/>
- Organisation for Economic Co-operation and Development (OCED). 2019. "OECD Principles on AI". Accessed 4th October 2020. <https://www.oecd.org/going-digital/ai/principles/>
- Oreglia, Elisa, and Rich Ling. 2018. "Popular digital imagination: Grass-root conceptualization of the mobile phone in the global south." *Journal of Communication* 68, no. 3: 570–589.
- Page, Tom. 2014. "Skeuomorphism or flat design: future directions in mobile device User Interface (UI) design education." *International Journal of Mobile Learning and Organisation* 8, no. 2: 130–142.
- Papert, Seymour. 1980. *Mindstorms: Children, computers, and powerful ideas*. New York: Basic Books.
- Paul-Emile, Kimani, Alexander K. Smith, Bernard Lo, and Alicia Fernández. "Dealing with racist patients." *New England J. Med.* 374 (2016): 708.
- PearsonLloyd. "A Better A&E – A project led by PearsonLloyd." 2012. Accessed 28 July 2020 www.abetteraande.com/#homepage.
- Penin, L. 2018. *An introduction to service design: designing the invisible*. London: Bloomsbury Publishing.
- Penin, L., & Tonkinwise, C. 2009. "The Politics and theatre of service design." *IASDR 2009 Proceedings*, 4327–4338.
- Petersen, A., Anderson, A., & Allan, S. 2005. "Science fiction/science fact: medical genetics in news stories." *New Genetics and Society*, 24(3), 337–353.
- Pich, Jacqueline, Michael Hazelton, Deborah Sundin, and Ashley Kable. 2010. "Patient-related violence against emergency department nurses." *Nursing & health sciences* 12, no. 2: 268–274.
- Pirinen, Antti. 2016. "The barriers and enablers of co-design for services." *International Journal of Design* 10, no. 3: 27–42.

- Plesinger, Filip, Petr Klimes, Josef Halamek, and Pavel Jurak. 2015. "False alarms in intensive care unit monitors: detection of life-threatening arrhythmias using elementary algebra, descriptive statistics and fuzzy logic." In 2015 Computing in Cardiology Conference (CinC), pp. 281–284. IEE.
- Productivity Commission. 2006. "Australia's health workforce." Productivity Commission, Government of Australia Research Reports.
- Productivity Commission. 2009. "Public and private hospitals." Productivity Commission, Government of Australia Research Reports.
- Pruyn, A. Th H., and Ale Smidts. 1993. "Customers' evaluations of queues: Three exploratory studies." ACR European Advances.
- Rongsheng, Kee. Jonathan C. Knott, Suelette Dreyfus, Reeva Lederman, Simon Milton, and Keith Joe. 2012. "One hundred tasks an hour: an observational study of emergency department consultant activities." *Emergency Medicine Australasia* 24, no. 3: 294-302.
- Pullin, Graham. 2009. *Design meets disability*. Cambridge: MIT press.
- Qian, Sun. 2020. "Towards a New Agenda for Service Design Research." *The Design Journal* 23, no. 1: 49–70.
- Rittel, Horst WJ, and Melvin M. Webber. 1974. "Wicked problems." *Man-made Futures* 26, no. 1: 272–280.
- Rittenmeyer, Leslie, Dolores Huffman, and Chris Godfrey. 2014. "The experience of patients, families and/or significant others of waiting when engaging with the healthcare system: a qualitative systematic review." *JB I Database of Systematic Reviews and Implementation Reports* 12, no. 8: 193-258.
- Rochlen, Lauryn R., Robert Levine, and Alan R. Tait. 2017. "First person point of view augmented reality for central line insertion training: A usability and feasibility study." *Simulation in healthcare: Journal of the Society for Simulation in Healthcare* 12, no. 1: 57.
- Roth, Julius A. 1972. "Staff and client control strategies in urban hospital emergency services." *Urban Life and Culture* 1, no. 1: 39–60.
- Royal College of Art. "Accident & Emergency Project Wins Top Award from IDSA." 15 November 2013. Accessed 4 February 2021 https://www.rca.ac.uk/news-and-events/news/accident_emergency/
- Ryan, Mark, and Bernd Carsten Stahl. 2020. "Artificial intelligence ethics guidelines for developers and users: clarifying their content and normative implications." *Journal of Information, Communication and Ethics in Society*.
- Rushmer, Robert F. 1975. *Humanizing health care: Alternative futures for medicine*. Cambridge: MIT Press
- Sanders, L. Stappers, P. 2012. *Convivial Toolbox: Generative Research for the Front End of Design*. Amsterdam: BIS Publishers
- Sayah, Assaad, Loni Rogers, Karthik Devarajan, Lisa Kingsley-Rocker, and Luis F. Lobon. 2014. "Minimizing ED waiting times and improving patient flow and experience of care." *Emergency medicine international*
- Shapiro, Jason S., Joseph Kannry, Mark Lipton, Eric Goldberg, Paul Conocenti, Susan Stuard, Brian M. Wyatt, and Gilad Kuperman. 2006. "Approaches to patient health information exchange and their impact on emergency medicine." *Annals of emergency medicine* 48, no. 4: 426–432.
- Shostack, G. L. 1982. "How to Design a Service", *European Journal of Marketing* 16 (1): 49–63.
- Shostack, G. L. 1984. "Designing Services that Deliver". *Harvard Business Review* 62 (1): 133–139.

- Silverberg, Robert. 1967. *The dawn of medicine*. New York: Putnam.
- Silverstone, Roger, and Thomas Berker. 2006. *Domestication of Media and Technology*. London: Open University Press.
- Skinner, Claire. 2020. "At a time of looming crisis, a vision for health system transformation" Croakey.org. Accessed 6th July 2020. <https://croakey.org/at-a-time-of-looming-crisis-a-vision-for-health-system-transformation/>
- Slaughter, R. A. 1998. "Futures beyond dystopia". *Futures*, 30(10), 993-1002.
- Smith, S. 2016. "Limbless Solutions': the Prosthetic Arm, Iron Man and the Science Fiction of Technoscience." *Medical Humanities*, 42, no. 4: 259-264
- Somrak, Maja, Mitja Luštrek, J. Šušteršič, Tomo Krivc, Ana Mlinar, Tilen Travnik, Luka Stepan, Mitja Mavsar, and Matjaž Gams. 2014. "Tricorder: Consumer Medical Device for Discovering Common Medical Conditions." *Informatica* 38, no. 1.
- Stanford D.school. (2013). "D.school bootcamp bootleg: The Shape of An Interview". Accessed 15th March 2020. <https://dschool.stanford.edu/resources/the-bootcamp-bootleg>
- State of Victoria. November 2019. *Royal Commission into Victoria's Mental Health System, Interim Report*, Parl Paper No. 87 (2018–19).
- Stember, Marilyn. 1991. "Advancing the social sciences through the interdisciplinary enterprise." *The Social Science Journal* 28, no. 1: 1-14.
- Sterling, Bruce. 2005. *Shaping things*. Cambridge: MIT Press.
- Stewart, Jonathon, Peter Sprivulis, and Girish Dwivedi. 2018. "Artificial intelligence and machine learning in emergency medicine." *Emergency Medicine Australasia* 30, no. 6: 870–874.
- Stewart, Susan. 2002. *Poetry and the Fate of the Senses*. Chicago: University of Chicago Press.
- Stickdorn, M., Hormess, M. E., Lawrence, A., & Schneider, J. 2018. *This is service design doing: Applying service design thinking in the real world*. Newton: O'Reilly Media.
- Sullivan, Clair, Andrew Staib, Sankalp Khanna, Norm M. Good, Justin Boyle, Rohan Cattell, Liam Heiniger. 2016. "The National Emergency Access Target (NEAT) and the 4 hour rule: time to review the target." *Medical Journal of Australia* 204, no. 9: 354-354.
- SuperFlux. (2020). "About us". Accessed 7th July 2020. <https://superflux.in/index.php/about/#>.
- Superflux (2020b). "Better Care". Accessed 7th July 2020. <https://superflux.in/index.php/work/better-care/#>.
- Taylor, S., 1994. "Waiting for service: The relationship between delays and evaluations of service." *Journal of Marketing* 58, 56–69.
- Tonkinwise, Cameron. 2014. "How We Intend to Future: Review of Anthony Dunne and Fiona Raby, *Speculative Everything: Design, Fiction, and Social Dreaming*." *Design Philosophy Papers*, 12(2), 169–187.
- Tonkinwise, Cameron. 2015. "Just design: being dogmatic about defining speculative critical design future fiction." Cameron Tonkinwise (Blog), August 21 (2015).
- Tonkinwise, Cameron. 2019. "End design studios without design studies now". Keynote at Monash ADR Conference 2019. Available online at www.youtube.com/watch?v=Kc3RqlpB2IU. The 2nd Annual Design Research Conference. 3 & 4 October 2019, Monash University, Melbourne.
- Tracey, Richard and Lynelle Briggs (2019). "Interim Report of the Aged Care Royal Commission." Accessed 15 September 2020 <https://agedcare.royalcommission.gov.au/publications/>

- Tsekleves, Emmanuel, and Rachel Cooper, eds. 2017. *Design for health*. Taylor & Francis.
- Ulrich, Roger. 1984. "View through a window may influence recovery." *Science* 224, no. 4647: 224–225.
- Vanian J. Fortune. 2017. "This is the next battleground for Apple, Google, Facebook, and Microsoft" Accessed online 3rd December 2019. <http://fortune.com/2017/06/07/apple-google-facebook-microsoft-are-battling-augmented-reality>
- Vatandoost, Mohsen, and Sanaz Litkouhi. 2019. "The Future of Healthcare Facilities: How Technology and Medical Advances May Shape Hospitals of the Future." *Hospital Practices and Research* 4, no. 1: 1–11.
- Vaughan, L. (Ed.). 2018. *Designing cultures of care*. London: Bloomsbury Publishing.
- Voros, Joseph. 2003. "A generic foresight process framework." *foresight* vol. 5 no. 3, pp. 10-2
- Victorian Agency for Health Information (VAHI). 2017. "Patients treated by urgency category". Accessed 3rd October 2020. <https://vahi.vic.gov.au/emergency-care/patients-treated-urgency-category>
- Victorian Agency for Health Information (VAHI). 2020. "Emergency Care and Emergency Department performance". Accessed 6th July 2020. <https://vahi.vic.gov.au/reports/victorian-health-services-performance/emergency-care>.
- Walker, B. 2004. "Final report of the Special Commission of Inquiry into Campbelltown and Camden hospitals." Sydney: New South Wales Attorney General's Department (2004).
- Wang, Xiaomei, Tracy C. Kim, Sudeep Hegde, Daniel J. Hoffman, Natalie C. Benda, Ella S. Franklin, David Laverigne. 2019. "Design and Evaluation of an Integrated, Patient-Focused Electronic Health Record Display for Emergency Medicine." *Applied clinical informatics* 10, no. 4: 693.
- Watts, Nick, Markus Amann, Nigel Arnell, Sonja Ayeb-Karlsson, Kristine Belesova, Helen Berry, Timothy Bouley. 2018. "The 2018 report of the Lancet Countdown on health and climate change: shaping the health of nations for centuries to come." *The Lancet* 392, no. 10163: 2479-2514.
- Weber, Ellen J. 2019. "Editorial: Triage: making the simple complex?." *Emergency Medicine Journal*; 36:64-65.
- Weiser, Mark. 1991. "The Computer for the 21st Century." *Scientific american* 265, no. 3: 94–105.
- Whitely, Martin. 2020. " Submission in response to the Mental Health Productivity Commission Draft Report." PsychWatch Australia. Accessed 3 October 2020. https://www.pc.gov.au/__data/assets/pdf_file/0020/252083/sub1198-mental-health.pdf
- Wickström, Gustav, and Tom Bendix. 2000. "The" Hawthorne effect"—what did the original Hawthorne studies actually show?." *Scandinavian journal of work, environment & health*: 363-367.
- Wiler, Jennifer L., Christopher Gentle, James M. Halfpenny, Alan Heins, Abhi Mehrotra, Michael G. Mikhail, and Diana Fite. 2010. "Optimizing emergency department front-end operations." *Annals of emergency medicine* 55, no. 2: 142-160.
- Winner, Langdon. 1978. *Autonomous technology: Technics-out-of-control as a theme in political thought*. Cambridge: MIT Press.
- Wohlmann, A., & Steinberg, R. 2016. "Rewinding Frankenstein and the body-machine: organ transplantation in the dystopian young adult fiction series Unwind." *Medical Humanities*. 42, no. 4 (2016): e26-e30.

- World Health Organization. 2011. "Palliative care for older people: better practices." Accessed 3rd October 2020. <https://apps.who.int/iris/bitstream/handle/10665/107290/e95052.pdf>
- Yoon, JungKyo, and Marieke Sonneveld. 2010. "Anxiety of patients in the waiting room of the emergency department." In Proceedings of the fourth international conference on Tangible, embedded, and embodied interaction, pp. 279–286.

Appendices

a — Sample of interview and co-design workshop coded transcripts

Co-Design Workshop #1

July 2018. Participants: 5 Nurses, 1 Clerk, 1 Consultant Physician



Researcher: Hello, my name is <name>. I'm a PHD candidate at Monash University in the department of design. I'm attached to a research lab called The Health Collab and we're interested in health and wellbeing futures. Keith Joe is one of my supervisors in that project and is also an associate professor in our research lab. So that's where I come from, that's what I do.

Researcher: My research is really looking at the emergency department waiting room, and the waiting experience. As well as triage, allocation, and how we deal with flow or when things aren't flowing in the emergency department waiting room.

Researcher: So, what I've got here on this map is a giant empty square, which is an empty waiting room. I've got these cards, which represent the triage desk, the clerk desk, and a paediatric version of the waiting room. So, what I'm gonna ask you guys to do, if that's okay with it, is actually just a proto-type, make a waiting room in responses to my questions using some of this which I've got here:

Researcher: Lego, and plywood, and paper, and these little characters which I've made to occupy the space as well. There's no right or wrong answers for this research. It's helping to inform the future of emergency department waiting rooms and experiences. It's all part of my PHD degree research, which I'm conducting in collaboration and creating.

Nurse 1: In just Cabrini?

Researcher: At the moment, Cabrini only sort of part of hospital. But, yeah, I'm looking into it for the research with other hospitals. Just building up a relationship takes a lot of time and energy. Studying with Cabrini, and then hopefully testing these ideas that are developed here with other hospitals. To have residents across the field, if that makes sense.

Researcher: Is everyone cool?

Researcher: So, using all of these parts ... you don't have to get up, unfortunately ... but... can I ask you to build the worst waiting room and a waiting experience, including the paediatric room, the closest triage desk that you can possibly imagine. The absolute worst.

Nurse 2: Don't you [inaudible 00:02:00]

Researcher: (laughs) [crosstalk 00:02:03]

Nurse 3: So, just to - [crosstalk 00:02:05]

Nurse 4: - ... to fill that in ...[crosstalk 00:02:06]

Researcher: So, as I said, the front door is this red area here.

Nurse 3: Okay.

Researcher: And that's towards the rest of the emergency department - [crosstalk 00:02:11]

Nurse 3: Okay... and here -

Researcher: - but, other than that, we can do is, is actually ... [crosstalk 00:02:16]

Nurse 1: [crosstalk 00:02:19] ... entrance and exit there ...

Nurse 3: [crosstalk 00:02:19] ... we need ...

Researcher: The absolute worst.

Nurse 2: Oh, the worst?

Researcher: The absolute- ... and it's not about what's reality. It's about the worst waiting room you can imagine.

Nurse 2: Ohh okay.

Nurse 4: Just one clerical staff man down... in the [inaudible 00:02:33]

Researcher: (laughs) That's the way.

Nurse 2: Yeah, that will be worst [crosstalk 00:02:38]

Nurse 1: Yeah, yeah. [crosstalk 00:02:42]

Researcher: So, where ... where would you put the seats? Where would you put the people? Where would you put the walls?

Nurse 3: In the worst - [crosstalk 00:02:47]

Nurse 2: - in the worst -[crosstalk 00:02:47]

Researcher: In the worst way you can imagine.

Nurse 2: In the worst, you come in through the front door, yeah.

Nurse 3: They're bringing their kids to your desk.

Nurse 2: Yeah (laughs)

Nurse 4: (laughs)

Nurse 3: We'll put walls around the desk.

Researcher: And use some Lego as well. I can get more later. I didn't rule out ...

Nurse 3: If I knew this, I would've brought some from home.

Researcher: I've got some ... there's more in that box, but there wasn't enough space when people do that.

Nurse 2: The worst. Just put anything anywhere.

Nurse 3: Yeah.

Nurse 2: Away from the nursing stand.

Nurse 3: Yeah.

Nurse 4: Isn't that fun?

Nurse 2: No, it's the worst.

Nurse 4: [crosstalk 00:03:40]

Researcher: So where would you be putting the people? The doctors, the patients, the nurses, the clerks ...

Nurse 3: So, that's doctor, doctor?

Researcher: It's up to you, if you wanna leave it there. It's just imagery, that's it really.

Nurse 3: Is this going to be the waiting area?

Nurse 1: It's the worst E.D. The worst.

Nurse 4: [crosstalk 00:04:03] The whole E.D.

Researcher: No, it's just - [crosstalk 00:04:03]

Nurse 4: [crosstalk 00:04:05] Yeah.

Researcher: If we do the whole E.D., we'd be here for four hours.

Nurse 4: Yeah, yeah.

Nurse 2: Nice.

Nurse 4: We got this here -

Researcher: (laughs)

Researcher: So, I'm just trying to ... do you think we're done?

Nurse 3: Yeah, I think we can fit it all in here -

Nurse 2: [crosstalk 00:04:40] You're making the worst E.D. but, [crosstalk 00:04:44] -

Researcher: Cluttering everything.

Nurse 3: It's a mess.

Researcher: So, what's - [crosstalk 00:04:55]

Nurse 2: It's making more confusion.

Nurse 3: Oh, yeah.

Nurse 4: Really trying triage.

Nurse 1: See, that's good. Because that's sometimes what happens- [crosstalk 00:05:02]

Nurse 2: And everybody will come in, got no idea where they're going - [crosstalk 00:05:08]

Researcher: Yes, absolutely. Put it right there. I can grab more.

Nurse 4: Waiting area.

Researcher: The worst waiting area.

Nurse 4: The worst.

Nurse 2: So, [inaudible 00:05:17], where's the ED-dock?

Researcher: I dunno, where is ED-dock?

Nurse 3: They're all over the place.

Researcher: Not in the pediatric room.

Nurse 3: This is ... -[crosstalk 00:05:27]

Nurse 2: What that?

Nurse 3: That's a water fountain.

Nurse 2: (laughs)

Nurse 3: Just outside the pediatric room, so it'll spill everywhere. What do you think?

Nurse 1: It's not a water fountain. It's like a waterfall. (laughs)

Nurse 2: And what's that?

Nurse 3: That's a decoration.

Nurse 2: Oh, okay.

Nurse 3: Let's just put it somewhere where it's going to get in the way. Right over.

Nurse 3: This is a plant.

Researcher: Would you like some more Lego?

Nurse 1: No, that's enough.

Researcher: Think that's enough?

Nurse 1: Yeah.

Nurse 2: Because, as it is, is a risk [crosstalk 00:06:12]

Nurse 2: The whole thing is making it more confusing.

Nurse 3: We'll put triage at the front door. And where are we gonna put a trolley that's in the way?

Researcher: Is that a bed?

Nurse 3: That's a bed.

Researcher: Can I ... do you mind if I take a photo of you for you?

Nurse 2: Aw, that's cute.

Researcher: Thank you.

Nurse 3: And we're gonna put a potted planet near the triage desk, so it's really blocking everything.

Researcher: So, while I get a few more photos of this, will you walk me through why this is worst waiting room.

Nurse 6: **Well, it's clutter-seating.**

Nurse 2: Exactly. Where is the ... the ... the patient?

Nurse 4: Is that the patient?

Nurse 3: Those are all patients. I'll put the patients here. And here.

Nurse 4: Okay.

Nurse 2: Because it's really confusing.

Nurse 3: Right in the way of the triage.

Nurse 5: It is! So they enter the main entrance ... [crosstalk 00:07:02]

Nurse 4: **They don't know where to go.**

Nurse 3: **They don't know where to go. There's a blockage there, a wall or something. There's no sign.**

Nurse 1: No sign.

Nurse 4: No, there's no sign.

Nurse 2: **It's like going in a maze, isn't it? Trying to find which way to get out.**

Nurse 3: You can't actually see staff, 'cause you can't see clerical staff, you can't see triage nurse. So ... **by rights, anyone who enters an emergency department should have first on view of the triage nurse.** And the triage nurse should have first on view of them. So, that's just the ... absolute.

Nurse 3: So here, they've gotta go round all of these, around the clerical desk, which I've covered over. And past all of these, you know, things that are all in the way. And

try to find the triage nurse. Even if there is a sign. They can't see them. They can't see her. That's worst of all.

Nurse 3: **We've got chairs near entry ways, which could be trip-hazards. We've got stuff in the way.** We've got a water fountain outside the pediatric waiting room - [crosstalk 00:08:02]

Nurse 1: But you've also got a seating room - [crosstalk 00:08:04]

Nurse 3: They couldn't stay and wait there, yep. So nobody knows who's around. Or what's wrong with them.

Researcher: And you can't see them from - [crosstalk 00:08:11]

Nurse 5: Can't see them from the desk, yeah. Cluttered.

Nurse 4: So once they finally get through here, then they can't see where the clerk is.

Nurse 3: They're not gonna go back.

Nurse 4: Trolleys are right here. And they've got adults in wheelchairs in the kids' room. Oh dear.

Researcher: It's all over.

Nurse 2: Make it all very confusing.

Nurse 3: It's all very confusing.

Researcher: (laughs)

Nurse 3: **Yeah, so. There's no direct vision. It's cluttered. There's stuff everywhere. There's no organization at all or anything.**

Nurse 2: And there's not one single person here.

Nurse 5: **No flow.**

Nurse 2: ... to direct them where they're supposed to be.

Researcher: Hello.

Clerk 1: [00:08:44] Hello?

Researcher: We've just made the worst waiting room you could imagine.

Nurse 3: Could you make it any worse, <name>?

Researcher: So you enter from here?

Nurse 4: (laughs)

Researcher: Like I said, there's no right or wrong answers. I'm gonna make it more tricky in a sec, though.

Nurse 4: **Lots of obstacles.**

Researcher: Lots of obstacles. So, you make here, the game ... [crosstalk 00:09:06]

Nurse 1: You're gonna make it trickier?

Researcher: I am gonna make it trickier.

Researcher: So, I think you've got the idea of this segment of the game. Now, I need you to make the safest E.D.

Nurse 2: Oh, that's easy.

Nurse 4: That's easy.

Nurse 3: That's easy. You just put a [inaudible 00:09:32] and set up the hall.

Researcher: (laughs)

Nurse 3: Okay, so ...

Nurse 2: When they come in, they need to visualize ...

Nurse 3: Yeah.

Nurse 4: Never too unexpected.

Nurse 2: Yeah.

Nurse 4: Put triage here ...

Nurse 3: Yeah.

Nurse 4: We improved the room.

Nurse 3: Yeah.

Nurse 1: Yeah.

Nurse 2: Yeah.

Nurse 3: And then we can just have chairs ... [crosstalk 00:09:47]

Nurse 1: ... that's triage. Yeah.

Nurse 2: And you need to put chairs around... -

Nurse 3: A chair for triage. And a chair for the clerical. And they sit and do their stuff. And then - ...

Researcher: Should they sit behind ... Oh, so the triage now sits here.

Nurse 2: Yup.

Researcher: And the patients sit there, okay. Yeah, okay.

Nurse 4: And then clerks and clerical over here. [crosstalk 00:10:08]

Researcher: What if you put the triage desk and the cleric's desk on top of each other?

Nurse 4: ... that's a lot.

Nurse 1: Yeah, a lot. They come here, they come here.

Nurse 2: There's a lot everywhere. [crosstalk 00:10:23]

Nurse 4: They'd want to sit next to - [crosstalk 00:10:25]

Nurse 2: We need ... [crosstalk 00:10:32]

Nurse 1: And then they'd go in the triage room. For privacy.

Nurse 2: Oh, that's perfect.

Nurse 1: In, like that. Yeah.

Nurse 4: Yeah.

Nurse 3: We'll have a bed here.

Researcher: I wouldn't write it out, too. It's just ... we all know it's a bed.

Nurse 3: [crosstalk 00:10:53] ... so much, over here ...

Nurse 3: And then, waiting room chairs, from here. If this is the waiting room, they can pop chairs, move around ... [crosstalk 00:11:04]

Nurse 1: Then we can see ... [crosstalk 00:11:13]

Nurse 2: Yes. Forward, and everywhere.

Nurse 2: But the waiting room is full, we can ... [crosstalk 00:11:20]

Nurse 4: [crosstalk 00:11:23] ... put pediatrics right here...

Nurse 3: [crosstalk 00:11:27] ... a large enclosure ... [crosstalk 00:11:30] ... you wanna see them.

Nurse 3: [crosstalk 00:11:39] ... and that'll keep them away as well.

Nurse 4: Where are the rest of them?

Nurse 1: [crosstalk 00:11:44] Because that's going to E.D., so ...

Nurse 3: [crosstalk 00:11:47] We can move them.

Nurse 2: [crosstalk 00:11:49] We can put them here, here, here ...

Nurse 1: [crosstalk 00:11:51] So the triage nurse can see ...

Nurse 3: Do we have to use all of these?

Researcher: No, you don't have to use all of them.

Nurse 3: Oh, okay.

Researcher: I've a question. For everyone. How does this room make you safe? As staff.

Nurse 3: As staff, okay. First of all, **from a clinical perspective, you can see the patients coming through the door.** So you can **identify who's really unwell, who you need to get in straight away, or needs help.** And then you can see the waiting room. Your **children, all in one area.** And there's a door to keep them in there. So you can still see them. And **they can't run out.** [crosstalk 00:12:27]

Researcher: Are they trapped?

Nurse 3: **Yeah, they're trapped.** **Because they run away from their parents as well. They're quick.**

Nurse 1: **If you, in reality, a good, reality waiting room, you might have a security station over here so they can see.**

Researcher: We'd have security out of the window.

Nurse 1: Yeah. That's a security guy.

Researcher: It can be.

Nurse 4: That's not security.

Nurse 1: We can have him sit here.

Nurse 3: - [crosstalk 00:12:54] ... security. Protecting all of us, here. Yeah, that's our security.

Researcher: **So, do you think security makes people feel safe in the waiting room? Does it make you feel safe as staff?**

Nurse 3: **No.**

Nurse 4: **No.**

Nurse 1: It does, it does [crosstalk 00:13:27] ... aware of what's gonna come through there.

Researcher: Why do you say no?

Nurse 3: Because, **I think a lot of people actually get really, really, really annoyed and angry.** **Coming from a public hospital system, if they see a security person close by, they actually get really angry. It just heightens anger.** **Because they just wanna pick a fight.**

Nurse 1: I guess that's really obvious, though.

Nurse 3: [crosstalk 00:13:51] ... but **usually, your drug, you know, your druggie patient. Not for here, but for the entrance.**

Nurse 1: Maybe not in private.

Nurse 3: In public - [crosstalk 00:13:59]

Nurse 1: - but in public, yeah. You need them.

Nurse 3: But they do cause ... they're usually behind glass, you know. **They're hidden. They're hidden and they're behind glass. So they're available for these guys, you can see, yeah, where ...**

Researcher: Makes sense.

Researcher: **So you put a big open space in the middle. If you were to put more seats, you wouldn't put seats in the middle?**

Nurse 3: Yeah, you could. But as long as there was room, so people ... so, we'll put people walk with frames and staffs, so it would have to be ... you know, for people to get around. But ... [crosstalk 00:14:40]

Nurse 2: Everyone should - ... [crosstalk 00:14:40] ... facing the triage desk - [crosstalk 00:14:42]

Nurse 3: - or something. So the triage nurse can see them.

Nurse 2: Yeah.

Researcher: Make sense.

Researcher: Cool. Let's clear the board, and we can go on to the next one.

Researcher: How you guys feeling? Good, so far?

Researcher: So I need you to make the most efficient waiting room and triage that you can imagine. With no added ... don't add ... so do you think the safest is also the most efficient?

Nurse 3: **I thought that would actually work really well. They come in, see the triage nurse, the clerks are right there.**

They can actually be doing stuff together, 'cause the clerks come here - [crosstalk 00:15:29]

Nurse 1: It is efficient, because, if you want to run in the Cabrini way, they come in. They see the triage. They move down to be registered.

Nurse 4: Yep, and then they - [crosstalk 00:15:38]

Nurse 1: - they either go straight in or they sit down here.

Nurse 4: Now, if you've got triage here and then you're stuck with all this staff, you'd never wait at all.

Nurse 1: What do you do with the ones you've triaged? Where do they go and tell them to go - [crosstalk 00:15:50]

Researcher: When you've got - [crosstalk 00:15:54]

Researcher: So, say triage is here. And you've got to cure seven people, here. How do you deal with all these people that are waiting to see triage?

Nurse 4: Well, we can always turn it around. You know, have triage ...

Nurse 3: We've got the ... we put chairs there, they could sit on the chairs there.

Nurse 4: Then we could just change them around - [crosstalk 00:16:17]

Nurse 3: It's like a waiting triage.

Nurse 4: Then we could put chairs ...

Nurse 2: Yeah, yeah. Somewhere here. Then the next person to come in will come ... so they sit here, next to triage. [crosstalk 00:16:32]

Nurse 4: And we could still put the waiting room here.

Nurse 2: Yeah.

Nurse 1: And delivery room would be here?

Nurse 3: Yeah.

Nurse 4: Yeah. [crosstalk 00:16:48] ... Actually, it's sort of like ... [crosstalk 00:16:53]

Nurse 1: There's not any sort of partition or anything here ... between - [crosstalk 00:17:03]

Nurse 3: ***We actually did that at Western. We put a big TV on the wall, because there's such huge waits there. So we had triage here, and clerical. And we put the seats like that. And we had video surveillance. So that people weren't watching other people come in, and getting taken through and everything. They actually had something to focus on*** - [crosstalk 00:18:55]

Nurse 3: - ... and then we had a waiting time, the waiting time and stuff, up on the wall. And had vending machines along here.

Nurse 4: [crosstalk 00:19:06] - ... so TV on the wall, and I can sit around here.

Nurse 3: And we've got TV, so we can see them.

Researcher: Do you think patients like watching TV?

Nurse 3: ***It's a distraction*** - [crosstalk 00:19:17]

Nurse 1: It's a choice. They don't have to sit in the waiting room, rather than - [crosstalk 00:19:22]

Nurse 3: ***it can be educational***. It doesn't have to be - [crosstalk 00:19:24] - doing educational stuff.

Nurse 1: - ... like, aggression. You know, not tolerating -

Researcher: Yeah, aggression towards the workers - [crosstalk 00:19:32]

Nurse 1: - all the info for the general public.

Nurse 3: Yeah.

Researcher: Cool.

Nurse 4: So, this is a TV.

Nurse 3: Yep. [crosstalk 00:19:41]

Researcher: They should sign up.

Nurse 4: Here we go.

Nurse 4: ... pretend that's not chairs.

Researcher: I can see what- [crosstalk 00:17:09]

Nurse 2: Maybe. But the thing is, you're gonna be busy asking all the details anyway, to here. What's going on over here?

Nurse 3: That would probably be, like a ... you wouldn't have that enclosed in there. The front of it would be - [crosstalk 00:17:26] - a wall. But that would be - [crosstalk 00:17:28] - all I've got at the moment. A connection, going across.

Nurse 3: So, that way you're not seeing and the rest of the people out there aren't seeing what's happening here.

Researcher: I have a pass ... 'cause we're running a little ... I feel like this might actually be too much, I don't think it works ...

Researcher: So I'm curious why you put these seats this way.

Nurse 3: I dunno. Just so we can see them.

Nurse 2: So we can see.

Nurse 4: From triage.

Nurse 2: Even though we're doing ... all the time, [crosstalk 00:18:01] when you're triaging, you can still see.

Nurse 4: [crosstalk 00:18:03] ... while sitting in the waiting room - [crosstalk 00:18:05]

Researcher: What if, instead of seeing them physically, you'd buy a camera or two there. So they couldn't see you, but you could see them.

Nurse 3: Yeah, and that's fine- [crosstalk 00:18:17]

Nurse 4: [crosstalk 00:18:16] - ... if you were to look at someone, you'd wanna know - [crosstalk 00:18:20]

Nurse 3: [crosstalk 00:18:23] - yeah, you can't see them.

Nurse 4: We could probably put a TV on this wall.

Nurse 3: Yeah, so that would be, actually, good - [crosstalk 00:18:28]

Nurse 2: You mean, a TV ...?

Researcher: Interesting. Cool.

Researcher: So they next thing, I think we've sort of covered this already but, I'm gonna throw ... a spin in the mix in the moment. Could you make the most dangerous waiting room you could imagine? For staff or for patients.

Nurse 3: I think we did, in the first one - [crosstalk 00:20:01]

Researcher: The first one?

Nurse 3: Yeah - [crosstalk 00:20:03] because it was cluttered. We couldn't see anything - [crosstalk 00:20:06]

Nurse 1: For personal health and safety.

Nurse 3: ***Your triage nurse is stuck in the corner. No one can see her, so if there's a violent or aggressive patient, no one can see what's happening.*** The clerks were almost fully enclosed, so they couldn't see. If there was an aggressive patient, or if patients were aggressive towards other patients, we couldn't see what was going on over there.

Researcher: So, do you think that - [crosstalk 00:20:25] - the worst waiting room is also a dangerous waiting room?

Nurse 1: Mm-hmm (affirmative)

Nurse 2: Yes.

Nurse 3: Absolutely.

Nurse 4: Yeah.

Researcher: Cool.

Researcher: I've only got one more of these questions. I want you to make the waiting room you would most like to work within and for. I know you don't all work in the waiting room, but. The one that you would like to see in your own emergency department.

Researcher: And don't worry about what exists, or what could be built at Cabrini. What is the future, or what could the future be?

Nurse 3: Okay.

Nurse 4: Let's do it, put triage [inaudible 00:21:07]

Nurse 3: Yeah. And I'm thinking we'd work in the middle. So they've actually got - [crosstalk 00:21:15]

Nurse 1: **Okay, so if you want a 360, that means we've got glass, glass, glass, and then you can turn around and observe...**

Nurse 4: We need to put the patients somewhere, to get them ...

Nurse 3: **We would have a curtain, like a curtain screen in there.** In the triage room, yeah.

Researcher: So, in the center - [crosstalk 00:21:37]

Nurse 3: It'd just be like a circular ... like a ... yeah.

Nurse 4: Wouldn't that get annoying, though? If you had people sitting behind you, you'd have to keep turning around to make, like, say, if you were just getting flooded with people coming in. Time to turn around and look to see - [crosstalk 00:21:50]

Nurse 1: But, in reality, we are getting a bigger department. There will be more than one triage nurse. **Hopefully we get two triage nurses.**

Nurse 3: From a practical point of view, I think clerical will have a lot of filing - [crosstalk 00:22:03]

Nurse 2: Yes.

Nurse 3: - so, if it's all glass ... there's no way for filing - [crosstalk 00:22:08]

Nurse 4: There's no way for filing, sort of, above this height.

Nurse 1: Is it just triage? Or is it just registration? To put another - [crosstalk 00:22:16] - in there? Not anywhere else?

Nurse 3: [crosstalk 00:22:18] ... the computer, everyone looks at your computer.

Nurse 4: So, for a privacy point - [crosstalk 00:22:22] - it's not gonna work. I think we have to stand - [crosstalk 00:22:25] - everyone has to see a stark wall - [crosstalk 00:22:29]

Nurse 2: Yeah, okay.

Nurse 3: So. Triage and clerks, together. But, also, so we can see the entry - [crosstalk 00:22:37]

Nurse 1: I still think, here - [crosstalk 00:22:39] - because they can see.

Nurse 3: [crosstalk 00:22:44] - and that way, we've got chairs here for the triage waits.

Nurse 4: Yeah.

Nurse 1: Yeah.

Nurse 3: So, they're waiting for triage.

Nurse 4: And a waiting room. Like a pediatric and adult waiting room kind of next to each other. So that, -

Nurse 3: Yeah -

Nurse 4: So the adults don't see the kids -

Nurse 3: Yeah, no. No, it's still - [crosstalk 00:22:58]

Nurse 2: And then, with the pediatric one, we can have a glass ... little box - [crosstalk 00:23:03]

Nurse 3: **We can have it as an interactive room.**

Nurse 2: Yes.

Nurse 1: Yes.

Nurse 2: So, it's a **glass tank** - [crosstalk 00:23:06]

Nurse 3: **Fish tank? Yeah?**

Nurse 2: Yeah. Exactly.

Nurse 3: And **some high-fashion-y things** up there- [crosstalk 00:23:11]

Nurse 2: - fish tank here - [crosstalk 00:23:13]

Nurse 4: **Interactive flooring.**

Nurse 3: Yes [crosstalk 00:23:15] ... okay.

Nurse 4: That's really good - [crosstalk 00:23:16]

Nurse 2: **And a fish tank here. And then both sides can see the fish tank, the fish ...**

Nurse 3: I need to stand - [crosstalk 00:23:24]

Researcher: So you'd put a wall between the two?

Nurse 3: I would put - [crosstalk 00:23:28] - **definitely glass. It could be a normal wall, to a certain height** - [crosstalk 00:23:33]

Researcher: I was thinking, actually, like a plywood one. Just do like that in there - [crosstalk 00:23:37]

Nurse 3: Oh, sorry!

Researcher: That's okay- [crosstalk 00:23:39]

Nurse 2: To represent, yeah.

Researcher: Yeah.

Nurse 3: Sorry, yeah. So that would be a wall.

Researcher: And you said about, interactive floor tiles and stuff, do you know how to go about the Lego ... see if you can - [crosstalk 00:23:47]

Nurse 3: Yeah - [crosstalk 00:23:51]

Researcher: And I've got more Lego as well. To make the floor.

Nurse 3: Have you ever been up to kids' bloc?

Nurse 2: Yeah, it's cool isn't it? Yeah.

Researcher: And the other thing with the wall, as well, attach - [crosstalk 00:24:02] - Yeah.

Nurse 1: [crosstalk 00:24:06] Good.

Nurse 3: **Some sensory, you know, that sort of stuff.**

Researcher: So, no wall between the two. They're together.

Nurse 4: No, I wouldn't have wall between the two. That's one space.

Nurse 1: One space?

Nurse 4: There'd be a curtain, or something down - [crosstalk 00:24:20]

Nurse 3: - some seating there - [crosstalk 00:24:22]

Nurse 1: **As long as there's some privacy for here. 'Cause that's where there are problems at the moment. We don't have any, when we're registering patients. They all come in ... when registering ... they all come and look about** - [crosstalk 00:24:34]

Nurse 2: In that case, we might have to have - [crosstalk 00:24:35] - another ... there is ... so they can wait to be registered.

Nurse 4: Shouldn't there be ... **some sort of divide? A wall or like** - [crosstalk 00:24:51] - at the moment, when you put the patient sitting there. There. They're closeted on the side. 'Cause if they're sitting right here, and a clerk is sitting right - [crosstalk 00:24:59] - they just have to be, when they're talking about their, you know - [crosstalk 00:25:07]

Nurse 3: Looks like you have to - [crosstalk 00:25:03] - So unless there is an assault glass - [crosstalk 00:25:09]

Nurse 4: - you've got the triage desk - [crosstalk 00:25:09]

Nurse 3: Some of them have walking aisle taxis, where it's like a bubble.

Nurse 4: Yeah.

Nurse 1: Mm-hmm (affirmative)

Nurse 3: **Yeah, it's like a bubble around. So it's like perspective bubbles.** So, you're not ... it's not fully [enclosive 00:25:20], but it's enough to keep the noise out. **So you're talking to the clerk or the nurse, and you're talking directly. So it keeps out the external noise when you're speaking. And it stops it from going everywhere.** So it's a bit - [crosstalk 00:25:36] - yeah.

Nurse 2:	If this was my emergency room, what I would do ... I would put a glass thing there. This are the people waiting to be triaged. And then ... maybe a glass there. So, this are waiting to be registered. And then they can go in there. So they can still see what's going on through the glass.		
Researcher:	So, just a question. So, this is ... Barry. Barry the patient. If Barry's sitting here, is he staring at a glass wall?		
Nurse 2:	Yeah.	Nurse 3:	[crosstalk 00:27:33] - I don't feel unsafe. [crosstalk 00:27:34] - Between these two, there probably does need to be, because people here might be listening to what's going on- [crosstalk 00:27:40]
Researcher:	He is? And there's a wall behind him, as well. Because you want to separate the staff and the waiting - [crosstalk 00:26:17]	Nurse 2:	Maybe the partition be- [crosstalk 00:27:45]
Nurse 2:	That's right. Yeah.	Researcher:	Oh, this is open?
Researcher:	Okay.	Nurse 2:	Yeah. Yeah. So - [crosstalk 00:27:47]
Nurse 2:	Yeah. 'Cause then they can't listen to what we're ...	Nurse 4:	Or maybe not glass, but some sort of ...
Researcher:	... so, why ... why glasses are about protecting yourself for that one patient? Or is it ...?	Researcher:	Divider?
Nurse 1:	It is a security thing - [crosstalk 00:26:34]	Nurse 4:	Something dividing but not blocking. Although when they have ... describing it feels unsafe, but, I feel like there's like ... wiring or something in front of you but you can see through it. To block. So people can't lean over - [crosstalk 00:28:06]
Nurse 4:	You can't have glass, though, directly in front of you in the ... you can't talk through glass, unless there's like a - [crosstalk 00:26:40]	Nurse 3:	Yeah, and that's like [St. Berini's [00:28:07] have the same sort of thing there. We haven't got to that stage here - [crosstalk 00:28:12] - we don't have that sort of - [crosstalk 00:28:14] ... and, more than that, for triage, that's what I would like, too. Is for people to actually come in, so. They actually come in, rather than sitting at a desk across from you. They actually come in and sit-
Nurse 4:	[crosstalk 00:26:47] - yeah, and private.	Researcher:	In a room- [crosstalk 00:28:27]
Nurse 3:	They have, like - [crosstalk 00:26:51]	Nurse 3:	Have you ever been to Epworth? They come in, they sit down, there's a chair. [crosstalk 00:28:31] So, the nurses ... Yeah ... they come in and sit down
Researcher:	Just because it is habit, is that actually what you guys want?		
Nurse 2:	No, it's going to be different - [crosstalk 00:26:54]		
Nurse 3:	More than anything, can I tell you that I hate those glass panels ... those glass partitions. The places that I've worked at with glass partitions, are the places where they've punched and spat, and yelled abuse. So, all the years at The Alfred that		
	next to the nurse. So, that way, those people aren't listening, 'cause the patient will come in and sit down- [crosstalk 00:28:43]	Researcher:	So separating walk-ins and ... self-referrals or whatever, and ambulance arrivals.
Nurse 4:	And then you have an exit point.	Nurse 4:	Preferably.
Nurse 3:	Yeah, they're gonna go back out -[crosstalk 00:28:48] - yeah.	Nurse 2:	Maybe we can make another entry, for just the ambulance to come in. But separate to the walk-in.
Nurse 4:	There are two doors. You can go - [crosstalk 00:28:50] - back, or into the waiting room. So you always have an exit, if someone's unexpected, if someone may be aggressive.	Nurse 3:	Maybe we can set them over here - [crosstalk 00:30:19]
Researcher:	That's first aid 101. Always have an exit.	Researcher:	So the ambulance comes in - [crosstalk 00:30:20]
Nurse 4:	Yeah -[crosstalk 00:28:59]	Nurse 2:	Yeah. Here's gonna be a walk-in and ambulance - [crosstalk 00:30:22]
Nurse 3:	Yeah, always have a way - [crosstalk 00:28:59]	Nurse 3:	Yeah, yeah.
Nurse 4:	So, with this strategy, yeah. We haven't got an exit.	Nurse 2:	And then ... so, if we have two triage nurses, one can do that and one can do the ambulance.
Researcher:	So can I throw a spanner into the works? We talked about triage as sort of the first thing people wanna see when they come in the door. Why not this? Putting triage right at the front?	Nurse 4:	Yep.
Nurse 4:	'Cause you'll have a queue out the door.	Nurse 2:	Because we are gonna be having - [crosstalk 00:30:34] - by the time this place is finished.
Nurse 2:	Mm-hmm (affirmative). And then they have to queue all the way out. We don't want that. Especially if they're still waiting to be triaged. You know. Miserable, it's raining.	Nurse 1:	We have to think positive.
Nurse 3:	Well, they could come in, and sit here. Waiting for triage. And then - [crosstalk 00:29:35] - go in from there. Then that's where they go and get clerked. So - [crosstalk 00:29:42]	Researcher:	Fascinating.
Nurse 2:	What about the ambulance presentation?	Researcher:	So that was the last sort of prompt I had. Is there any other sort of closing comments before we wrap ... I think we're gonna finish up a little bit earlier than I thought, initially. Any other comments?
Researcher:	It's interesting, because nobody's brought that up yet. I was sort of waiting for someone to - [crosstalk 00:29:48]	Nurse 1:	It's really hard to design, without knowing where -[crosstalk 00:31:00]
Nurse 2:	Because I'm looking and I say, hey, what happens when the ambulance comes in?	Nurse 4:	- and you're assuming it's - [crosstalk 00:31:01]
Nurse 3:	But in the new department, they're gonna be differently.	Nurse 1:	- we need toilets somewhere ... [crosstalk 00:31:08] - and water cooler. We need a water cooler.
Researcher:	But do they ... do you guys want them to be? Is that better if they're just different?	Nurse 3:	Yeah. We need water.
Researcher:	[crosstalk 00:30:01]	Nurse 4:	Definitely. And a vending machine.
		Nurse 2:	And a vending machine.
		Researcher:	So, why vending machines? Why water coolers?

Nurse 3: **Well, people get thirsty. And also with communication out there, as well. So you need to ... instead of having to go way back into the department to get water, you need to have your water available for them.** To give them. And, you know, **people have relatives and stuff** - [crosstalk 00:31:33]

Nurse 2: **And they bring the kids in, to see grandma.**

Nurse 3: And people from inside want to out and fill their water bottles and stuff like that ... [crosstalk 00:31:42]

Nurse 4: And after all this, there's nothing I can think of. [crosstalk 00:31:47] ... and vending machines could fit after it.

Nurse 3: **And it's a distraction, for most people. You know, if you've come picked your mum up because she's fallen over and she's sick, and you haven't had anything to eat all day ... you're hungry, so it's ...**

Nurse 1: **A pack of chips could save you** -[crosstalk 00:32:02]

Nurse 4: Yeah.

Researcher: Hangry. Hangriness.

Researcher: [crosstalk 00:32:09]

Researcher: It's really interesting. I've ... like I said, this is my PHD project. So I've been reading about this for about 18 months now. And the amount of patient feedback, which they talk about, just being able to get a cup of coffee ... Not so much the patients, but the people that come with them -

Nurse 3: Yeah, yeah ... [crosstalk 00:32:26]

Researcher: So, it's like, what if there was like a 24-hour café, even? Where it's not a vending machine, that's sort of ugly and gross and ... vending machine. There's actually a coffee machine - [crosstalk 00:32:34]

Nurse 1: That would be - [crosstalk 00:32:36]

Nurse 2: We need a vending machine that could have coffee and tea. Yes.

Nurse 4: **Or we could get a little kitchenette where you can make your own tea, or your own** - [crosstalk 00:32:47]

Researcher: And it's not so much an issue with vending machines, is it? Is it quite cold, quite impersonal? And that, is sort of ... In my opinion, it's antithetical to what you guys are doing - [crosstalk 00:33:00] - yeah, and they break and then-

Nurse 3: **They break down, people get angry** - [crosstalk 00:33:02]

Researcher: Right? And then triage gets questions like, "Why can't get my \$4 pack of Snik's Chips?" Like-

Nurse 4: **Like, "Can I get a refund? 'Cause it's taken all day"-. [crosstalk 00:33:11]**

Nurse 1: ... have a small coffee vending machines. They've done massive, great - [crosstalk 00:33:16]

Researcher: So why do you think distraction, coffee machines, is important?

Nurse 4: **It takes their mind off of the wait.**

Nurse 1: That's right.

Nurse 2: Yeah.

Researcher: So, it's about dis- [crosstalk 00:33:29] - occupying them?

Nurse 4: **Or even like their illness. They don't have to worry** - [crosstalk 00:33:31]

Nurse 2: You've got the distraction. You've **got the TV to distract them**. You've got **the coffee machine** to distract them. While they're waiting.

Nurse 3: Yeah. And you're always worried about ... if someone takes you to [inaudible 00:33:45] with you, or you **haven't had anything to eat or drink, you know ... maybe a cup of tea or something** ... you can always think about that sort of stuff. And it's just ... **it does distract them, and it also stops them from talking at all the staff and what they're doing.**

Nurse 3: **And you might have a minute where you sit down, or you're having conversation, having a bit of a laugh because something's funny.** And if they're all sitting there, waiting, waiting, waiting ... and that's what they see. They'll be like, **"All the staff is just sitting there, laughing. They have nothing to do,"** you know. And it might be ... I'm not saying about today, but ... [crosstalk 00:34:19] **that might be our only minute in a really busy shift,** that you've just like ... you know, you might go back to your triage and (laughs) "What's going on?" And have a bit of a laugh. **And then patients will think that you're having a great time. And that it's not busy.**

Nurse 3: **So, if they're distracted, it takes a toll off their waiting time and about they're ... and they're also anxious, and worried, and it's just a way to calm them down.**

Researcher: Yeah. It's sort of ... it was a really interesting point, when you guys had making sure that triage can see into the waiting room. And so you can see the patients. But that also means the patients can see you.

Nurse 3: Yes! [crosstalk 00:34:51]

Researcher: Which, has the problem that you've just described. And balancing sort of comfort-talk with case-talk. Or just banter. I think it's a real challenge. And it was interesting to sort of see that perspective.

Researcher: Yeah.

Nurse 3: Yeah, so having going for tea and [inaudible 00:35:08] a good idea.

Researcher: I see - [crosstalk 00:35:11]

Nurse 3: I stopped a lot of our compliments at the [IBM 00:35:13]. They had really long waits. And so, having ... facing away from the triage nurse, and the TV, [crosstalk 00:35:25] and the vending machines [crosstalk 00:35:26]

Researcher: (laughs)

Nurse 1: I guess you could even just go when you have your car serviced. You know. They've got tea and vending machines, or tea and coffee-making when you're waiting. So. Not always for patients, but more - [crosstalk 00:35:39]

Nurse 2: ... when I have my emergency ... always nice, the people from the kitchen to come - [crosstalk 00:35:49] - and have a tea.

Nurse 3: [crosstalk 00:35:56] ... yeah, that would be really good.

Researcher: Something I find really interesting, looking and writing experiences, is why waiting in an emergency department can't be like waiting in the conference lounge. For example. Or why can't - [crosstalk 00:36:08]

Nurse 2: [crosstalk 00:36:09] ... or with an alcohol fridge! (laughs)

Researcher: Yeah! (laughs)

Nurse 3: Food, everywhere (laughs) office speeding, something I'm worried about, so I start up the champagne breakfast (laughs)

Researcher: Yeah, and even like waiting for trains. Like, why can't ... why can't we draw these waiting experiences from other places to improve the waiting experience in a hospital? Yeah, well, we might leave it there -

Appendices

b — Images of co-design workshops undertaken with Cabrini ED staff

