'Feel Chair'

Attestation of Authorship

'I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning. '

Date:

27/02/2017

Signature:

'Feel Chair'

Emotionally Resonant Aesthetic Experiences in Oncology

Written and Crafted
By Antonio Wan

Acknowledgements

Abstract
Design Journey

1   Cancer Research UK, When Chemotherapy Is Used.

2   Z Wang et al., "Cancer Treatment Environments: From Pre-Design Research to Post-Occupancy Evaluation," World Health Design, no. July (2011).

3   Paul Bate and Glenn Robert, Bringing User Experience to Healthcare Improvement: The Concepts, Methods and Practices of Experience-Based Design (Radcliffe Publishing, 2007).

The project aimed to understand the experiences of cancer patients specifically those undergoing intravenous chemotherapy treatment to aid the redesign the infusion chair to improve these experiences. Chemotherapy is a systemic type of cancer treatment which can treat cancer cells almost anywhere in the body by using the patient's bloodstream.[1] Due to the nature of cancer, any cell type can become cancerous and consequently there is no definitive approach to cure all types of cancer. Chemotherapy is a regimen of drugs tailored to treat each patients whole body to helps fight the growth and spread of the cancerous malignant tumours. These drugs are unable to differentiate between a normal and mutated cell and cause the various side effects we all know of when we think of the word 'cancer' or 'chemo'. The most common form of administrating chemotherapy is intravenously, where chemotherapy treatment can last anywhere from 15 minutes to over 8 hours.[2] Chemotherapy is form of cancer treatment however, it has various side effects which can affect people in different ways. Because of this, the emotional experience of chemotherapy patients can differ between every patient depending on their situation.

Through the immersive research design practice and emotional journey taken, a clear understanding of the aesthetic and emotional landscape was achieved, ultimately exposing problem areas within the areas of performance, engineering, and aesthetics of the oncology ecosystem. The performance, engineering, and aesthetics of experience of products contribute to good healthcare design and the fundamental elements to bringing user experience to healthcare improvement.[3] The prevailing paradigm within medicine on cost efficiency for medical outcomes hinders progress and change of aesthetic experiences within healthcare as the profession has traditionally focused on performance and engineering to achieve curative outcomes. This research focused on exploring the relationship between aesthetics and emotion, and where the value of design sat within the healthcare continuum. However, the immersive design practice used to complete this research has not only helped gain great insight into the chemotherapy experience, an understanding of the current aesthetics and emotions at play, but helped establish the foundation for the research by exposing the motivations of healthcare practitioners, healthcare designers, and my personal design ethos, the phenomena of care.

Table of Figures
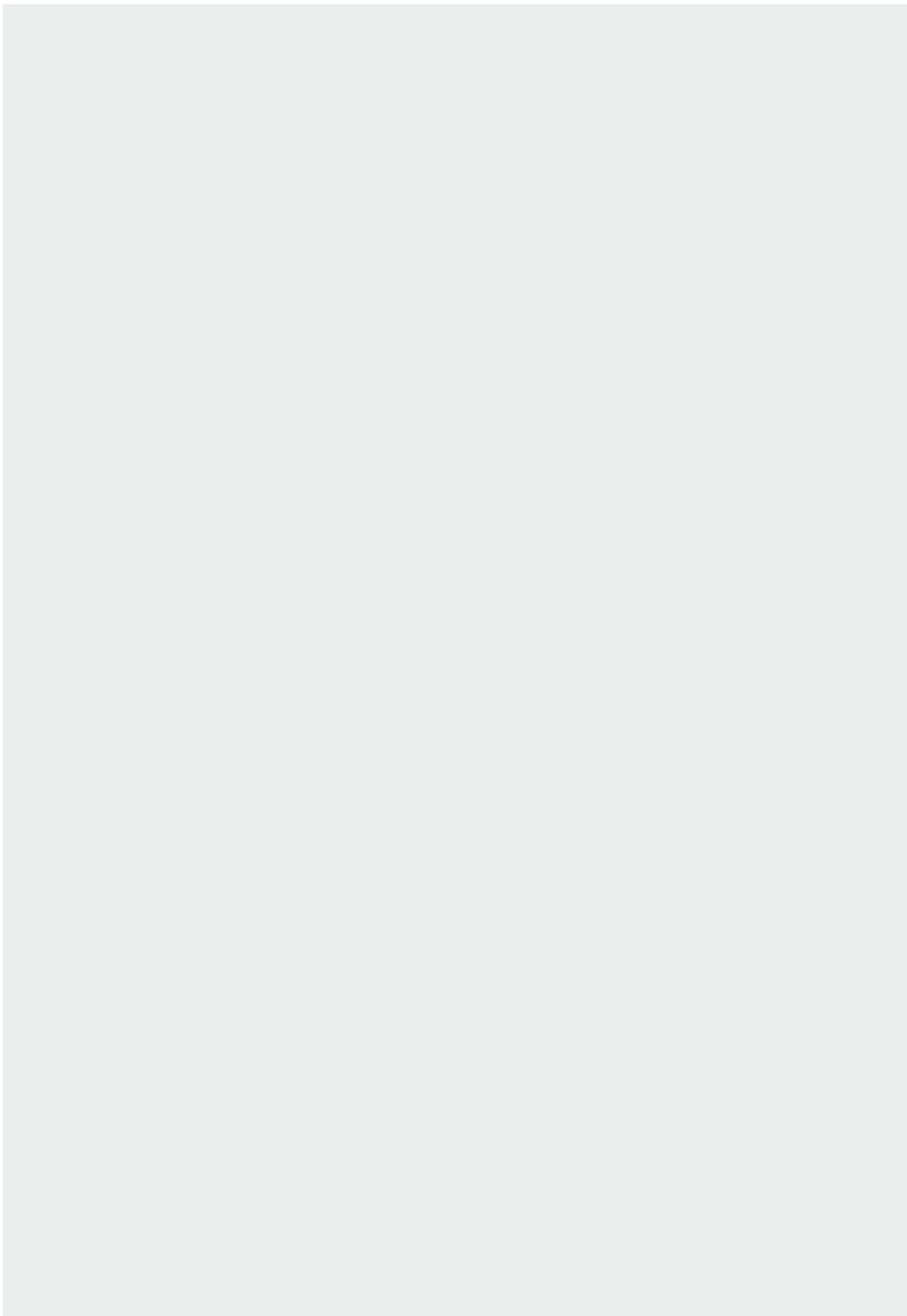
Figure 1. Dry July NZ. (2013). Retrieved from https://www.facebook.com/
dryjulynz/photos/a.656156164492849.1073741830.374872842621184/6561
56337826165/?type=3&theater

Figure 2. Design Boom: Mx-5 Le Vanto Garage Italia Convertible. (2016).
Retrieved from http://www.designboom.com/technology/mazda-mx-5-
levanto-garage-italia-convertible-06-25-2016/

Figure 3. Dezeen: Hella Jongerious Homelike Cabin Interiors. (2015).
Retrieved from https://www.dezeen.com/2015/11/23/hella-jongerius-
homelike-cabin-interiors-klm-boeing-787-dreamliner-aircraft/

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İntroduction

Positioning the Researcher
A bit about me for you to know.

Dear reader,

My name is Antonio. Like many males growing up in New Zealand, I seem to have fallen under the guise of a 'bloke' who is often less comfortable communicating or conversing on the emotional plane. I think that this is not the case. Not mine at least. I often find myself filled with intense resonant emotion.
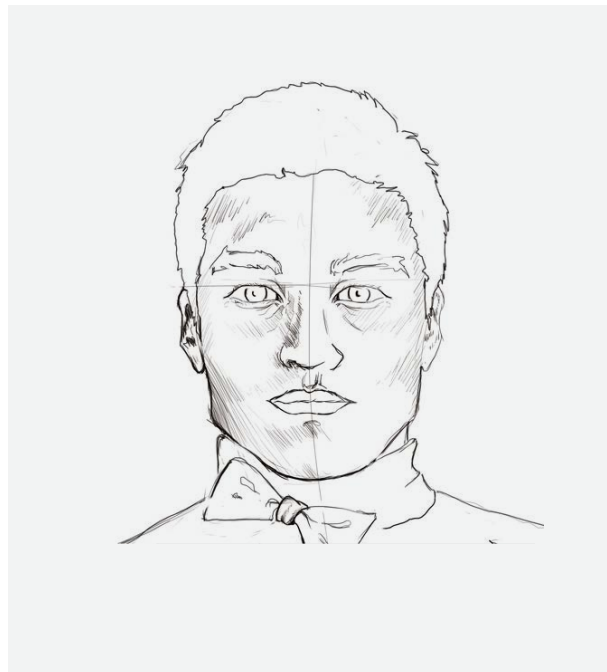
Seeing the different faces of the people in Auckland city hospital, their expressions, mannerisms, their interactions, fill me with emotion and feeling I can only start to imagine what these people are going through. In that sense, this ability may be my greatest flaw, and my greatest strength as a designer. I cannot help but reimagine another person's experience as my own, exploring every detail of how it would affect myself, my loved ones and the repercussions of the experience, which gives me a great sense of what someone else is feeling. This can however come at the cost of my emotional wellbeing.

I've had the great fortune of having a healthy family and healthy friends, none of whom have cancer. So I went into the project quite blind, but also without any preconceived notions. Initially I had a rough idea of what cancer is and how horrible it could be but this year showed me in great depth what the experience truly meant for many of the patients and their loved ones. As soon as I started this research, the great fortune of health I thought I had, diminished. People I knew, friends of friends, partners of family, family friends, all have some tie to the truly malignant and uninvited experience of cancer.

My emotional sensitivity was reinforced by the connections and bonds I found I already had as well as the ones I made throughout my research journey. These people have been forced into this abject lifestyle we call cancer. The incredible people who are fighting the good fight for health, have brought me to tears, brought me joy, taken me with them through their emotional experience. I can't help but feel inspired, and driven to do something that endeavours to help make their experience a little bit better. I truly hope that one day my work in the design profession is able to do this.

I hope you enjoy reading my thesis,

Antonio Wan

Previous Experience

Prior to this research, I completed my Undergraduate Degree, and Honours year at AUT. My Honours research surrounded the bathing experience of neonatal babies within Auckland City Hospitals Neonatal Intensive Care Unit (NICU). I carried out research to understand the functional and emotional needs of the parents during the emotionally stressful time in the NICU. This research identified the bathing processes was a touchpoint within the experience which tells parents their baby is able to breath, feed, and hold their own temperature without the aid of NICU technologies. The outcome of this research was a redesigned baby bath. The design met the clinical, functional and the emotional needs of the experience. Learning and understanding the emotional experiences made me feel a sense of duty to carry out the project for 'The little ones'.
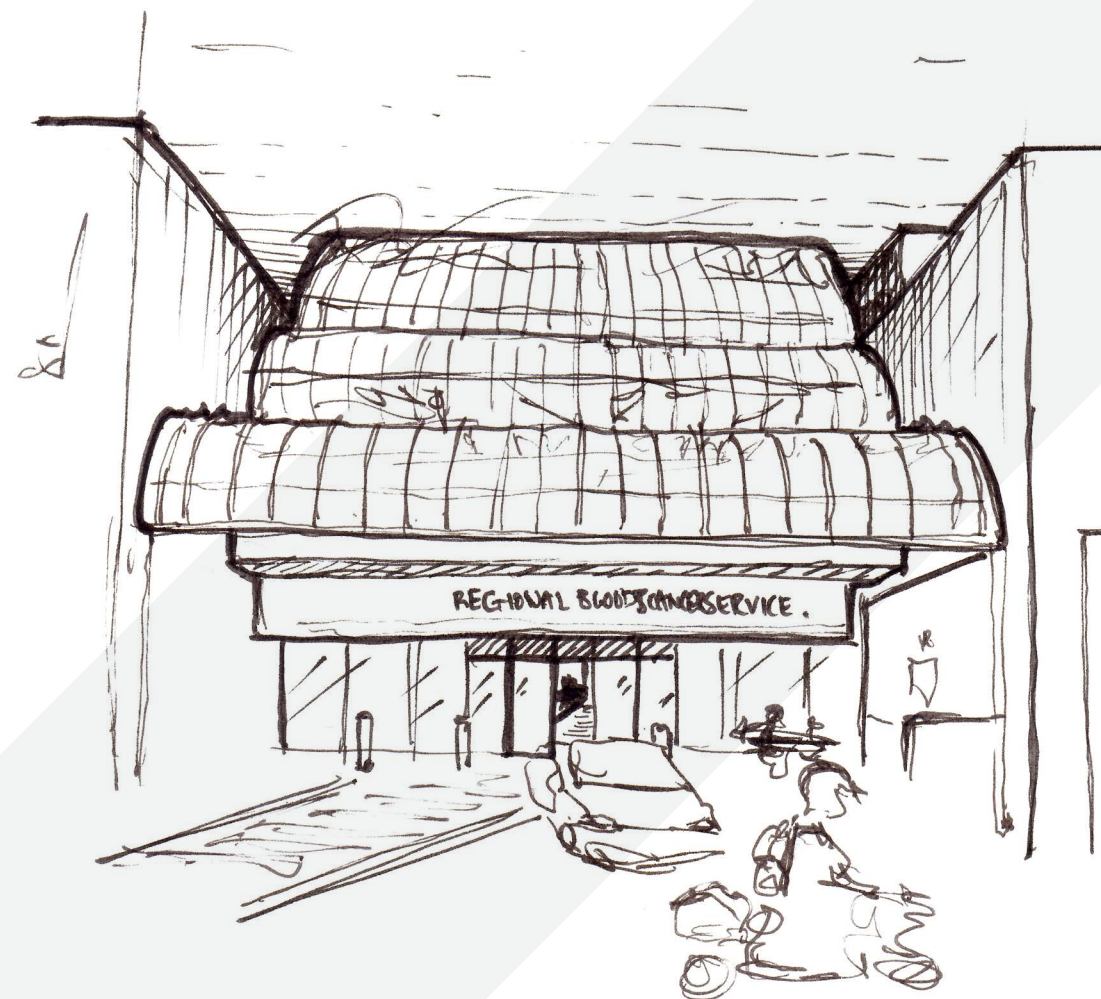
Auckland Regional Blood and Cancer Service

This research is located within Auckland City Hospital's Regional Blood and Cancer Service. Architects from Silver Thomas Hanley were undertaking a larger design project to improve the oncology environment. They identified the need for a better experience and chemotherapy seating solution. However, there was limited internal recognition of design failures within existing infusion chairs. The Design for Health and Wellbeing Lab (DHW Lab) was then approached with the project to redesign the chemotherapy treatment chair. The existing design had functionality, systemic, procedural, and maintenance issues which effected the patient experience during chemotherapy in a potentially negative way.

Literature Review
Critical Contexts
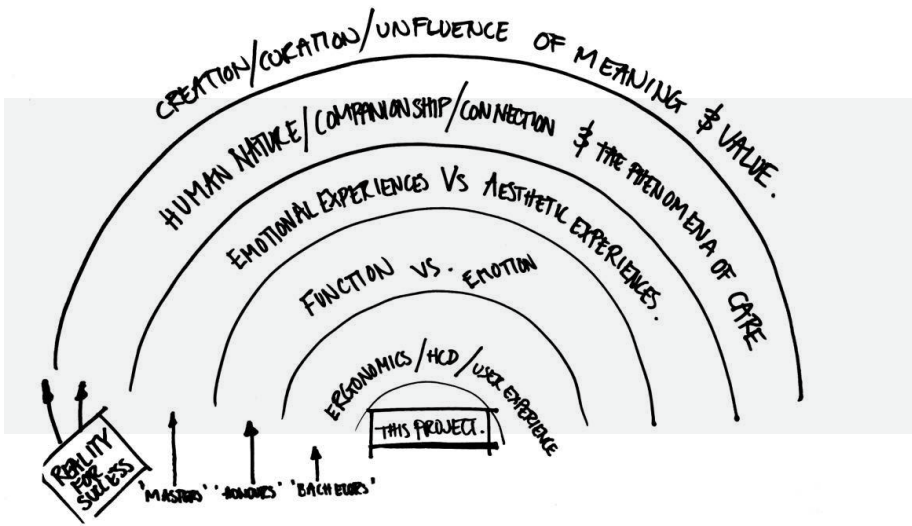
There is concern over existing chemotherapy chair design within Auckland District Health Board's (ADHB) Regional Blood and Cancer Service. It was suspected that the existing design had problems with its performance, engineering, and aesthetics of experience however there was limited recognition around these problems. These areas are the key factors that make good healthcare product design and should be addressed to improve the patient experience.[4] Despite the aim of healthcare system to provide care, effective delivery of care is sometimes compromised by the complexities of the system, which distance it from the people it is meant to serve.[5] This research was an opportunity to consider the role of aesthetics and function of healthcare designs might play in improving patient experiences in these emotionally charged environment.

4 Ibid.

5 Peter H Jones, Design for Care (Rosenfeld Media, 2013).

6 Paul Gilbert, "The Origins and Nature of Compassion Focused Therapy," British Journal of Clinical Psychology 53, no. 1 (2014).

7 P. Gilbert, Human Nature and Suffering (Taylor & Francis, 2013).

8 P.D.R.N.N.E.A.B.C.F. Marlaine C. Smith, R.N.P.D.N.E.A.B.C.F. Marian C. Turkel, and P.D.R.N.F. Zane Robinson Wolf, Caring in Nursing Classics: An Essential Resource (Springer Publishing Company, 2012).

9 Ibid.

10 A S Hornby, "Oxford Advanced Learner's Dictionary," (2000); Marikken Høiseth and Martina Maria Keitsch, "Using Phenomenological Hermeneutics to Gain Understanding of Stakeholders in Healthcare Contexts," International Journal of Design 9, no. 3 (2015).

11 Nel Noddings, Starting at Home: Caring and Social Policy (Univ of California Press, 2002).

12 Madeleine Leininger, "The Phenomenon of Caring. Part V. Caring: The Essence and Central Focus of Nursing," Nursing research report 12, no. 1 (1977).

13 Paul B Hofmann, Frankie Perry, and Richard J Davidson, Management Mistakes in Healthcare: Identification, Correction, and Prevention (Cambridge University Press, 2010).

14 Ibid.

15 Jones, Design for Care.

16 Roger S Ulrich, "Effects of Interior Design on Wellness: Theory and Recent Scientific Research," Journal of health care interior design 3, no. 1 (1991).

17 Tara Mullaney et al., "Thinking Beyond the Cure: A Case for Human-Centered Design in Cancer Care," International Journal of Design 6, no. 3 (2012); Ulrich, "Effects of Interior Design on Wellness: Theory and Recent Scientific Research."

The Phenomenom of Care

Over the last two million years, humans have evolved the motivation and emotional capacity for affiliative, caring and altruistic behaviour.[6] Our ability to interact and form relationships is often associated with the phenomenon of care.[7] In the context of this research, 'caring' is a mode of human nature which extends from the shared feeling for the human experience.[8] The essence of caring in healthcare is described as the adopted moral orientation for relationships between healthcare practitioners and the patients they are caring for.[9] It can be defined as the provision of necessities for the health or protection of an individual, however 'care' also encompasses love and attentiveness towards, grief and concern for others.[10] Because of this, the notion of care is considered a fundamental characteristic of human nature as people have a desire to care and be cared for.[11]

In healthcare, practitioners are guided by the moral orientation of care, however the meaning of care sometimes places the focus on treatment process at the expense of patient's emotional needs and experiences.[12] The traditionally bureaucratic processes guiding decision-making in healthcare organizations can put pressure on medical staff to deliver curative outcomes.[13] These pressures may be at odds with the intrinsic motivations of medical staffs to be emotionally attentive even though organizations and clinicians share the common goal of providing 'care'.[14] This characteristic of healthcare (treatment over care) has set a baseline for patient expectations regarding their healthcare experience. This is because we project concern and hope into a shared future, and hold both memory and expectation for the cared for.[15] Design for healthcare reflects a similar trend. Products, services and facilities designed for healthcare traditionally emphasize the delivery of measurable treatment outcomes but are often emotionally 'hard' or 'uncaring'.[16] Designs that are unsuited to the needs of patients, visitors and clinicians may fail to deliver the intended outcomes and sometimes even contribute to negative or traumatic experiences.[17]

İmproving the Experience
Healthcare and Aesthetics

The State of Healthcare Aesthetic

18 Emma Tumilty, Simon Walker, and Steve Tumilty, "Tainting by Numbers–How the Disadvantaged Become Invisible within Evidence-Based Medicine," Physical Therapy Reviews 19, no. 5 (2014).

19 Jonathan Belsey and Tony Snell, What Is Evidence-Based Medicine? (publisher not identified, 2009).

20 Tumilty, Walker, and Tumilty, "Tainting by Numbers–How the Disadvantaged Become Invisible within Evidence-Based Medicine."

21 Belsey and Snell, What Is Evidence-Based Medicine?

22 Philip Remedios, "Idsa Announcement," accessed 7 july, 2016. http://www.blackhagendesign.com/1659-2/.

23 Ibid.

24 Tim Parsons, Thinking: Objects: Contemporary Approaches to Product Design (AVA publishing, 2009).

25 Remedios, "Idsa Announcement."

26 Belsey and Snell, What Is Evidence-Based Medicine?

Evidence-Based Medicine (EMB) is the key criterion for decision making in healthcare.[18] EBM is the process of systematically reviewing the strength and weight of scientific evidence on clinical practice in order to deliver the optimum care to patients based on clinical effectiveness, cost effectiveness and patient health benefit when allocating resources across healthcare organizations.[19] EMB was originally proposed as a framework to help make objective and fair equitable decisions regarding a patients treatment and provide a basis to cease use of ineffective treatment or surrounding artefacts.[20]

EBM has provided a decision-making system that healthcare management executives have relied on since it was established in the 1940's.[21] The use of EBM has helped cultivate an aesthetic style intrinsic to the medical profession that is dominated by values such as, clinical, optimal, and functional.[22] The potential of design in the medical profession has often been misunderstood by executive management and engineering thus relegating design as the final touches to a products development, rounding off edges and adding stripes or colour.[23] As such, design is valued as an "optional extra – the icing on the cake rather than, as it should be an ingredient that permeates the whole cake".[24] This is because executive management has historically (and appropriately) focused on technology, safety and efficacy which is critical to delivering optimum healthcare.[25] The rise of EBM meant that decisions on delivery and provision of healthcare are increasingly driven by evidence of clinical efficacy, cost-effectiveness and systematic assessment of health outcomes.[26]

Due to the 'constant pressure to efficiently perform treatment procedures, medical product's live among life, health and death affairs and the design of medical products can go beyond pure function. Today, the framework of EBM in healthcare and the design of medical products have cultivated a visual culture, which easily identifies as clinical or sterile.[27]

Clinical aesthetics aggregates the myriad of medication and applications whilst complying to the processes, regulations, collateral, architecture, vehicles, and other materials of hospitals and other healthcare corporations.[28] This supported the development of values distilled within healthcare as sterile, vague 'scientific', hierarchy and an authority that seems to say 'trust us, we know what we are doing.[29] This has created design inconsistency and products that are engineered with safety and reliability in mind. These products often negate the final criterion of 'good design', "the aesthetics of experience".[30] This makes good experiences within healthcare uncommon because there is lack of human centred designed experiences to drive innovation as costs continually rise.[31]

The 'aesthetics of experience' refers to how the whole interaction of the product or service feels or is experienced.[32] Fulfilling the first two criteria of good design in healthcare, functionality and engineering, seem to appease more the systematic infrastructure of healthcare rather than good experiences. This is supported by how healthcare often considers the end users of the hospital environment and products to be the clinician, not the patient.[33] If healthcare places such emphasis on procedural efficiency and are dominated by curative measurable outcomes, where "patients are numbers, digital readouts, and test results", how does the voice of the patient come into play to create cohesive "good design?[34]

Emotional Dissonance of Healthcare

Healthcare has always honoured the intrinsic obligation of a charitable institution which provides quality healthcare by the professions best knowledge. The institutions current solution to aesthetics within healthcare environments does not meet the shifting baseline expectations for quality healthcare and a 'good experience'.[35] The time spent in hospital for patients, family, friends, or staff can be traumatic, yet the current measures of quality healthcare, look to the immediate medical results rather than the patient experience for assurance and assessment of quality.[36] This industry wide mind-set displays a gap in the advocacy of quality patient experiences, which can be supported by fulfilling the last criteria of good design. By bringing the voice of the end user, in this case the patient, into the design process the aesthetic of experience can be integrated into the design of products to improve the quality of health care.[37] This defines the foundation for this research to explore an 'appropriate aesthetic' to salve the negative experience of being in hospital.

Discovering and developing a suitable aesthetic in medical equipment or products for hospital environments requires a deeper understanding of product semantics and semiotics due to the wide spectrum of emotions patients experience throughout the continuum of care.[38] A few emotions associated with hospital treatment might include: "hope, despair, encouragement, confusion, fear, satisfaction, anger, disappointment,

safety, loneliness, anxiety, support, depression, relief".[39] These emotional responses are a result of the day-to-day happenings within hospitals for patients and families. In recent years however, there has been a shift towards 'helpful hospital aesthetics' to try and relax this emotionally charged environment.[40] The notion of 'helpful hospital aesthetics' encourages a positive outlook on the hospital experience by creating an environment that induces a sense of wellness.

Improving the patient experience may involve the use of positive distraction techniques, such as artwork.[41] The meaning of a medical aesthetic can convey a more visceral message through product semantics and semiotics.[42] Product semantics in the context of this research relates to understanding and researching the form of medical equipment/products on a deeper level than a products physical property (e.g. function, colour and finishes), and instead looks at the illusive 'subliminal message' that the product's physical form conveys. Understanding product semantics instead of mere styling can help purposefully use shape, texture, materials and colour to convey a specific meaning and create a positive experience.[43]

Semiotics is the study of "signs and symbols, especially the relations between written or spoken signs and their referents in the physical world or the world of ideas".[44] Semiotics in context of product design concerns the "complex interplay between meaning and form" of products to inform the evaluation and validation of a product's identity, metaphors and visibility within the physical world and world of ideas.[45] Semiotics in design can be understood simply by understanding the signifier-signified concept where the signifier is a physical form of an object or an aesthetic, and the signified is the content, the meaning we make out of what we experience.[46] Semantics can be used in place of "mere style" to create products that are intuitive and engaging and thus create better patient experiences.[47]

27 Jeremy R Owen Deborah Williams, "Visual Language and Health-Care," Creative Review 35, no. 4 (April 2015 2015), accessed 8 July 2016, http://eds.a.ebscohost.com.ezproxy.aut.ac.nz/eds/detail/detail?sid=8b2d73b3-c1ec-4f12-9511-73179aedeaba%40sessionmgr4003&vid=0&hid=4102&bdata=JnNpdGU9ZWRzLWxpdmUmc2NvcGU9c2l0ZQ%3d%3d#db=vth&AN=102146661.

28 Ibid.

29 Ibid.

30 Bate and Robert, Bringing User Experience to Healthcare Improvement: The Concepts, Methods and Practices of Experience-Based Design.

31 Joyce Lee, "Why Is Health Care Design So Terrible?", 2016, accessed 17 September 2016, https://www.fastcodesign.com/3062815/why-is-healthcare-design-so-terrible.

32 Bate and Robert, Bringing User Experience to Healthcare Improvement: The Concepts, Methods and Practices of Experience-Based Design.

33 Deborah Williams, "Visual Language and Health-Care."

34 Donald A Norman, Living with Complexity (MIT press, 2010); ibid.

35 Bate and Robert, Bringing User Experience to Healthcare Improvement: The Concepts, Methods and Practices of Experience-Based Design.

36 C Montoya-Aguilar, Milton Irwin Roemer, and World Health Organization, "Quality Assessment and Assurance in Primary Health Care," (1988).

37 Stephen Reay et al., "Designing the Future of Healthcare Together: Prototyping a Hospital Co-Design Space," CoDesign (2016).;Justin W. Cook Bryan Boyer, "Creating New Opportunities and Exposing Hidden Risks in the Healthcare Ecosystem," (22 - 04 - 2010 2010); Parsons, Thinking: Objects: Contemporary Approaches to Product Design.

38 Doug Della Pietra, "Make Emotional Connections for Better Patient Experiences," accessed 7 july, 2016. http://www.fiercehealthcare.com/hospitals/make-emotional-connections-for-better-patient-experiences.

39 Ibid.

40 Nadal Marcos, "Helpful Hospital Aesthetics," accessed 7 july 2016, 2016. https://neuroaesthetics.net/2012/07/17/helpful-hospital-aesthetics/.

41 Ibid.

42 Remedios, "Idsa Announcement."

43 John Milanski, Product Semantics (http://trex.id.iit.edu/~milanski/fun/cubes/cubes.html: unknown).

44 Collins Dictionary, accessed 24/07/16, http://www.collinsdictionary.com/dictionary/english/.

45 Sara Ilstedt Hjelm, Semiotics in Product Design (Citeseer, 2002).

46 Ibid.

47 Milanski, "Product Semantics.";Jennifer Robison, "What Is the "Patient Experience"?," (30 September 2010 2010), accessed 7 July 2016, http://www.gallup.com/businessjournal/143258/patient-experience.aspx.

What is Cancer?
Cancer and Cancer Treatment

Cancer

To be diagnosed with cancer can be seen as the standardized nightmare of today's society.[48] For many, cancer or the diagnosis of the disease is frightening in nightmarish proportions and is often perceived as the most frightening and serious of all diseases.[49] For many of those diagnosed, it can be seen as a painful, torturous, death sentence for which treatment is a means of prolongation of life instead of the possibility of cure.[50] Today, cancer diagnoses are growing in New Zealanders as the population ages. Cancer is the single largest cause of death in New Zealand.[51] It is estimated that one in every three people who are effected by cancer in New Zealand are cured or have their life expectancy extended due to more effective treatments.[52]

The human body is made up of millions of cells that grow and renew in a controlled manner.[53] These cells are made up of approximately 35,000 genes, of which only a small portion are associated with cancer.[54] Of this small portion there are three understood types of genes susceptible to mutation that can cause cancer, proto-oncogenes, tumour suppressors, and DNA repair genes.[55] Ordinarily, these genes maintain control over the growth, repair, or renewal of cells throughout the body, however sometimes the regulation of cell growth and renewal is lost.[56] Consequently, cancer is a disease of the body's cells, where the cells regulatory genes mutate due to external influence (carcinogens). This can cause transcription error during cell division, which leads to unchecked proliferation and ultimately tumours.[57] These mutations are often caused by carcinogenic (chemicals or radiation), or inherited defective DNA, The DNA within cells determines a cells function, growth and renewal.[58] The damage caused by chemicals and radiation to cells or the introduction of new DNA sequences often lead to the development of cancer.[59] The big difference between normal tissues and cancer is that the normal tissues will mature into distinct cell types with specific functions, whereas cancer cells develop into less specialized cells which continue to divide without regulation or control, becoming invasive.[60] This can happen to any cell or cell type, which is why there are so many forms of cancer, and a single treatment to cure them all is not feasible.[61]

48 A Hall, "Psychological Support for Cancer Patients and Their Medical Carers," JW Sweetenham & CJ Williams (1997). Supportive Care of the Cancer Patient (1997).

49 Neil Lothian, "Facing up to Cancer: The Lived Experience of Being Diagnosed with a Life Threatening Form of Cancer" (Master, Auckland University of Technology, 2002), accessed 25/07/16.

50 Ibid.

51 Ministry of Health – Manatū Hauora, Cancer, 11 january 2016 ed. (2016).

52 Ibid.

53 Chemotherapy and Biotherapy Gudielines and Recommendations for Practice (Oncology Nursing Society, 2014).

54 Annenberg Learner, Cell Biology and Cancer (2016).

55 Ibid.

56 Chemotherapy and Biotherapy Guidelines and Recommendations for Practice.

57 American Cancer Society, "The History of Cancer," (2014), accessed 27/07/16.

58 Mayo Foundation for Medical Education and Research, "Diseases and Condidtions - Cancer," (2015), http://www.mayoclinic.org/diseases-conditions/cancer/basics/causes/con-20032378.

59 American Cancer Society, "Development of Modern Knowledge About Cancer Causes," (2014), accessed 25/07/16, http://www.cancer.org/cancerbasics/thehistoryofcancer/the-history-of-cancer-modern-knowledge-and-cancer-causes.

60 NIH - National Cancer Institute, "What Is Cancer?," (09/02/15 2015), accessed 27/07/16, http://www.cancer.gov/about-cancer/understanding/what-is-cancer.

61 National Institutes of Health (US), Understanding Cancer (2007).

Chemotherapy

There are several types of treatment for cancer. The most common treatments are surgery, hormone therapy, targeted therapy, immunotherapy, radiation therapy, and chemotherapy.[62] Cancer treatment depends on the type of cancer and what stage the cancer has reached because every person's diagnosis is different. Every treatment regimen is different and sometimes a combination of treatment methods are employed.[63] Chemotherapy typically is used in the later stages of cancer (3 or 4) where cancerous cells have vastly proliferated. In this case chemotherapy is often most appropriate as it treats the whole body.

Chemotherapy is a process where anti-cancer drugs are injected into a patient's body to kill cancerous cells whilst trying to do the least possible harm to healthy cells.[64] However this approach to cancer treatment means the drugs can also effect healthy cells, causing side-effects. These side-effects include changes to bone marrow, infections or fever, fatigue, nausea, lack of appetite, weight gain, hair loss, sore or dry mouth or throat, numbness and tingling, itchy skin or other skin problems, bowel problems, forgetfulness and concentration problems (otherwise known as chemo-brain).[65] As such patients often associate these side effects with cancer instead of the chemotherapy treatment. These side effects often result in severe emotional reactions and have a high psychological effect on cancer patient's emotional wellbeing, as the treatment begins to change the patient's day to day life.

62 Society, "The History of Cancer."

63 NIH - National Cancer Institute, "Types of Treatment," (29/04/15 2015), accessed 27/07/16, http://www.cancer.gov/about-cancer/treatment/types.

64 Cancer Society NZ, "Chemotherapy", 2017, accessed 13 February 2017, https://auckland-northland.cancernz.org.nz/en/cancer-information/cancer-types/lung-cancer/chemotherapy/.

65 Ibid.

The Chemotherapy Experience

In the context of this research, intravenous chemotherapy experience was the main focus as it is the main form of chemotherapy treatment delivery which surrounds the use of the current infusion chair in Auckland City Hospital's Oncology Day-Stay. An intravenous chemotherapy session can last anywhere between 15 minutes to over 8 hours excluding any administrative time.[66]   Chemotherapy is a time consuming process that is surrounded by considerable periods of long waiting. Patients may find themselves waiting for their results on blood tests, appointments, treatments all with the uncertainty of your condition improving.[67]   This constant uncertainty and anxiety of waiting as a chemotherapy patient can be physically, mentally and emotionally exhausting, most often making patients feel like they have no control over your own life especially when they can't do anything about it.[68]   It's just a part of the process because diagnosis, treatment, results, testing, analysis, all take time, sometimes several days or weeks.[69]   This coupled with the emotional effects of cancer which can cause patients to feel a range of strong emotions like fear, anger, denial, sadness, guilt, loneliness, uncertainty and hope.[70]

Chemotherapy treatment directly effects the patient, that in itself can make the patient feel isolated, burdening and helpless.[71]   However the overall chemotherapy experience can transcend through the patients loved ones, family and friends as they have to adapt and cope with the life cycle changes.[72]   Patients and their loved ones both have to adjust to the new situation.[73]   Patients have to adapt to cancer, changing daily routines, financial stresses, family dynamic are all things synonymous with the cancer experience.[74] Chemo- indicates the involvement of chemical processes or reactions.[75]   Therapy, is the treatment of physical problem or illnesses.[76] Put together, chemotherapy should be a measure of treatment carried out to cure cancer, or to make someone feel better.[77]   From the medical perspective, the efficacy of chemotherapy is curative in that it attacks the cancerous cells. However, the side effects on the patient are emotionally and physically dominating aspects of the experience which are more often synonymous with the term 'chemotherapy' than the curative process itself.

66 Wang et al., "Cancer Treatment Environments: From Pre-Design Research to Post-Occupancy Evaluation."

67 Cancer Society NZ, "Coping with Waiting", 2017, accessed 13 February 2017, https://auckland-northland.cancernz.org.nz/en/cancer-information/living-with-cancer/coping-with-waiting/.

68 Ibid.; Wang et al., "Cancer Treatment Environments: From Pre-Design Research to Post-Occupancy Evaluation."

69 NZ, "Coping with Waiting."

70 Cancer Society NZ, "Emotions and Cancer", 2017, accessed 12 February 2017, https://auckland-northland.cancernz.org.nz/en/cancer-information/living-with-cancer/emotions-and-cancer/.

71 NZ, "Coping with Waiting."

72 Lea Ed Baider, Cary L Cooper, and Atara Ed Kaplan De-Nour, Cancer and the Family (John Wiley & Sons, 1996).

73 National Cancer Institute, "Changes for Family", 2014, accessed 13 February 2017, https://www.cancer.gov/about-cancer/coping/adjusting-to-cancer/changes-for-family.

74 ibid.

75 Collins Dictionairy.

76 Sally Wehmeier and Albert Sydney Hornby, Oxford Advanced Learner's Dictionary of Current English (Cornelsen & Oxford, 2000).

77 Ibid.

Intervention
Design for Care

Design Intervention

Located within Auckland City Hospital's main building, the DHW Lab is a collaborative space which focused on improving healthcare experiences with patients, families and staff creating human centred designs.[78] Human centred design (HCD) encourages collaboration, empathy, creativity and prototyping with hospital users and presents an opportunity to transform the value of design at the front line of healthcare practices.[79] This research is representative of this transformation and the HCD approach prioritized the betterment of health experiences. Design intervention lies with the aesthetics of experience, which currently conveys a sterile, engineered and functional experience that did not meet the emotional needs of patients in oncology. The opportunity was to work with medical experts, patients and their support people to improve the aesthetic experiences through designs that communicate care and support.

Emotional Resonance of Aesthetic Experiences

'Emotions' are a part of a person's character that is connected with feelings.[80] They are an affective state of consciousness in which any strong agitation of feeling is stimulated by experiences which are often accompanied by physiological changes in our bodies (i.e. affecting the pace our hearts beats, and the depth of our breath).[81] 'Resonance' or 'Resonating' refers to the "power to bring images, feeling, and memories into the mind of the person", drawn from another's experience.[82] When these come together to form 'emotional resonance', the locution refers to the designers' ability to 'vibrate' on the same 'emotional frequency' as the end user, to be sensitive to the mood and feeling the "subtle atmospheric shifts which touches across air space".[83] To feel what the patients feel. Understanding the heightened emotional states while empathizing and unpacking the emotions of the end user, can help create more meaningful and better design responses.[84] The heightened emotions of an experience can create memories and meanings of those experiences. It is through this that patients try to make sense of the quality of their healthcare experiences.[85] Changing the physical inputs into such experiences can improve the emotional output and fashion patient perceptions.

78 DHWlab, "Dhw Lab - About," (accessed 16/06/16, http://www.dhwlab.com/about/.

79 Ibid.; Jones, Design for Care.

80 Wehmeier and Hornby, Oxford Advanced Learner's Dictionary of Current English.

81 , s.v. "Emotion," accessed January 10, 2017, http://www.dictionary.com/browse/emotion.

82 Hornby, "Oxford Advanced Learner's Dictionary."

83 Giuliana Bruno, Surface: Matters of Aesthetics, Materiality, and Media (University of Chicago Press, 2014).

84 Jane Fulton Suri, Inclusive Design through Individual Insight, vol. 44, Proceedings of the Human Factors and Ergonomics Society Annual Meeting (SAGE Publications, 2000).

85 Pietra, "Make Emotional Connections for Better Patient Experiences."

Project Aims

Literature related to chemotherapy infusion including the phenomena of care, aesthetic experiences, and emotional resonance, helped set the foundation for the research. From the topics discussed in the introduction and literature review, project aims were formed in hopes of improving the chemotherapy experiences of patients in ADHB's Oncology Day-stay through the design of a new chemotherapy chair.
Project aims formed in response to knowledge gained in the literature included:

Understand the emotional experiences of chemotherapy patients and their needs.

Support the patient voice to be heard and seen through in design.

Prioritize the user and aesthetic experiences to underpin good designs for a patient centred healthcare context.

Challenge the current healthcare aesthetic and explore an 'appropriate aesthetic' for better emotional experiences.

Explore opportunities to transform the value of design and aesthetic experiences in the context of health care product design.

Conclusion

The synthesis of contextual research directed the project towards a human centred framework to understand the meanings and value of design within the emotional spectrum of the healthcare experience. The inclusive nature of HCD within medicine is a part of a movement, which aspires to bring the patient voice into designs within the hospital context, to shift baseline expectations of patient's experiences from measures of curative care to quality care. The project aims to bring cohesive design into healthcare, through artefactual design intervention to answer the research question:

How can I use design to better the emotional resonance of a chemotherapy chair's aesthetic to improve the emotional experience of patients during chemotherapy?
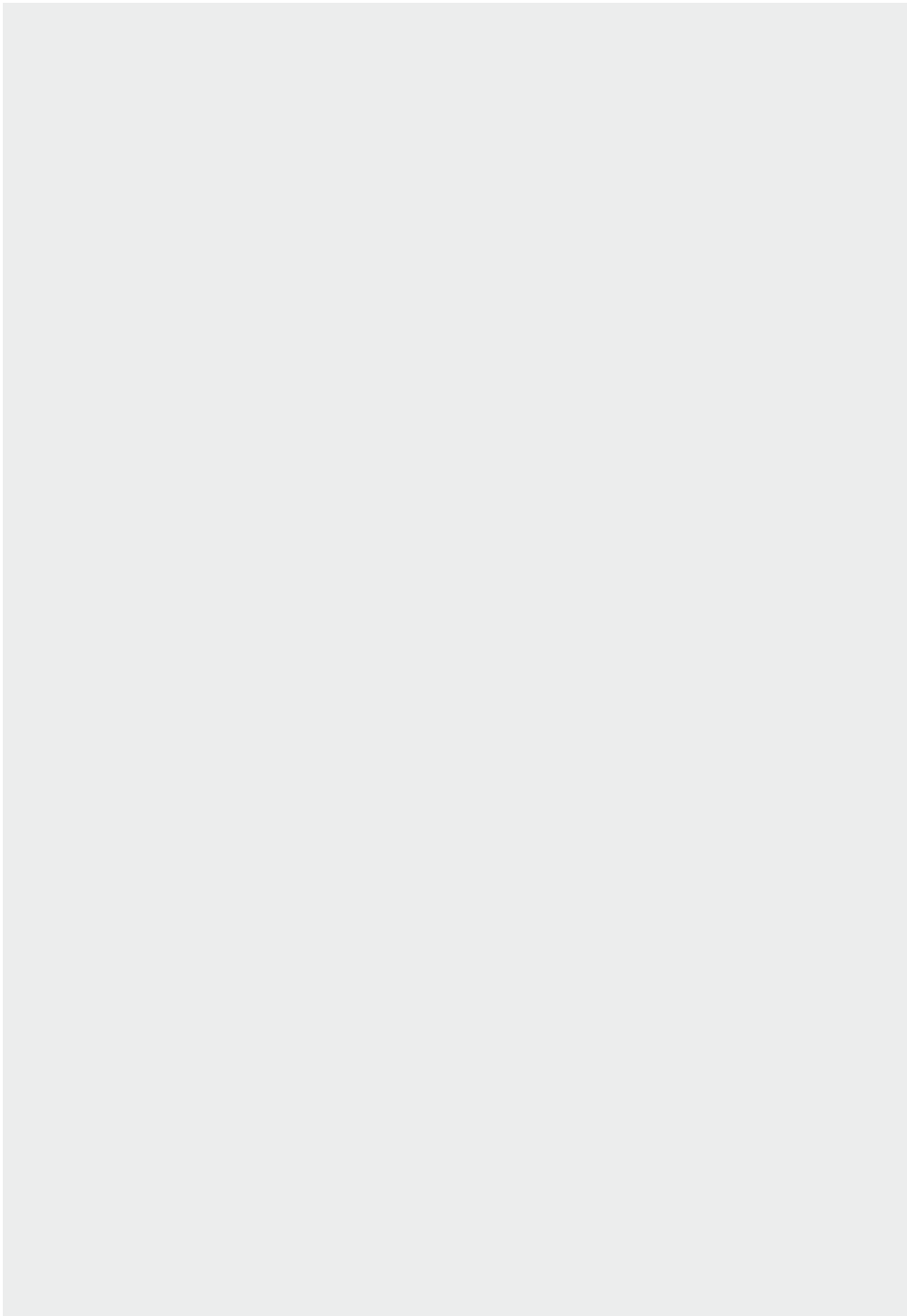
Methodology

Methodology
Introduction

86 Wehmeier and Hornby, Oxford Advanced Learner's Dictionary of Current English.

87 Cal Swann, "Action Research and the Practice of Design," Design issues 18, no. 1 (2002).

88 Wehmeier and Hornby, Oxford Advanced Learner's Dictionary of Current English.

89 William P Fisher Jr and A Jackson Stenner, "Integrating Qualitative and Quantitative Research Approaches Via the Phenomenological Method," International Journal of Multiple Research Approaches 5, no. 1 (2011).

90 Jones, Design for Care.

91 Gerald I Susman and Roger D Evered, "An Assessment of the Scientific Merits of Action Research," Administrative science quarterly (1978).

Methodologies are purposefully structured course of action, which endeavours to aid research.[86] In the case of this research, the methodology structure closely resembled those formed of creative thinking, producing and philosophy.[87] This research follows design research methodology that depended on physical explorative design methods to help theorize design ideas within healthcare. This section discusses the methodology, critical frameworks, ethical consideration, and methods used in this research.

The research used a mixed methods research design, and used both quantitative and qualitative research methods to drive the design process. Quantitative research was connected to measurable data within the research findings.[88] Contrast to this, qualitative research prioritized the subjective experience of the research participants and contributed more meaningful, authentic and objective comparisons, which endeavours to find out how good things are.[89] The integration of qualitative and quantitative research methods offered a framework with multiple efficiencies and meaningful research suited this project as it is situated between the healthcare and design professions.[90]

The chosen methodology is Action Research. In addition to the action research, Human Centred Design, and Emotional Experience Design frameworks were applied. Action Research was used as a systematic approach of methods, which helped improve the efficiency of the design process.[91] Creating and acting upon a design research was best suited to the project's ethical and contextual boundaries.
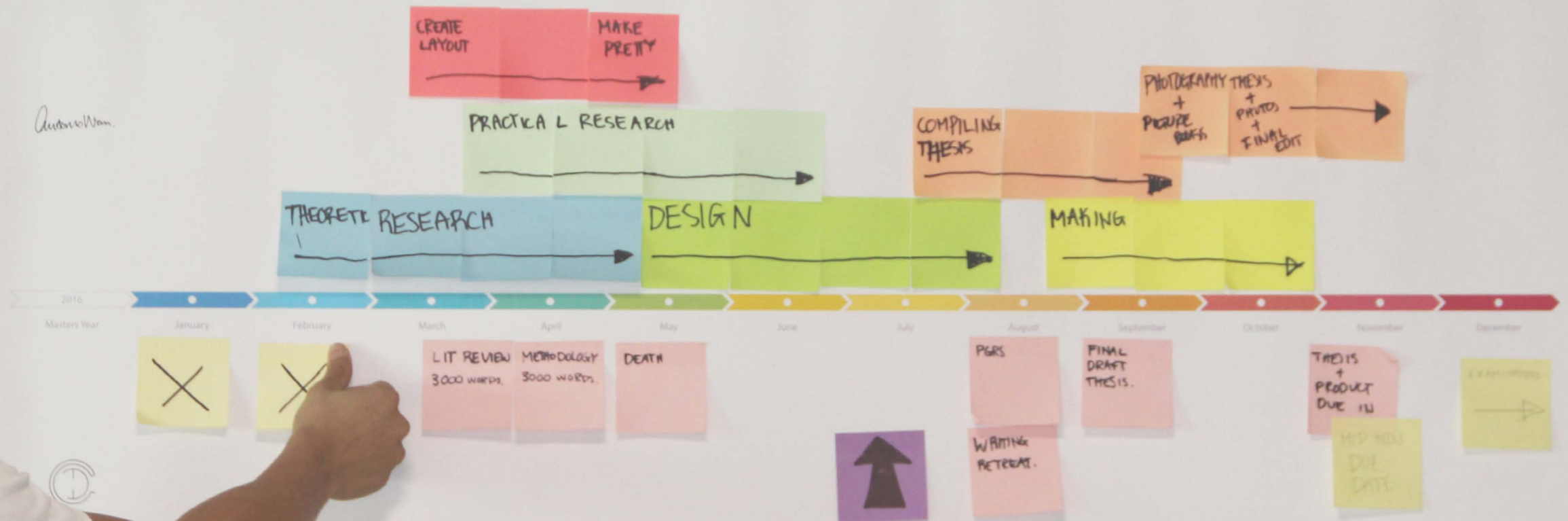
Methdology
Action Research

DIVERGE   CONVERGE

CREATE CHOICES   MAKE CHOICES

PLAN   ACT   OBSERVE   REFLECT

Critical Frameworks
Human Centred Design

D DELIVIER
C CREATE
H HEAR
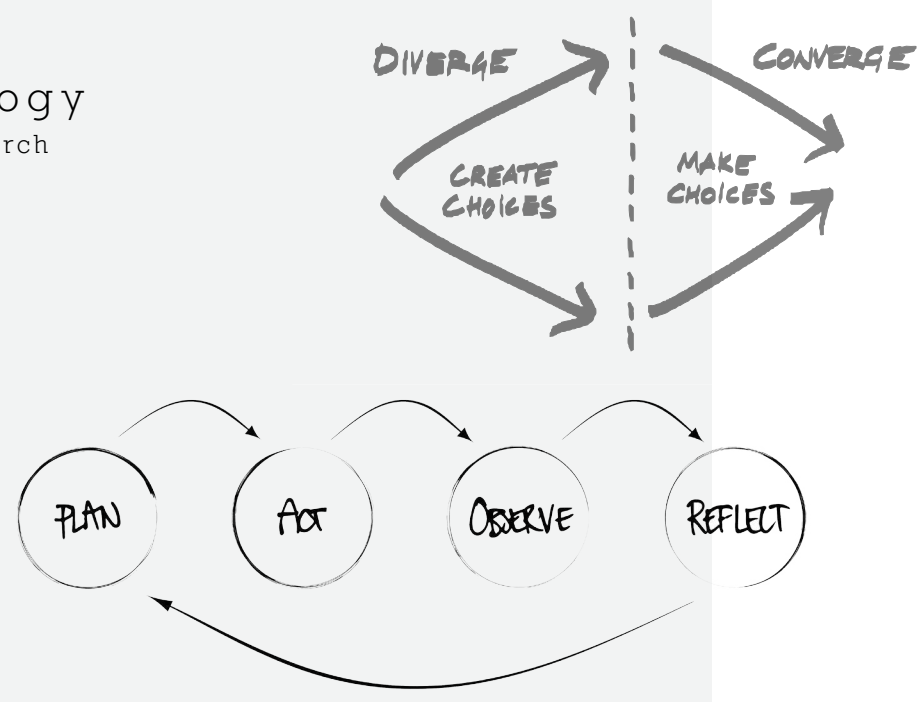
Action Research is systematic approach of investigation which can help people from various professions and occupations to find effective solutions to real world problems they confront in their everyday lives. Focusing on researching and understanding specific situations and localizing solutions brought about change or improvement.[92] In this research, this methodology combined theory building and practical research to improve behaviour or encourage change, not to present finalized 'finalized' answers to problems but to reveal the truths and realities of the individual perspectives within ADHB's chemotherapy day stay.[93]

This methodology consisted of a cyclic research framework of planning, acting, observing, and reflecting on the effects of the actions that took place to then returned to the planning stage to restart the process.[94] The cyclic nature of this methodology created overlaps in the different stages where cycles ran parallel with each other while it worked towards the same goal.[95] This framework's structure was closely relatable to the design process and has been shown to be easily applied over a variety of professions.[96] This made it appropriate for this mixed methods research firstly because the elegance of action research allowed different approaches to be incorporated, secondly the nature of the methodology allowed theories and methods to be synthesized as the research progresses, and finally because the research dealt with healthcare and design.[97]

92 Ernest T Stringer, Action Research (SAGE, 2007).

93 David E Gray, Doing Research in the Real World (Sage, 2013).

94 J MacNiff, "Action Research: Principles and Practice," (1988); ibid.

95 Gray, Doing Research in the Real World.

96 Bruce Archer, "The Nature of Research," Co-Design Journal 2, no. 11 (1995).

97 MacNiff, "Action Research: Principles and Practice."
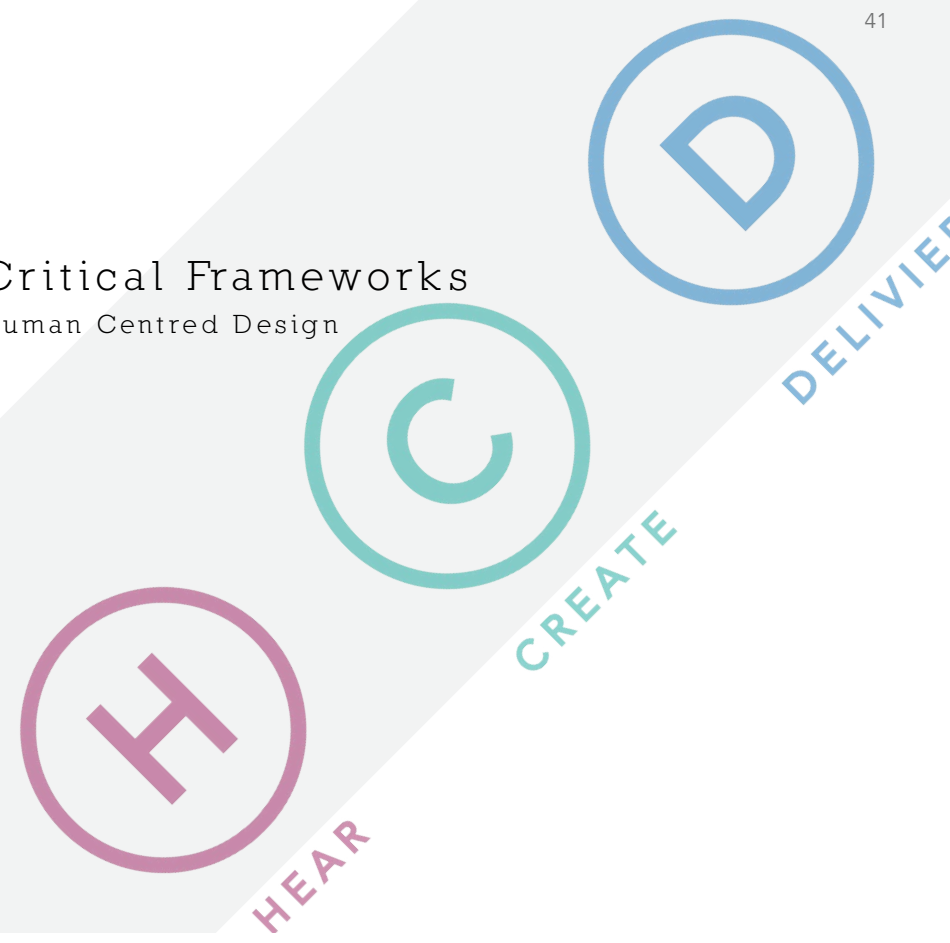
98 Klaus Krippendorff*, "Intrinsic Motivation and Human-Centred Design," Theoretical Issues in Ergonomics Science 5, no. 1 (2004).

99 Ibid.

100 Human Centered Design Toolkit, "Ideo," Retrieved on 24th November (2008).

101 Ibid.

102 DHWlab, "Dhw Lab - About."

103 Jones, Design for Care.

104 Bate and Robert, Bringing User Experience to Healthcare Improvement: The Concepts, Methods and Practices of Experience-Based Design.

The umbrella of Human Centred Design (HCD) strongly emphasized that design artefacts are inseparably linked to the perception, imagination, interfacing, the use of and moreover the meaning of the design to the user.[98] People do not respond to physical qualities of things, instead they respond to what products mean to them.[99] Returning to the research question, the idea of manifesting and purposefully integrating meaning and value was only achieved by first understanding the experience of the patients the design is for.

HCD is a process or set of techniques employed to better understand the needs, wants and behaviours of the patients I am designing for to create effective solutions.[100] In the context of this research, possible solutions included products, services, environments and modes of interactions.[101] Emphasis on HCD and the value of the user's voice are core values of the DHW Lab to create meaningful design outcomes that meet the needs of hospital users and improving their experiences.[102] This framework is instrumental to improving design in healthcare as it helps gain a better understand of the everyday life contexts of patients.[103] Practicing this research from the DHW Lab through the lens of user-centred design helped bring user experience into the healthcare experiences.[104]

Ethics
Considerations & Limitations

107 Parsons, Thinking: Objects: Contemporary Approaches to Product Design.

108 AUT, "Research Ethics - a Guide to Write up Your Autec Application" (Power Point Presentation), 2014, accessed 19 February 2017, https://www.aut.ac.nz/ study-at-aut/faculty-of-health-and-environmental-sciences/research/research-toolbox-for-staff/ethics/?a=492895.

109 John W Creswell, "Research Design 4th Edition," (2014).

110 Ibid.

111 Auckland University of Technology Ethics Committee, "Ethics - a Guide to Obtaining Research Ethics," Auckland University of Technology Ethics Committee, last modified 23/2/2015, accessed 30/6/2016, 2016. https://www. aut.ac.nz/study-at-aut/faculty-of-health-and-environmental-sciences/research/ research-toolbox-for-staff?a=492885.

112 Suri, "Inclusive Design through Individual Insight."

Ethics within this research was a system of moral principles that govern the designer's behaviour while conducting research.[107]   Respect, partnership and protection for the participants were the ethical principles which underpinned the project.[108]   This ensured the my awareness of potential physical, psychological, social, economic or legal risk of the methods used, and being considerate of the special needs of vulnerable populations.[109] The research involved collecting data from patients to understand the environment, situation, and context that surrounded the experiences of chemotherapy patients. The patient's dependence on the environment, various cancer treatments, products equipment and their medication in their journey for health, meant they were potentially vulnerable which added a layer of ethical complexity.[110]

In this research, recognition of end users involved in the chemotherapy experience that had potential risk in intruding their dignity, rights, safety, health and wellbeing, whether it be emotional or physical, created an ethical dilemma for the research.[111]   Researching as a student of Auckland University of Technology (AUT), the internal ethics committee, Auckland University of Technology Ethics committee (AUTEC) required formal ethical approval to undertake this research, to ensure the ethical awareness of the planned methods of research due to the context. Initially it was advised that even as a part of a master degree, direct interaction with chemotherapy patients held too much potential risk of harm to the emotional and physical wellbeing of the patients. Limiting the possible methods in the early stages of the design processes. This however changed as I began to gain clarity over my research methods as the research journey progressed. In order to maintain a HCD ideology, methods which involved patient interaction had to be used to connect , empathize and resonate with the experiences of chemotherapy patients to create meaningful and more appropriate design solutions. [112]   Amendments to these ethical constraints were made and approved thanks to the support and consultation of oncology staff who approved the research methods with direct user interaction.

As a framework, HCD comprises of three phases. Firstly, hearing the user or in this research listening to the voice of the user, observing and understanding the experience. Secondly, abstract creation of concepts, solutions and prototypes in response to the themes, opportunities and insights derived from the first phase. Finally, delivering a concrete solution to the initial problem.

Experience Design

Experiences are dynamic, complex, subjective phenomena, with a dependence on the sensory qualities which create emotional responses.[105] Experience design is an approach to create emotional connection with the user through careful planning of the tangible and intangible elements.[106] In this research, experience design was used to approach the design of the tangible visual aesthetic to influence the intangible emotions to help improve the chemotherapy experience of ADHB's oncology centre.

105 Marion Buchenau and Jane Fulton Suri, Experience Prototyping, Proceedings of the 3rd conference on Designing interactive systems: processes, practices, methods, and techniques (ACM, 2000).

106 Madeleine E Pullman and Michael A Gross, "Ability of Experience Design Elements to Elicit Emotions and Loyalty Behaviors," Decision Sciences 35, no. 3 (2004).

Methods
Modes / Methods

Methodology Map
Timeline for the Masters research

Through this master's research project, research design was conducted through two different thinking modes. This coincided with the design process of first learning and understanding the experience then designing to improve it. The first mode of methods was research for design, where investigation and exploration into the existing contexts, artefacts, and experiences were used to create a design brief which validates the need for the research, provided a timeline and constrained the project scope. The second mode design for research, took findings from the research for design mode. These findings or insights were then used to generate design concepts. These two modes work in support of the reflective, cyclical nature of action research.

	M	A	M	J	J	A	S	O	N	D	J	F
Research												
Literature Review												
Expert Interviews												
Role-play/Simulation												
Insights & Opportunity												
Patient Questionnaires												
Patient Interviews												
Observations												
Task analysis												
Analaysis												
Generate												
Ideation												
Mapping												
Sketch Prototyping												
Evaluation/Reflection												
Critique												
Develop												
Sketch Prototype												
3D Prototype												
Evaluation/Refleciton												
Critique												
Refine												
Evaluation/Reflection												
Validation												
Detail Design												
Communicate												
Final Prototype												
Thesis												
Photography												

Patient Questionnaires

Patient questionnaires are objective, open ended set of questions designed to answer a specific set of research questions.[119] For this research a visually interactive questionnaire was designed to gather qualitative data which revealed trends, attitudes, or opinion of the sample population of oncology day stay.[120] This helped to to draw generalizations or inferences to the population.[121] Due to the ethical considerations, questionnaires were anonymous.[122] The design of the questionnaire understood that different people communicate in different ways and gave patients the option to communicate verbally or visually.

119 Creswell, "Research Design 4th Edition."

120 Taylor, Integrating Quantitative and Qualitative Methods in Research.

121 Creswell, "Research Design 4th Edition."

122 Taylor, Integrating Quantitative and Qualitative Methods in Research.

123 Stickdorn et al., This Is Service Design Thinking: Basics, Tools, Cases.

124 Ibid.

125 Liz Sanders and Pieter Jan Stappers, Convivial Design Toolbox: Generative Research for the Front End of Design (BIS, 2012).

Patient Interviews.

Patient interviews were conducted in the oncology space as patients are more familiar with the environment, and were more comfortable providing insight into their thoughts and behaviour.[123] The difference between patient and expert interviews was that the patient is the end user of the chemotherapy chair, and therefore was the focus of this research. These patient interviews were semi-structured, anonymous and intercept interviews used to validate concepts and allowed myself to both observe and probe the behaviours I was interested in.[124] However, these interviews went beyond the superficial layer of behaviour, as participants expressed their opinions, voiced their needs, indicated reason, and reported on events that happened.[125]

Role Play/Simulation – emersion exercise

Roleplay was used to explore the issues involved in the complex contextual situations in oncology.[126] This method placed the me into the shoes of the user, giving the designer meaningful and first-hand experience with the problems patients face.[127] Due to the clinical and ethical limitations of the research and oncology space, only certain hours in the morning were allowed for research in chemotherapy day stay rooms. During this time staff were preparing for the patients to begin treatment. Because of the working environment, staff were not able to facilitate roleplay of the treatment experience. Instead to navigate the ethical limitations, whilst remaining efficient, I used role play in two different ways.

I first used roleplay to experience the oncology space and put myself in the shoes of a first time patient as I do not have cancer this was the most relatable persona to adopt. A record of procedural notes, my thoughts or emotions were made through written reflective notes as I progressed from the entrance, administration and to treatment rooms. This helped me gain understanding and empathy of the emotional experience of chemotherapy patients from within the oncology space.[128]

I also used role play as an immersive exercise which helped understand how patients would feel during chemotherapy treatment. This was done twice by sitting myself in a chair for extended periods of time to replicate the chemotherapy treatment, on a day when I was unwell to replicate the side effects with similar facilities and appliances around to mimic the environment. This was done twice on two different chairs. The first time was on an fixed back armchair at home, to mimic the hospital recommended chair in a private setting. The second was on an airplane seat to mimic a chair with limited movement within a public space. This helped my understanding of the physical needs of the patients during chemotherapy which are directly related to the design of the chair.

126 M.D Adam Blatner, "Role Playing in Education," (18 October 2009 2009), accessed 3 January 2017, http://www.blatner.com/adam/pdntbk/rlplayedu.htm.

127 Andrew Withell, "Design Thinking Methods - a Toolbox for Exploring and Applying Design Thinking Methods: Version 2," (2013).

128 Ibid.

129 Taylor, Integrating Quantitative and Qualitative Methods in Research.

130 Ibid.

Observation (electronic)

Observation is a systematic method used to understand the existing conditions, keeping a record of fieldwork descriptions of an activity, paying particular attention to behaviours, actions, conversations, interpersonal, interactions, organizational or community processes.[129] This helped my awareness of the different aspects of observable patient experience and yielded rich detailed descriptions of the context the observations were made in.[130] Due to the initial ethical constraints, I was unable to directly observe patients within ADHB in the early stages of the research, however I was able to navigate around this by observing patient activity within electronic sources and within public spaces. I observed patients during chemotherapy through electronic, open-domain sources, to gain detailed insight of the chemotherapy treatment processes. However, when the ethical limitations of the research changed, I was able to observe patients and family within the public areas of oncology. This helped to gain an empathetic understanding of the emotional experiences of chemotherapy.

Analysis

Analysis is a method of critically evaluating experiences or products to identify the attributes of the experience or product. This helped to expose any implications, new knowledge and understanding which aided the design process.[131] I analysed the materials, processes, aesthetic, functional, engineering and economic decisions that were made in existing product or space. Analysis of ADHB's chemotherapy environment and their chairs was conducted to identify problems with the older designs. Understanding the existing design's attributes sets a baseline to improve the experience from.[132] I mapped out the travel pathways of the people in the oncology space. This was undertaken to show how people and staff operated in the space, whilst also helping me to identify problems within the area. Analysis of the existing chair designs was also conducted to unpack the problems and unmet emotional needs of the patient.

131 Withell, "Design Thinking Methods - a Toolbox for Exploring and Applying Design Thinking Methods: Version 2."

132 Usability, "Task Analysis", accessed 12 February 2017, https://www.usability. gov/how-to-and-tools/methods/task-analysis.html.

133 Parsons, Thinking: Objects: Contemporary Approaches to Product Design.

134 Sanders and Stappers, Convivial Design Toolbox: Generative Research for the Front End of Design.

Mapping

Mind mapping is a simple technique that enabled all possible directions the project or task could take which could include subcategories, ideas, and sketches.[133] Mind maps were used to help organize thoughts visually, and helped effectively draw out key aspects to identify and support a central idea.[134] Mind mapping was used throughout the research to help plan research cycles, explore design attributes, and conclude themes or trends during periods of reflection.

Ideation

Ideation is the generation of ideas and took place at any time during the design process.[135] Concepts and ideas were quickly created to connect the problems and opportunities with solutions. Constant ideation helped to synthesize the research findings, themes, insights, and opportunities and connected them to solutions generated through visual tools such as, mapping, brainstorming, and drawing.

135 Parsons, Thinking: Objects: Contemporary Approaches to Product Design.

Prototyping/sketch

Prototyping is a creative process that usually resulted in making an artefact. Prototyping was used throughout the design process to explore competing ideas and resolved ambiguities that might have been associated with a particular solution.[136] Prototyping was also used to bring ideas and concepts to life using 3D models to help develop and communicate ideas in 3D or sketched forms.[137] A variety of 2D sketches and 3D models were produced concurrently throughout the design process, drawing from earlier synthesized analysis of research, insights, and opportunities that responded to the research question and design problems. Initially rough sketches and quick 3D models were used which grew in refinement as the design process progressed. As the design direction became clearer, more refined drawings and models were produced to help visualize detailed design, so proper evaluation, validation and reflection could be conducted.[138]

As this research, dealt with producing an aesthetic and complex physical product, 3D prototyping was the primary form of prototyping. Detailed drawings were used as supporting material to communicate the design ideas. Primarily working with materials and scale similar to end product in 3D, allowed constant refinement of the detail design throughout the different iterations. Forming 3D prototypes helped visualize the artefact before producing the final model, and helped understand the appropriate manufacturing processes.

136 Sanders and Stappers, Convivial Design Toolbox: Generative Research for the Front End of Design.
137 Withell, "Design Thinking Methods - a Toolbox for Exploring and Applying Design Thinking Methods: Version 2."
138 Parsons, Thinking: Objects: Contemporary Approaches to Product Design.
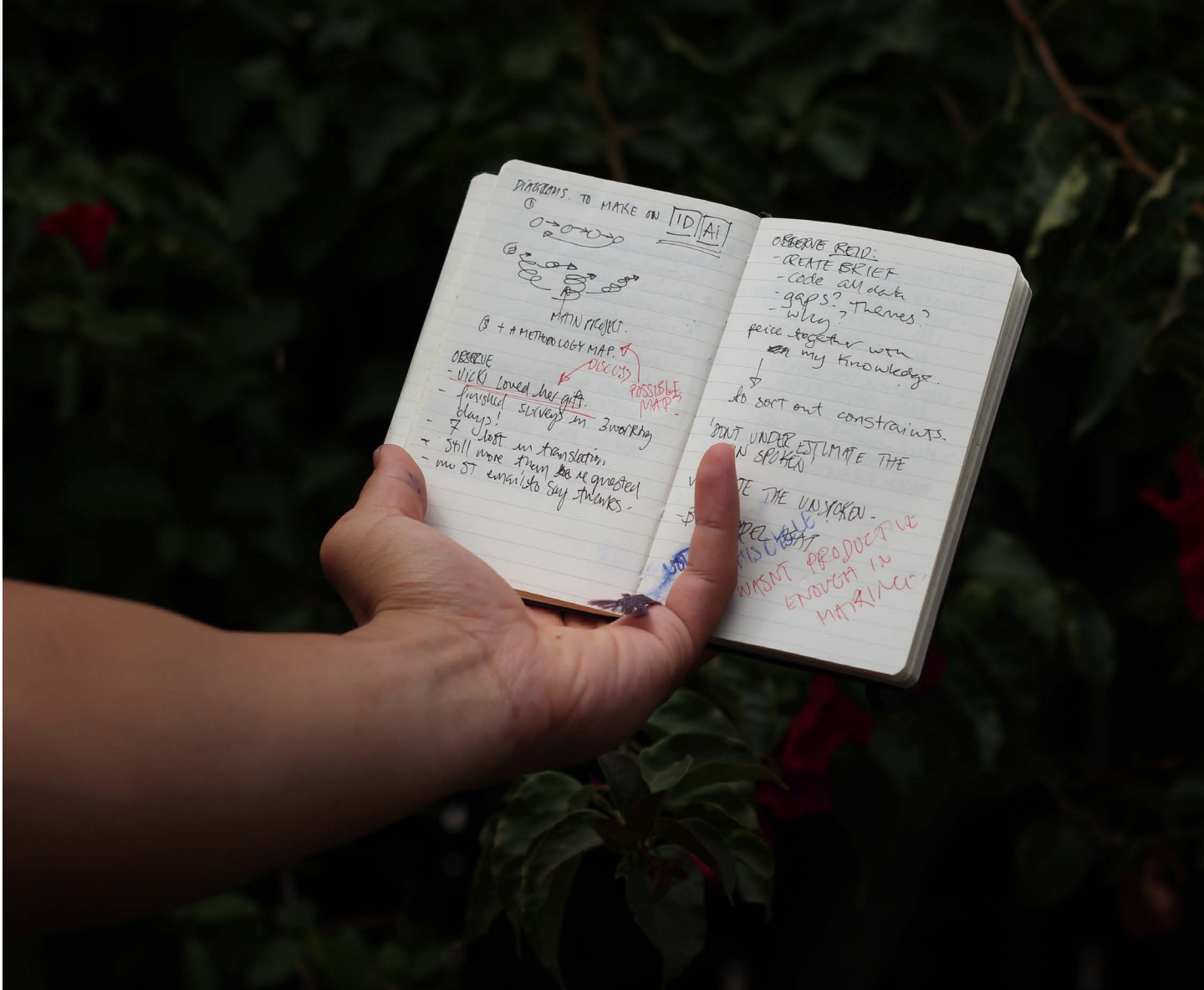
Evaluation and Validation

Evaluation and validation of concepts helped acknowledge, understand and address weaknesses in the current design.[139] Exposing the weak-points in a concept or designs early allowed them to be revised before the design was finalized. Peer, expert, and self-evaluation was conducted to review designs and validate concept directions. This helped identify problems, opportunities and brought fresh perspectives. Self-evaluation included testing the current prototypes, models. Understanding that being too close to a research, can make a designer to overlook important issues. This made opinions outside of the research valuable and insightful.

139 Withell, "Design Thinking Methods - a Toolbox for Exploring and Applying Design Thinking Methods: Version 2."

140 Chartered Society of Physiotherapy, "What Is Reflective Practice and How Do I Do It?", 2017, accessed 14 February 2017, http://www. csp.org.uk/faqs/cpd/what-reflective-practice-how-do-i-do-it.

141 Ibid.

142 Stickdorn et al., This Is Service Design Thinking: Basics, Tools, Cases.

Reflective Practice

Reflection was the last stage of the action research cycle that involved thinking about the research design process and consciously analysing the decisions made.[140] Reflection was used to critically analyse and evaluate the design practice and research. This helped generate new knowledge and ideas which drew on theory relating to communicating care through design.[141] This process allowed ideas and prototypes to be tested against the research question, related theory and literature.[142] Reflective practice was used to re-ground the research to the central research question, and helped to ensure the design practice would enable the research question to be explored fully. The reflection of prototypes and concepts was especially important during the development of a design to refine intricate details of design. Understanding the shortcomings and strengths of each cycle helped plan and improve the efficacy and efficiency of the next cycle of design, action, and research.

DESIGN.

RESEARCH.

Research

Literature Review
Expert Interviews
Patient Questionnaires
Observations
Task Analysis
Analaysis
Role-play / SImulation
Insights/Opportunities

Generate

Ideation
Mapping
Sketch Prototype
Evaluate
Reflect
Critique

Develop

Sketch Prototype
3D Prototype
Evaluate
Reflect
Critique

Refine / Communicate

Evaluation
Testing
Validation
Discussion
Opportunity Spotting

Documentation of Research

1

Introduction

Tacit Knowledge

Hand-drawn diagram:

INTERNAL FACTORS — HOW DOES THIS HAPPEN — EXTERNAL FACTORS — REGULATORY GENE MUTATION

RADIATION

CELL DIVISION — CELL MUTATION

UNCHECKED PROLIFERATION ← TRANSCRIPTION ERROR

TUMOURS (LOTS OF TUMOURS)

CANCER

AESTHETIC — EMOTIONAL — CAN HAPPEN TO ANY CELL TYPE

THIS PROJECT

CHEMO-THERAPY

CHEMOTHERAPY

WHAT IS IT? — ONE TYPE OF CANCER TREATMENT

INJECTING RADIOACTIVE SUBSTANCES TO KILL CANCEROUS CELLS
↓
BUT...
↓
ALSO KILLS HEALTHY TISSUE
↓
THEREFORE
↓
CREATING ALL THE HORRIBLE SIDE EFFECTS.

BAD BECAUSE...

THERE ARE SO MANY TYPES OF CANCER.
SO...
A SINGLE TREATMENT TO CURE THEM ALL ISN'T FEASIBLE

Following the contextual review, the project narrowed to surround the redesign of the chemotherapy chair. Firstly, I engaged patients and experts to help gain a greater understanding and empathy for the chemotherapy experience. The lack of prior knowledge made it difficult to resonate with the physical and emotional intricacies of the chemotherapy experience. This challenged me to push the ethical constraints as the year progressed, using design-thinking methods to explore the chemotherapy process and how design could improve the experience.

To gain meaningful insight and knowledge of the chemotherapy experience on both functional and emotional planes; Action research, HCD and Ideo's design thinking methods revealed the performance, engineering, and aesthetic problems within existing designs. The documentation of research is presented through the cycles of action research which helped to triangulate insights, knowledge, and creativity. I began the design research phase with the 'Tacit Knowledge' design. This involved; assumption mapping, mood boards, sketching and prototyping to expose any knowledge gaps that needed to be filled.

Images for Moodboards removed for copyright reasons.

Mood Boards

Initially I understood that chemotherapy involved treatment which could take hours, uses healthcare products and is an emotionally intense journey, however I didn't know what the chemotherapy environment looked or felt like. Mood boards were used to explore the emotional and visual landscape of chemotherapy wards, places of prolonged sitting, and crafted furniture.[143] I was shocked at the stark visual differences between comforting spaces and the oncology wards.

143 ANDRES LUCERO vERA, "Co-Designing Interactive Spaces for and with Designers: Supporting Mood-Board Making," (2009).
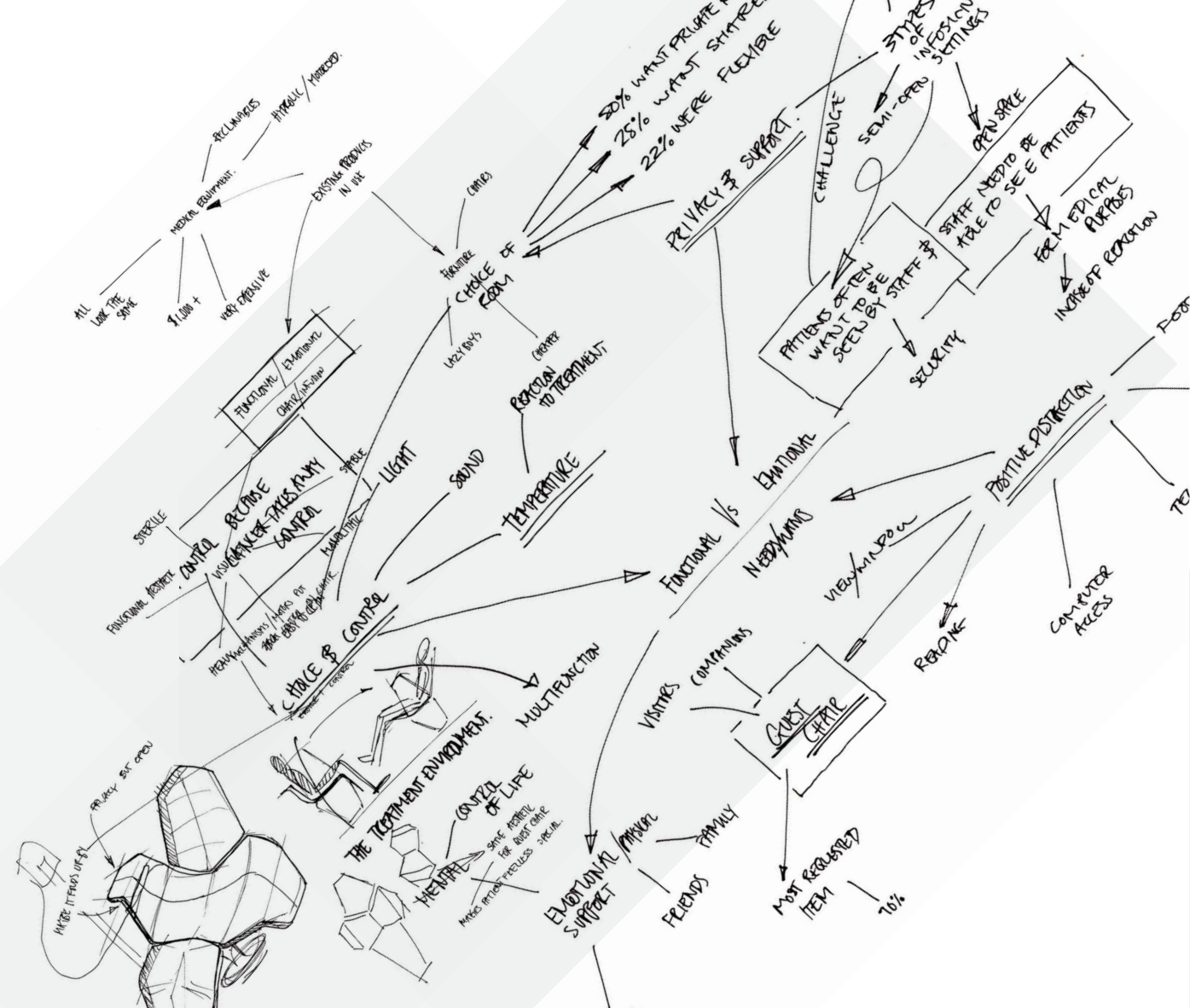
Prototype

The current products looked hard, uncomfortable and uninviting yet according to literature the needs of the chemotherapy patients include; choice and control, privacy and support, and positive distraction and companionship.[144] This knowledge was projecting into the first prototype and was used to embody those needs and wants.

144 Wang et al., "Cancer Treatment Environments: From Pre-Design Research to Post-Occupancy Evaluation."

145 Parsons, Thinking: Objects: Contemporary Approaches to Product Design.

Reflection

Reviewing the progress, I felt that mapping was not effective as it didn't have many trains of thought.[145] My limited knowledge in this field required me to first research the clinical and functional requirements and the emotional needs for an improved experience.

2

Cycle 2
Planning

DONT FORGET MY LENSES.

THE JOURNEYS!

LIMITATIONS

CONSTRAINTS

THE PLAN

EXPERT INTERVIEWS

↳ ARCHITECT

↳ CLINICAL PSYCHOLOGIST

↳ CHARGE NURSE.

THE ENVIRONMENT

WHAT IS THE BRIEF?

DONT FORGET MY LENSES.

INVITIATE THE PROJECT

WHAT IS THE CONTEXT?

WHAT DO I NEED TO RESEARCH? WHAT ARE MY KNOWLEDGE GAPS?

WHO DO I NEED TO TALK TO?

DO'S & DONTS

EXPERIENCE #52 EMOTION VS. AESTHETIC LENS.

STH.

FIND OUT...
"LAY THE FOUNDATION FOR RESEARCH"

BUILD RAPO

NEED TO UNDERSTAND THE USER EXPERIENCE

RESEARCH GUIDELINES.

LIMITATIONS

ETHICAL CONSIDERATIONS

A RESEARCH ADVOCATE?

VISION/INSPIRATION

PRACTICE/ RESEARCH GUIDELINES

PROBLEMS, NEEDS, WANTS.

CHARGE NURSE?

The initial stages of research were slow as I first focused on forming trusting relationships with the staff, in particular the staff members of chemotherapy day-stay. This person needed to 'be on the ground' to give insight into the chemotherapy process, current issues and clinical information.

Secondly I focused on setting the foundation of the project by scoping out the limitations, research, and ethical guidelines. I conducted expert interviews with an architect from STH, a clinical psychologist from oncology and a clinical charge nurse from oncology day-stay. These interviews helped identify the project vision, research scope, and explore the clinical and ethical requirements. I also gained valuable knowledge on how to practice research within the healthcare context.

Expert İnterview
Architect

Expert İnterview
Clinical Psychologist
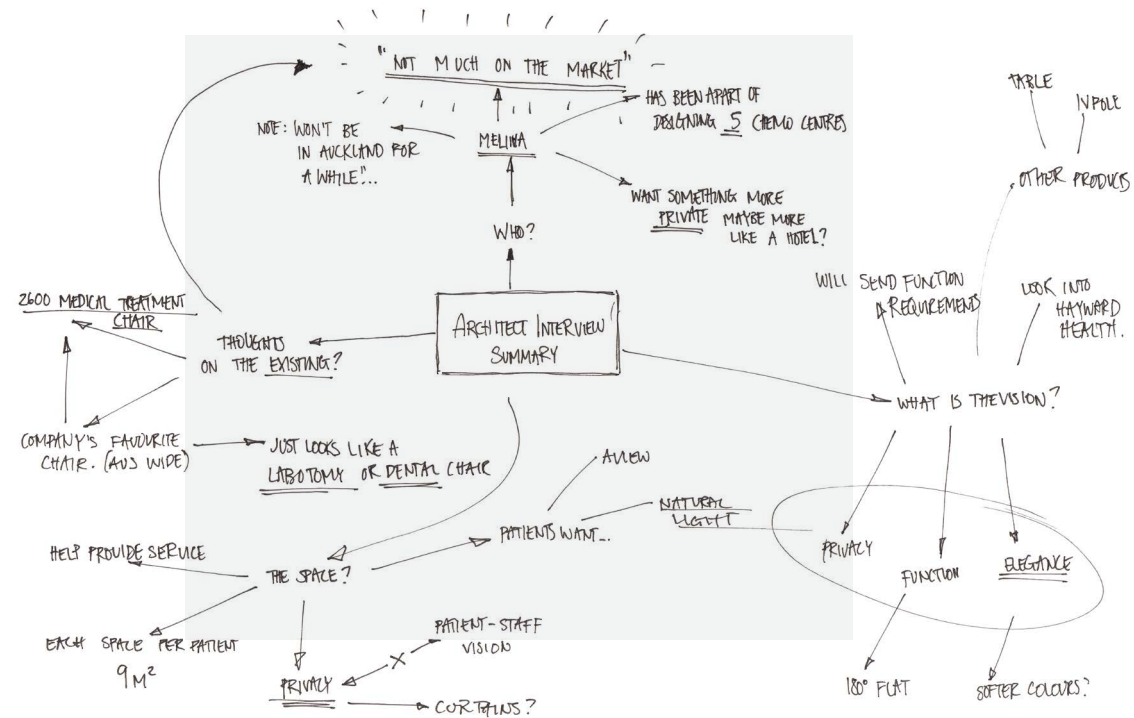
Architect

I conducted a semi-structured interview with the architect to find out the project vision, and details surrounding the use of the chair. They felt the aesthetic of clinical products let down the overall experience of clinical environments and wanted to focus on privacy, function, and elegant design. This interview helped establish the vision for the chair which consisted of a private-care style piece to fit within the designated 9m2 bays designed in the new spaces.

Clinical Psychologist

A semi-structured expert interview with the clinical psychologist was conducted to gain insight into the possible methods of research and ensure the research practice was within the ethical scope. The interview reinforced the emotional sensitivities of the research context and helped create research guidelines to ensure I was respectful, sensitive and used inclusive language.

WHAT IF A SICK PATIENT GETS STUCK?!?

I KEPT ALMOST HITTING MY HEAD!

VERY NARROW AND SHORT.

THE ELAVATORS BREAK DOWN ALOT!

THE "QUICK FIX" SPIRAL STAIRCASE

SOLUTION

EVEN I GOT STUCK ONCE!

FEELS LIKE PATIENTS GET Ø PRIVACY!

TREATMENT ROOMS ARE EXPOSED

$ VULNERABLE.

"ON DISPLAY"

DOWN STAIRS GARDEN HOLDS AND CREATES MOISTURE $ HUMIDITY.

CAUSE $ EFFECT BEST TO BRING AN UMBRELLA! THE CEILING LEAKS!

ALL THESE FLAWS MAKE ME FEEL ...

TURNS OUT IS A H$S ISSUE. → RELEASES FUNGAL SPORES.

Meet and Greet
Clinical Charge Nurse

Clinical Charge Nurse

I met with the charge nurse of oncology day-stay to introduce the project and we concluded the oncology space required an overhaul as they were dealing with a snowball effect of problem caused by the cramped, outdated space. This meeting created guidelines ensuring my ethical safety as a student within healthcare contexts was upheld. The busy workspace meant I could only interview the charge nurse between 0600-0700 hrs. This made the research difficult but I was grateful that a person under such pressure would give me this time.

My First Time

I have not had any personal experience within hospitals as a patient so every experience within Auckland city hospital was a rich learning opportunity. I sketched and noted the mood of the space to help me understand the patients emotional experience. This revealed existing design failures such as the leaking roof that created a drab, uncomfortable atmosphere. This was the opposite of what I anticipated as it did not leave good first impressions which is essential to creating good patient experiences.[146]
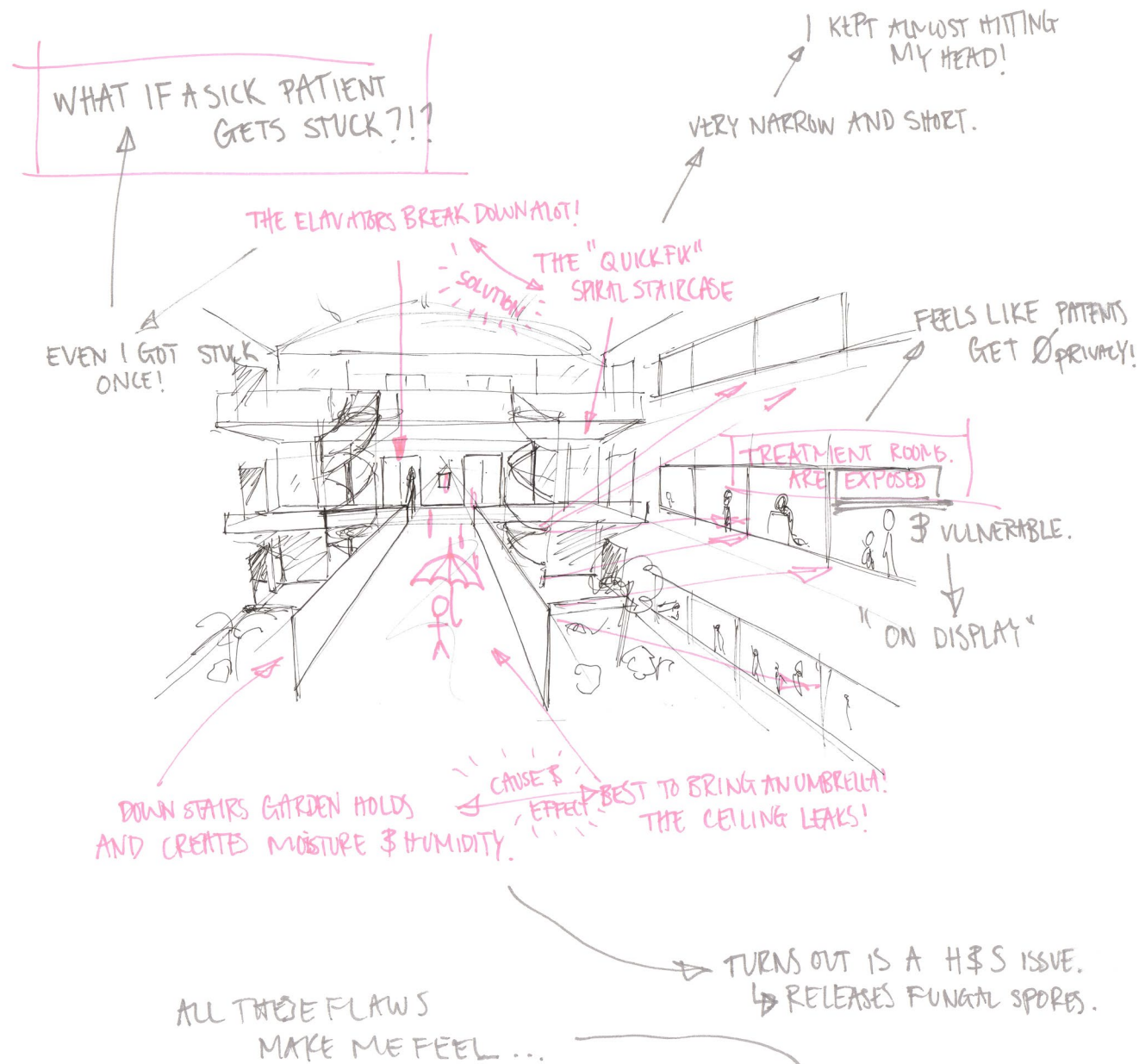
146 Peep Laja, "First Impressions Matter: The Importance of Great Visual Design," (2013), https://conversionxl.com/first-impressions-matter-the-importance-of-great-visual-design/.

THE SPACE FEELS...

LIKE ITS BEEN OUTGROWN

NOT UP TO DATE.

FEELS LIKE I CAN'T TRUST THE PLACE

LIKE THERE'S BEEN ALOT OF QUICK FIXES

RUN DOWN.

OLD

CONSISTENTLY FLAWED THROUGHOT.

INCONSISTENT WITH THE REST OF THE HOSPITAL.

BROKEN

VERY COLD IN THE MORNING

LIKE IT DESPERATELY NEEDS AN OVERHAUL

SUPER HOT IN THE SUN.

NOT CUTTING EDGE.

LOOKS/FEELS LIKE AN 1950'S ABANDONED MENTAL ASYLUM FROM A 80'S MOVIE.

WHERE IS THE PATIENT? FLAGSHIP MEDICAL/STERILE COLOURS FROM PRE-2000.

Reflection
Where is the Patient?

This cycle focused on methods which helped gain a sense of the mood within the space which was run down and in desperate need of repairs.

Locating the oncology centre was complex due to poor wayfinding both inside and outside of ADHB. IT is unjust that the patients are required to dodge cars before navigating a confusing system of hallways. From the moment I stepped through the dark sliding doors, it was clear there was little intimacy between the design of the space and the patients whom traffic it. It was clear I needed to consider the patient voice in my design process.[147]

147 Norman, Living with Complexity.

Handwritten annotations on sketch:
- LEAKY ROOF
- DRAFTY INSIDE.
- DIRTY. 80's STYLE BRICK
- MORE ROAD? THAN WALKWAY.
- COMPLETE LACK OF SIGNAGE
- FELT UNSAFWALKING.
- DARK AND DINGY
- MORE ORANGE BRICK.
- WHAT A TERRIBLE NAME
- BLOOD ?!
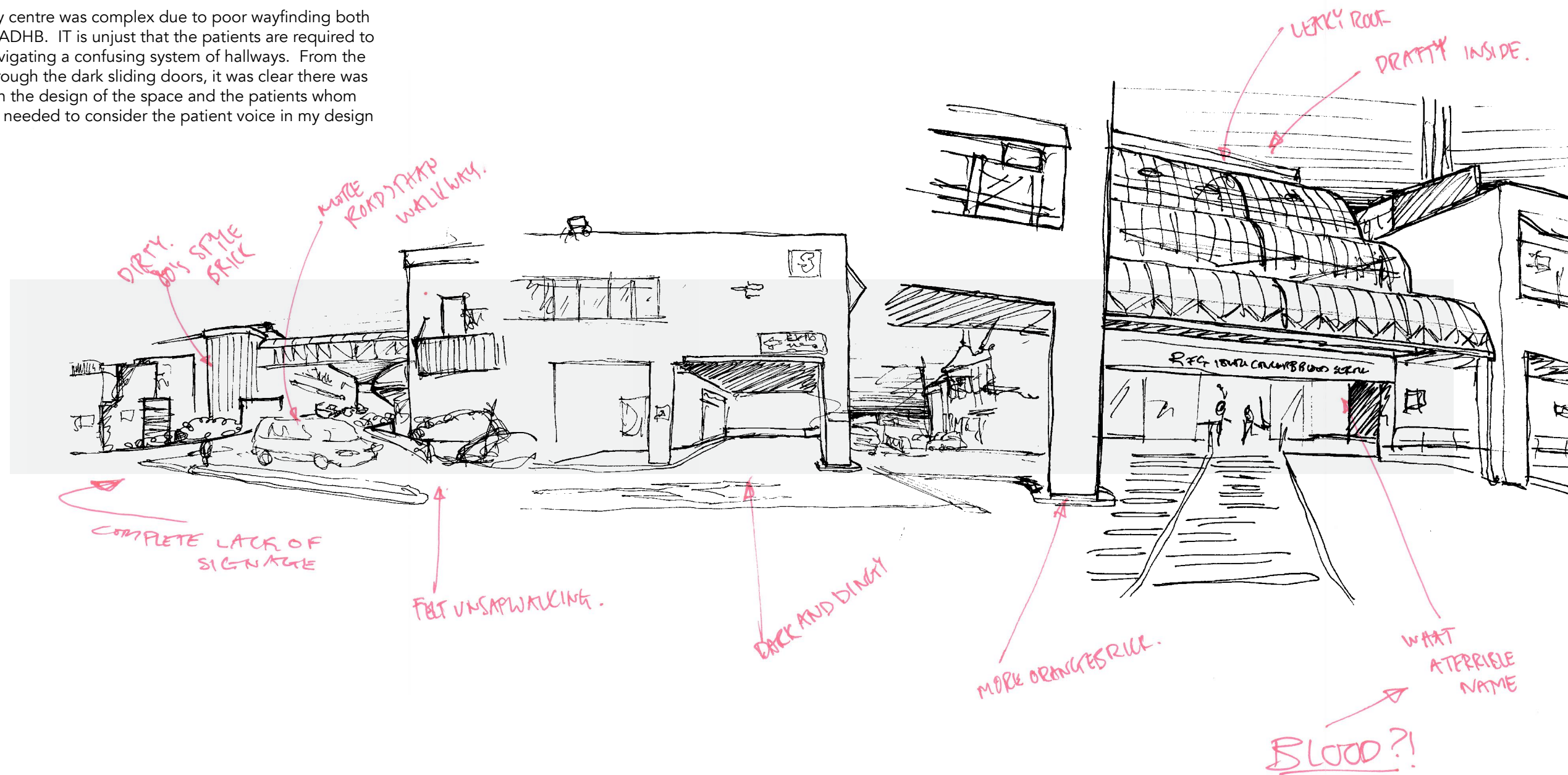
Cycle 3
Introduction to research for design.

3

148 Bruno, Surface: Matters of Aesthetics, Materiality, and Media.
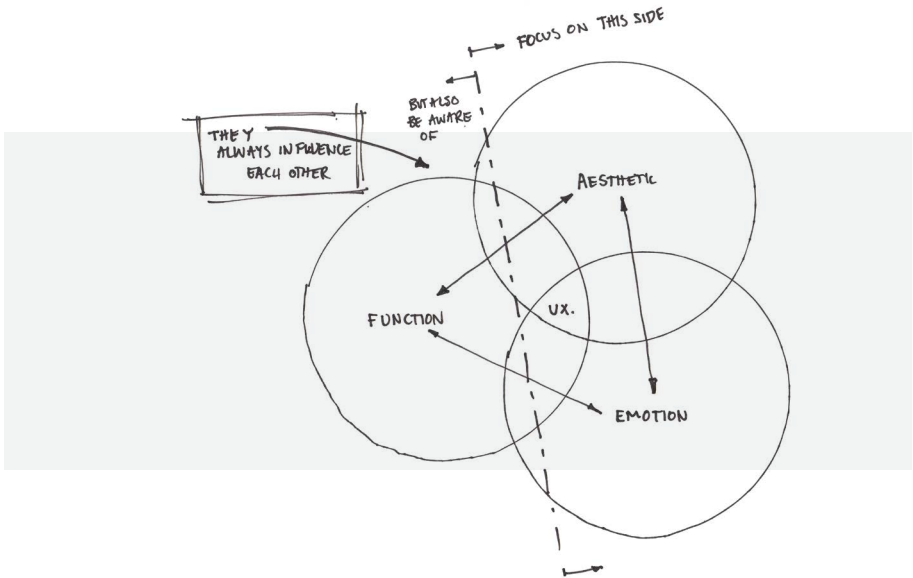
The aim of this cycle was to holistically understand the intricate system within oncology day-stay and gain empathy for the patient experience while enriching my understanding of the context and systems. This revealed some underlying problems which brought light to new issues that design could solve.

Research for design methods were used to understand the ecosystem of the environment, the emotional charge of the space and the aesthetic meaning of the space or products to the patients.[148]   This helped to understand the essence of the cancer or chemotherapy experience while building a foundation for the research design. Critical analysis of the experience, products and environment were conducted to understand the meaning of aesthetic experiences and the relationship between aesthetics and emotions.

Enironment Walk-Through
Enironment Walk-Through
First time experiences

I began to immerse myself within the chemotherapy environment to understand the patient journey, environment, the products, and the patient experience. The charge nurse showed me the products and facilities used by patients and staff and I began to notice the environment was cluttered, lacked space and privacy.

Here were my first impressions from my first visit…
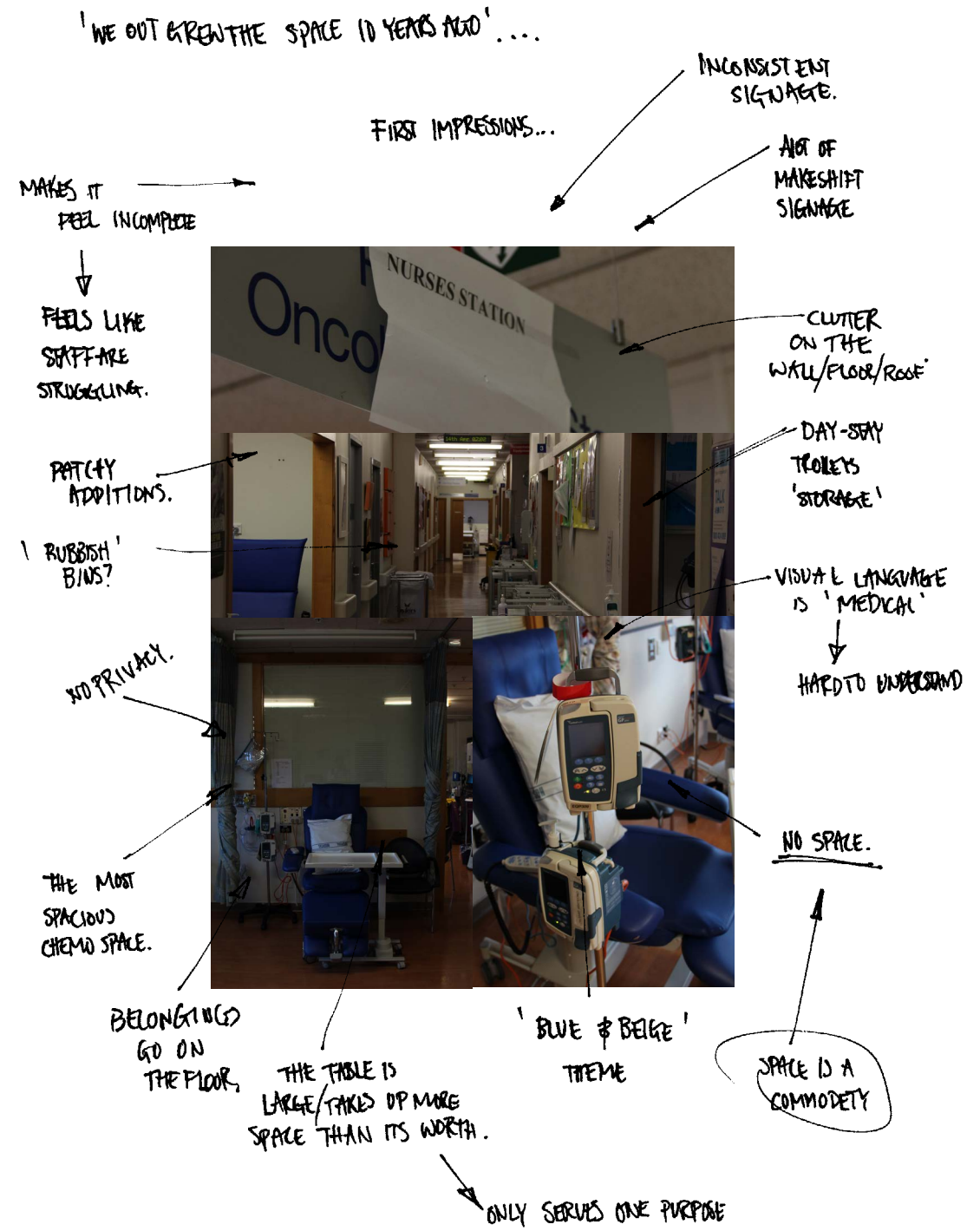
'WE OUTGREW THE SPACE 10 YEARS AGO'....

FIRST IMPRESSIONS...

INCONSISTENT SIGNAGE.

ALOT OF MAKESHIFT SIGNAGE

MAKES IT FEEL INCOMPLETE

FEELS LIKE STAFF ARE STRUGGLING.

CLUTTER ON THE WALL/FLOOR/ROOF

PATCHY ADDITIONS.

DAY-STAY TROLLEYS 'STORAGE'

'RUBBISH' BINS?

VISUAL LANGUAGE IS 'MEDICAL'

HARD TO UNDERSTAND

NO PRIVACY.

NO SPACE.

THE MOST SPACIOUS CHEMO SPACE.

BELONGINGS GO ON THE FLOOR,

THE TABLE IS LARGE/TAKES UP MORE SPACE THAN ITS WORTH.

'BLUE & BEIGE' THEME

SPACE IS A COMMODITY

ONLY SERVES ONE PURPOSE

Area Analysis

Mapping the Ecosystem of the Space
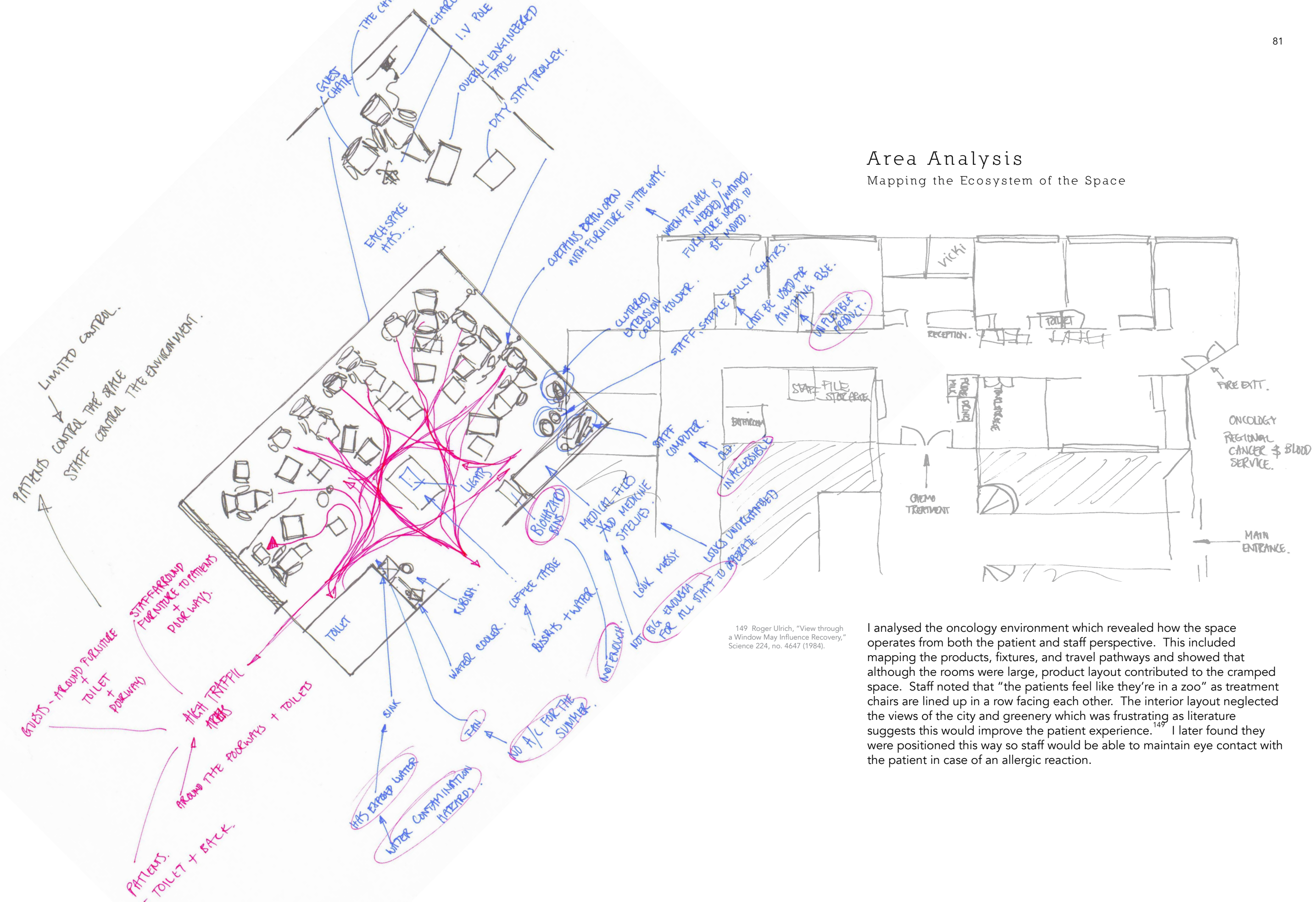
149 Roger Ulrich, "View through a Window May Influence Recovery," Science 224, no. 4647 (1984).

I analysed the oncology environment which revealed how the space operates from both the patient and staff perspective. This included mapping the products, fixtures, and travel pathways and showed that although the rooms were large, product layout contributed to the cramped space. Staff noted that "the patients feel like they're in a zoo" as treatment chairs are lined up in a row facing each other. The interior layout neglected the views of the city and greenery which was frustrating as literature suggests this would improve the patient experience.[149] I later found they were positioned this way so staff would be able to maintain eye contact with the patient in case of an allergic reaction.

CHAIRS

OBSTRUCTIONS/CLUTTER

FLOW

VIEW VIEW VIEW VIEW VIEW

ROOM 1 ROOM 2

VICKI.D OFFICE

MARGARET

ROOM 3 ROOM 4 ROOM 6

TOILET

EXIT

FAMILY ROOMS 1

FAMILY ROOM.

STAFF AREA.

FILE STORAGE

TEA COFFEE STORAGE CUPBOARDS.

ROOM 5

W.C

CHEMO DAY STAY BACK DOOR

HEAMOTOLOGY

CHEMO DAY STAY ENTRANCE

LIFT 1

LIFT 2

MAIN ENTRANCE
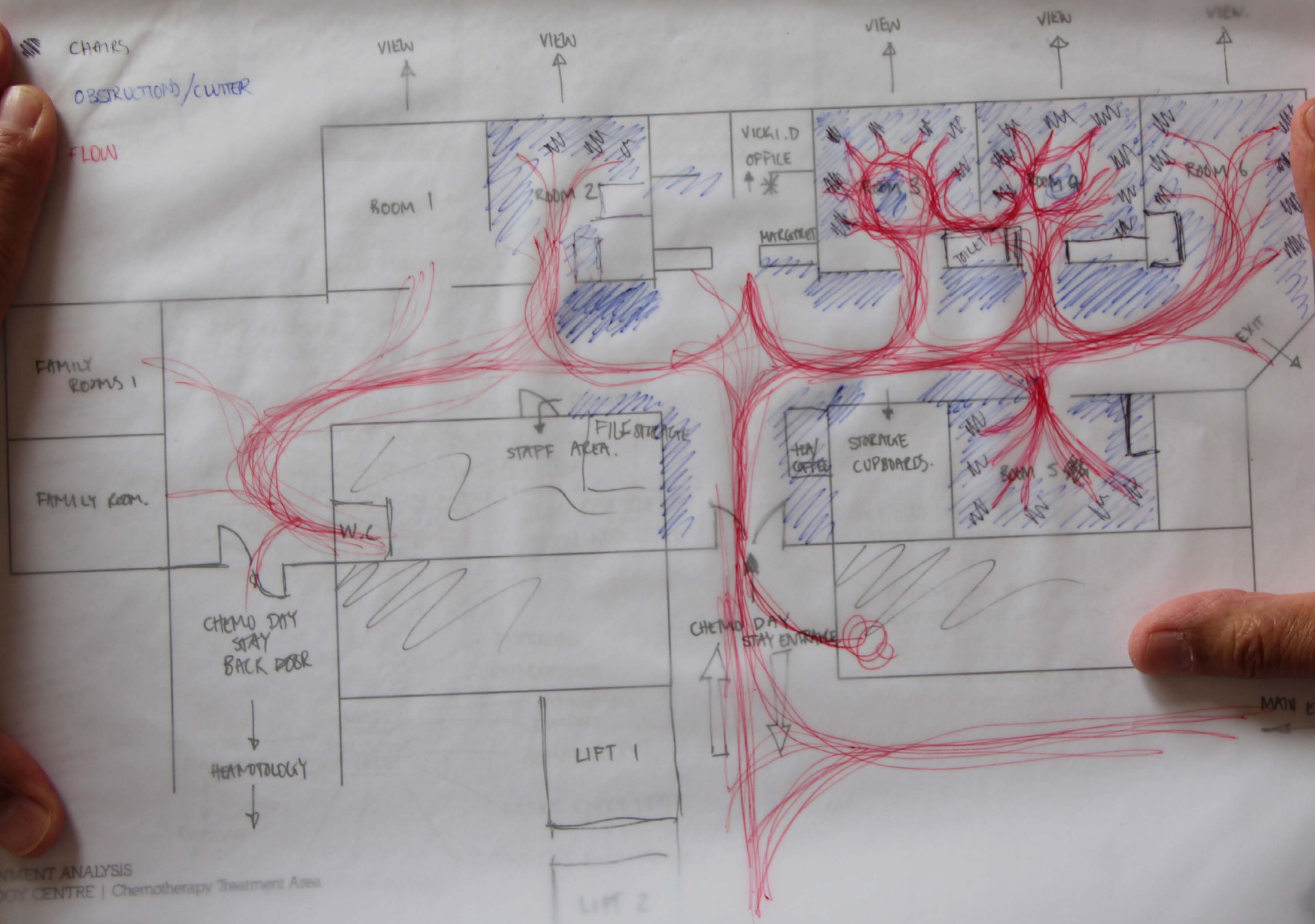
ENVIRONMENT ANALYSIS
ONCOLOGY CENTRE | Chemotherapy Treatment Area

Reflection
I feel like I'm missing something...

The insights gained through expert interviews, blog research, environment and product analysis revealed that chemotherapy treatment is a small part of the chemotherapy experience. Reflecting on this cycle, I found it easier to uncover the functional and aesthetic aspects context of design and how they contribute to user experience but I was yet to uncover the patient's emotional experiences. I felt that I still didn't have the empathy or emotional resonance to design an aesthetic for this chair so I needed to gain empathy of the emotional experiences from the patient, instead of basing design decisions off my assumptions.

4

Introduction to Generate
Knowledge, Assumptions, Gaps, and Counter Measures
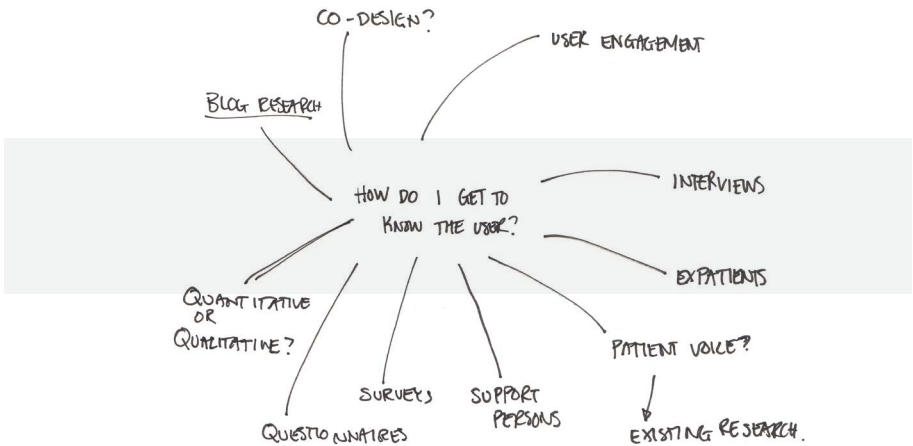
In this cycle I needed to engage the users to understand their functional and emotional experiences surrounding the use of the chair, however, patient engagement still was out of the ethical scope so I looked to other methods of learning about the patient experience and their needs. External reports and previous research were used to drive generative methods. A patient journey map, map of effects and map of needs were generated to gain empathy for the patient experience. This segued into a short phase of ideation, where a rapid-visualisation exercise was conducted.

Cancer Report
Integrated Cancer Service - User Engagement

150 Fisher Jr and Stenner, "Integrating Qualitative and Quantitative Research Approaches Via the Phenomenological Method."

DHW Lab staff were undertaking research to report on the current oncology experience within ADHB which used observations, focus groups, interviews with patients and guests, and feedback boards to gain insight into the patient experience of the physical space within the oncology outpatient facility. This report reviewed the current patient experience and explored opportunities to improve the experience. First hand, untampered quotes from the user gave great insight into how patients perceive the current oncology centre.[150]   As a person, not a designer, it became increasingly hard to comprehend the patients' situations and their day to day struggles. The patient voice revealed a strong need to holistically improve the oncology centre. Much more than I had anticipated.

The report identified key themes which would improve patient experience within the space. The themes include, a welcoming environment, a compassionate yet empowering environment, a nourishing environment, a culturally supportive environment, a family-friendly environment, and a flexible environment. While these points seem to look at the overall picture, the same ideas do translate into the artefacts within the space, as that is what makes up an environment. Looking through the data, I was able to code, and translate the data to apply to this research, and identify the "what this chair needs to be".

Left mind map (Key themes):

- SOCIAL
- PRIVACY
- ACOMODATE FOR DIFFERENT NEEDS
- FEEL COMFORTABLE
- FEEL AT HOME
- A FLEXIBLE ENVIRONMENT
- A WELCOMING ENVIRONMENT FOR PATIENTS, GUESTS, STAFF
- ACCESS TO INFORMATION
- FEEL CONFIDENT IN THE SERVICE.
- KEY THEMES TO IMPROVE THE SPACE
- A FAMILY-FRIENDLY ENVIRONMENT
- TO FEEL SAFE
- REASSURANCE
- RELAX AWAY FROM HOME
- A COMPASSIONATE, YET EMPOWERING ENVIRONMENT FOR PATIENTS / FAMILIES
- FEEL SUPPORTED
- FEEL IN CONTROL
- A CULTURALLY SUPPORTIVE SPACE
- WELCOMING OF ALL CULTURES
- HONOURS MAORI CULTURES
- A NOURISHING ENVIRONMENT
- TREATED WITH CARE AND KINDNESS
- INVOKE POSITIVITY
- RELAXATION
- HEALING

Right mind map (How the report translates):

- SOCIAL
- PRIVATE
- FAMILIARITY
- NEEDS TO BE AWARE OF THE SPECTRUM
- NEEDS TO CATER TO ALL NEEDS
- FEEL COMPY
- FEEL AT HOME
- FLEXIBLE
- WELCOMING
- CONFIDENT IN.
- FAMILY FRIENDLY
- HOW THE REPORT TRANSLATES... WHAT THE CHAIR NEEDS TO BE.
- NEEDS TO FEEL SAFE
- FEEL REASSURING
- FEEL LIKE YOU CAN RELAX AWAY FROM HOME
- COMPASSIONATE YET EMPOWERING
- CULTURALLY SUPPORTIVE
- NEEDS TO FEEL SUPPORTIVE
- WELCOMING TO ALL CULTURES.
- NOURISHING
- MAKE PATIENTS FEEL IN CONTROL
- NEEDS TO FEEL/INVOKE POSITIVITY
- FEEL LIKE A PLACE OF RELAXATION
- FEEL LIKE HEALING
- FEEL LIKE THEIR BEING CARED FOR
- WARM & HOMEY
- RESTORE NORMALCY & CONTROL

Translating the data

The insights gathered from the cancer report currently targeted the physical design of the facility. To make this information useful, I generated maps to translate the insights drawn from the cancer service report into key themes which would improve the patient experience. This helped create a list of words I could use to evaluate concepts against in future designs.

NO SIDE EFFECTS?

WHAT DOES CHEMO DO TO YOU?

CHANGES TO BONE MARROW

INCREASED POSSIBILITY OF INFECTION/ FEVER

EFFECTS ON BLOOD CELLS

DRY MOUTH

HAIR LOS

LOWERED LABIDO

SORE THROAT

NEASEA

LACK OF APPETITE

HEADACHE

OF ENTRATION

FATIGUE

PAIN

BOWEL CONTROL PROBLEMS

CHEMO BRAIN

VOMITING.

WEIGHT GAIN

BOWEL PROBLEMS

FORGETFUL

SKIN PROBLEMS EG. ITCHY

CONTRACEPTION IS A MUST. CHEMO CAN CAUSE BIRTH DEFECTS

PERIPHERAL NEUROPATHY

VAGINAL ITCH/BURN/DRY

SYMP OF MEND P

SEXUALITY IN MEN

MAY CAUSE INFERTILITY

PERIODS STOP OR BECOME LESS REGULAR
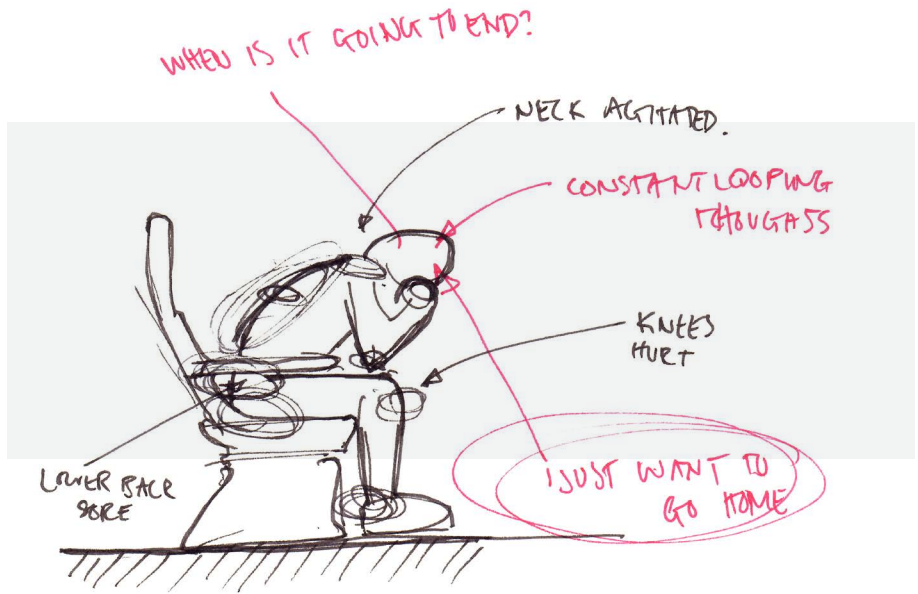
SEXUALITY IN WOMEN

LABIDO MAY DISAPPEAR

The Facts
Cancer Treatments and the Effects

I conducted an immersive role playing exercise and placed myself in a seated position for several hours to simulate the time spent during chemotherapy treatment. Prior to this, I mapped out the possible side effects of chemotherapy which outlined the effects of the drug during treatment which causes physical change, discomfort, or pain which is potentially overwhelming for the patient. During my time on an airplane seat, I began to feel nauseous, and dizzy so I took advantage of the situation and used the time to simulate the chemotherapy experience. This method gave great insight into the discomforts and pain experienced by the patient, however, I felt that the physical effects were covered in the layer of emotional side effects.
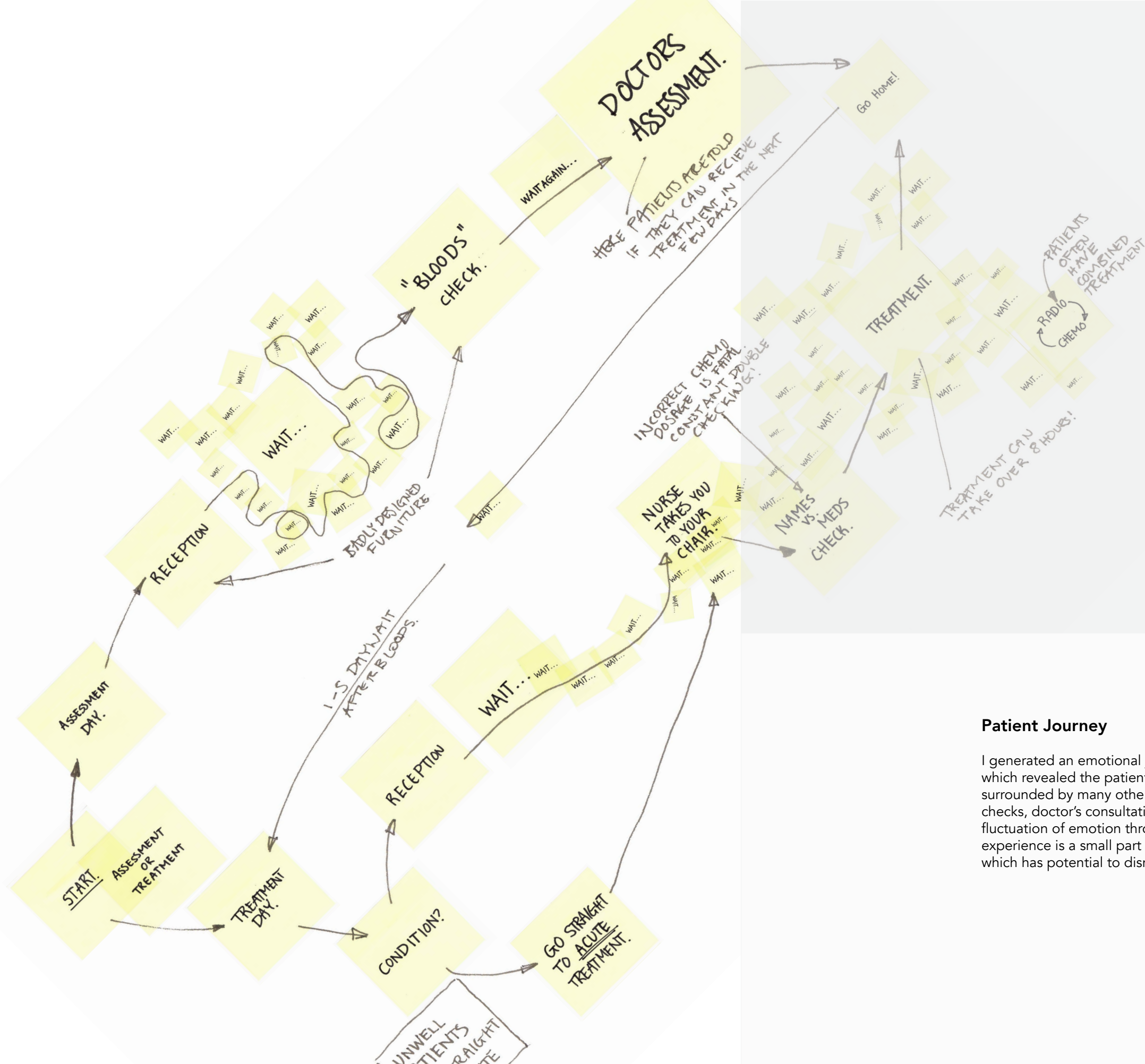
Patient Journey

I generated an emotional journey map of the chemotherapy experience which revealed the patient's emotional experiences. Chemotherapy is surrounded by many other administrative processes which require blood checks, doctor's consultations, and waiting which caused a constant fluctuation of emotion throughout the journey. I felt the chemotherapy experience is a small part within the larger cancer treatment experience which has potential to disrupt lifestyles and routines.

Ideation
Post-it Ideation

RAPID VIZ PLAN. ⟶ BRAIN STORMS

POST-IT. ⟶ 40 RAPID

ROUGH 3D SKETCH ⟶ 10 STRONGEST
OF BETTER
IDEAS

'MORE REFINED' 3D ⟶ 3 THEMES.
SKETCH WITH
SUPPORTING
DRAWINGS.

POST-IT. ⟶ 40   40   40

'ROUGH MODELS' ⟶ 10   10   10

'REFINED ⟶ 3 CONCEPTS   3 CONCEPTS   3 CONCEPTS
MODELS'
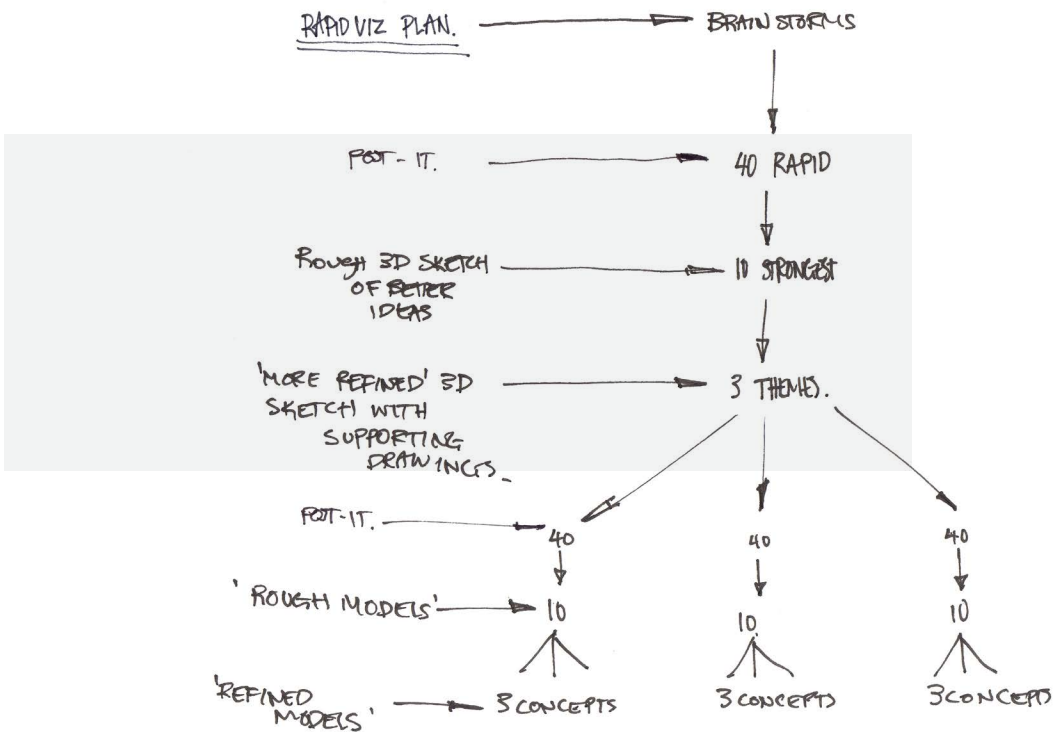
Using the rapid-visualisation exercise I generated and evaluated ideas to produce several concepts. I generated ideas to reflect on the needs of the patient identified in the cancer service report. The initial plan to generate forty ideas proved difficult as the ideas responded to larger notions like family centeredness instead of functional needs. Evaluation revealed three concepts which embodied compassionate care and systematic improvement.

Concept 1

This first concept took a pragmatic approach and responded to the lack of space. It looked to change the footprint of the chair's varying positions which in turn influenced the product interaction. I began to question what the chair's life was like within the space on a day to day basis.
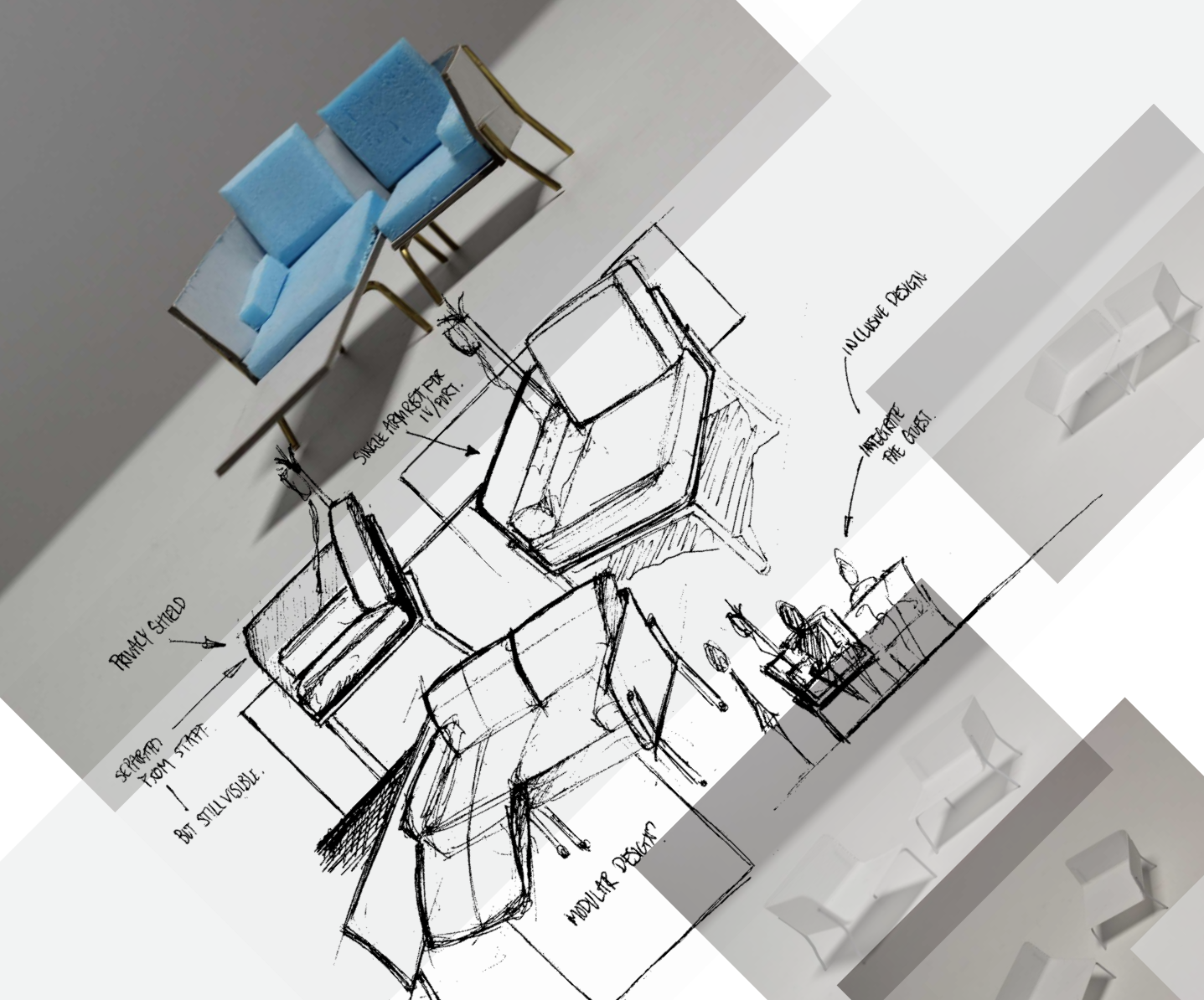
Concept 2

Concept two focused on promoting companionship between patients and guests by creating a modular that would allow guests to be inclusively positioned within the space, breaking any hierarchies between patient and guest. For privacy, the shape creates a space for patients and guests to make their own during treatment.
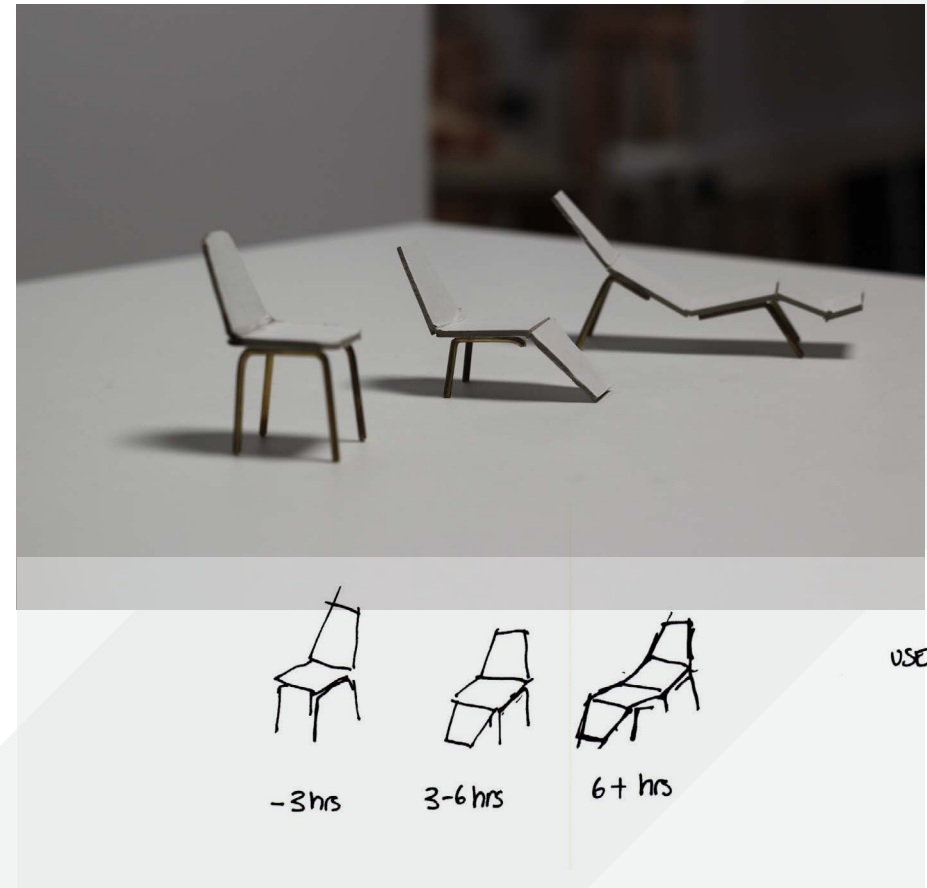
Concept 3

Concept three dealt with 'dose banding' chemotherapy chairs by creating different treatment chairs to suit varying treatment lengths. This combated the vast spectrum of needs which are treatment length specific which could create a more personal experience. This concept seemed logical, however, this banding system was not flexible and would not be effective in a working environment.

Reflection

The rapid 40 --> Sketch ideate

Handwritten diagram text:

IT FELT INEFFICIENT

WHAT WAS WRONG WITH THIS CYCLE

RESEARCH WAS GOOD

HOWEVER DID HAVE ONE GOOD CONCEPT.

BUT DIDNT TIE IN TO DESIGN AS BEST AS IT COULD HAVE

GENERATION

LOOKED ALOT AT...

FORM EMOTION AESTHETIC

SPECTRUM

FUNCTION

NEED TO LOOK AT.

EMOTIONAL RESONANCE

AESTHETICS

THEIR OWN SPACE

COMFORT/NURTURING

HOW IT WORKS

PROVISION OF SAFETY

FUNCTION

UX.

PROVIDES SAFETY

MEETS HEALTH & SAFETY REQUIREMENTS

PROVIDES CONTROL

PROVIDES PRIVACY

EMOTION

PROVIDES COMPANIONSHIP

MEETS THE NEEDS OF STANDARD NURSING PROCEDURE

GOES UP & DOWN

Initial research generated valuable findings and insights, however, this did not project well through ideation due to a lack of clarity of the experience I was generating. The concepts generated took a functional outlook, blanketed with a visual aesthetic but didn't explore the relationship between aesthetics and emotion. They had potential to encompass companionship, family centeredness, and empowerment but presented practicality issues. From the design process redirected to theory driven form.

5

Sketch İdeate
Visual Connotation

Having concluded that the design practice had not efficiently yield any great result, I realised I needed to give form to a design before applying function to it. I needed to create a form which encompassed the essence of the chemotherapy experience to provide the flexibility, support, and care patients needed. Freeform sketches allowed creativity to flow, starting as loose sketches and progressing into more defined drawings.   These sketches helped progress my ideas into 3d models.
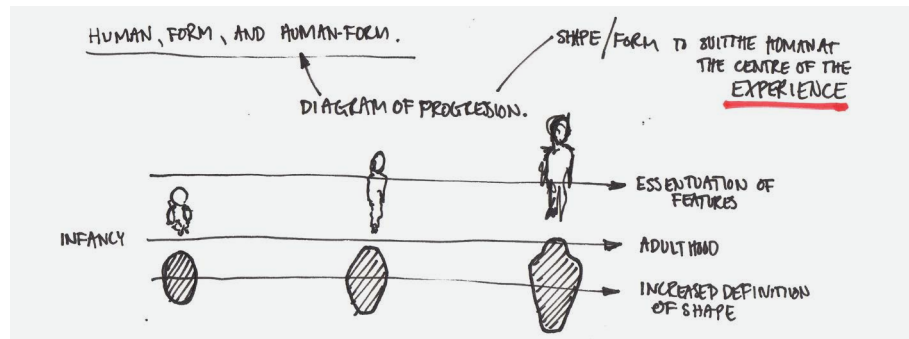
Form and the analogy of shape

Each of these freeform sketches portrayed different visceral messages.[151] Rounded shapes projected a sense of nurturing and comfort, whereas more defined shapes conveyed a sense of maturity.

151 Hjelm, Semiotics in Product Design.

Visual Weight

I drew three visual themes from sketches which included; light, medium and heavy visual weights plus differing connotations to personal memories, feelings and emotions.[152] Peer review revealed that heavy and light forms stimulated a grounded feeling and familiarity of home, while the medium weighted drawings were more connotative of industry, office or medical furniture.

152 Richard E Lombardi, "The Principles of Visual Perception and Their Clinical Application to Denture Esthetics," The Journal of prosthetic dentistry 29, no. 4 (1973).

Card Exploration
The Rapid 40

I then generated forty different form studies which grew in refinement as ideas were developed and helped to probe my thinking. There was one shape which really stood out to me, which also happened to be the simplest. The asymmetry of the shape provided a sense of nurturing. This was a very rigid shape with little room to move or recline however the softness of the shape makes for a much more inviting and relaxing visual experience.

Reflection

Forcing it to work.
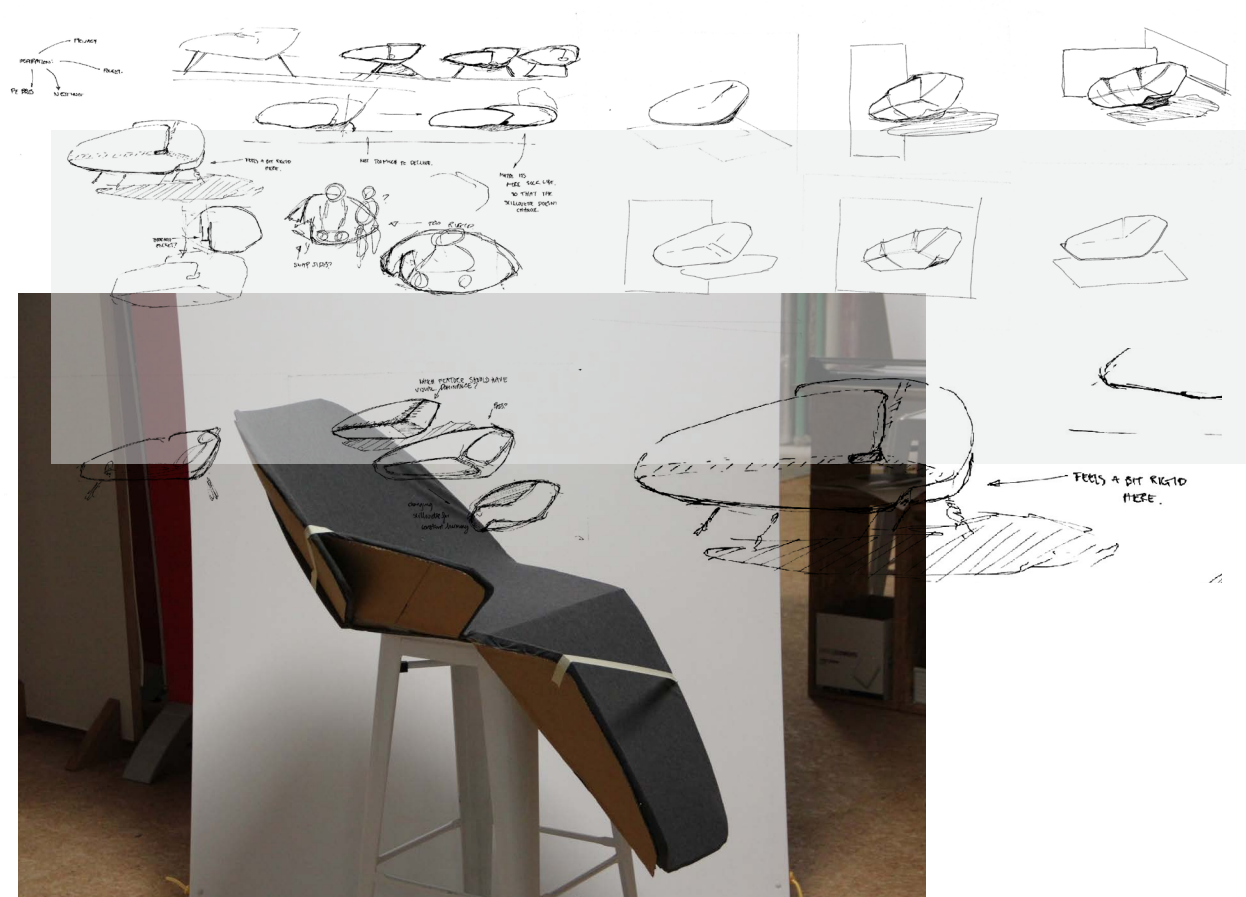
This cycle started well and yielded interesting insights with sketch, however the prototyping did not gain the same result. I felt I needed to ground the prototyping with some more facts, figures and requirements to constrain the design practice.[153] This Model felt like the form was forced to function as a recliner chair, losing its original beauty and simplicity the initial card model had. At this point the prototyping needed some clear dimensions to work with in order to ground the prototypes to a realistic scale and proportion.

153 William Lidwell, Kritina Holden, and Jill Butler, Universal Principles of Design, Revised and Updated: 125 Ways to Enhance Usability, Influence Perception, Increase Appeal, Make Better Design Decisions, and Teach through Design (Rockport Pub, 2010).

6

The Types of Chairs
Chair Design and Purpose
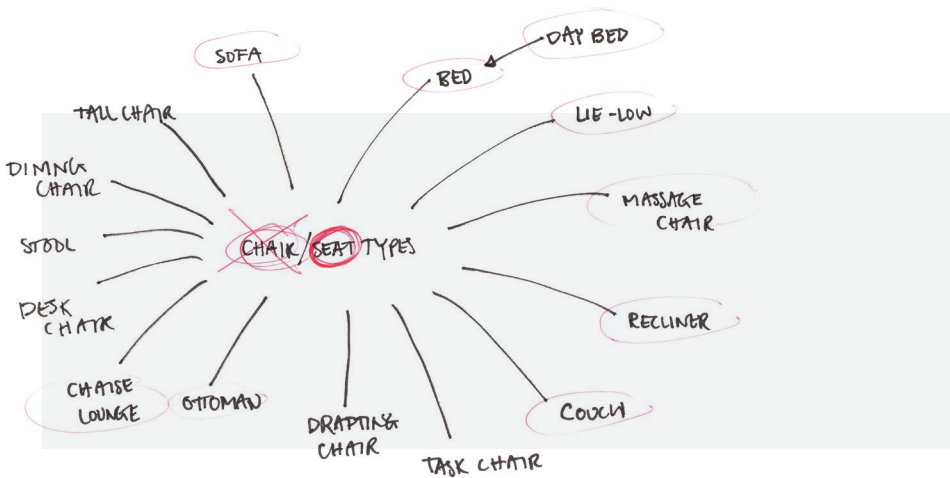
During this cycle I wanted to be sure prototyping was not misguided by the label 'chair' as the design should encompass the functions of a recliner seat. I first generated a map that identified different types of seats and highlighted seat types that would suit chemotherapy treatment. Deciding that a recliner suited the needs of patients best helped to bring movement parameters, dimensions and functional limitations to the prototyping.[154]

154 Ibid.

Reflection

155 Dara Sorkin, Karen S Rook, and John L Lu, "Loneliness, Lack of Emotional Support, Lack of Companionship, and the Likelihood of Having a Heart Condition in an Elderly Sample," Annals of Behavioral Medicine 24, no. 4 (2002).

Drawing and analysis revealed why certain forms felt comforting, inviting or soft. This shape is whole, unintimidating and inviting but more importantly it was a surface which felt like It could envelope and support a patient while being inclusive of the guest. By being inclusive of the guest during treatment could potentially remedy feelings of isolation and loneliness.[155]

Aesthetic Experiences
Continuous Form and Cohesive Design

FORM

LEGS

LIE-DOWN POSITION
$
SHOCK POSITION

PARTS TO DESIGN

PROBLEMS TO SOLVE

STORAGE

TABLE

GUEST
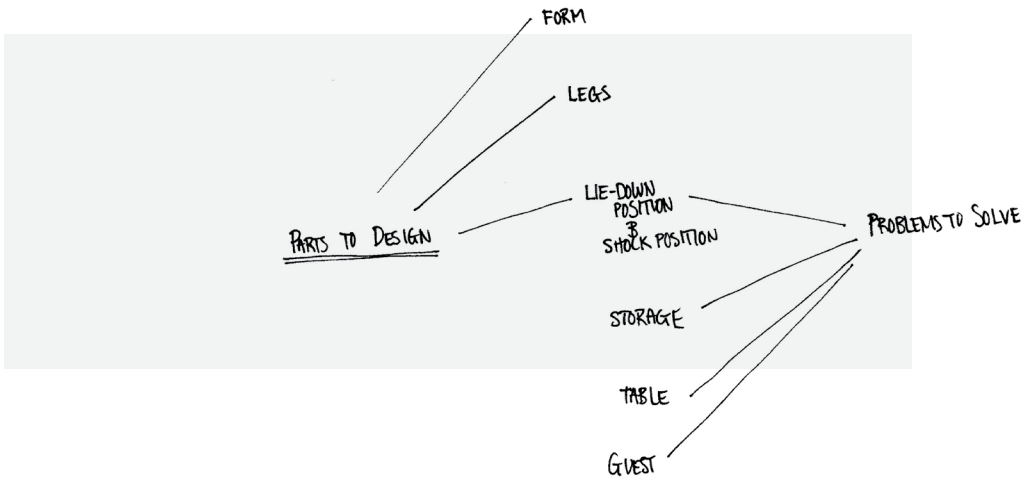
Here prototypes began to respond to the functional requirements of a treatment chair. The models made progressively became more defined however kept the logic of including; a leg rest, seat, and back rest.[156] These card models started with rough card models, and progressed to 'upholstered models. As the models progressed they moved away from asymmetrical forms as they were difficult to make aesthetically pleasing.

156 Parsons, Thinking: Objects: Contemporary Approaches to Product Design.
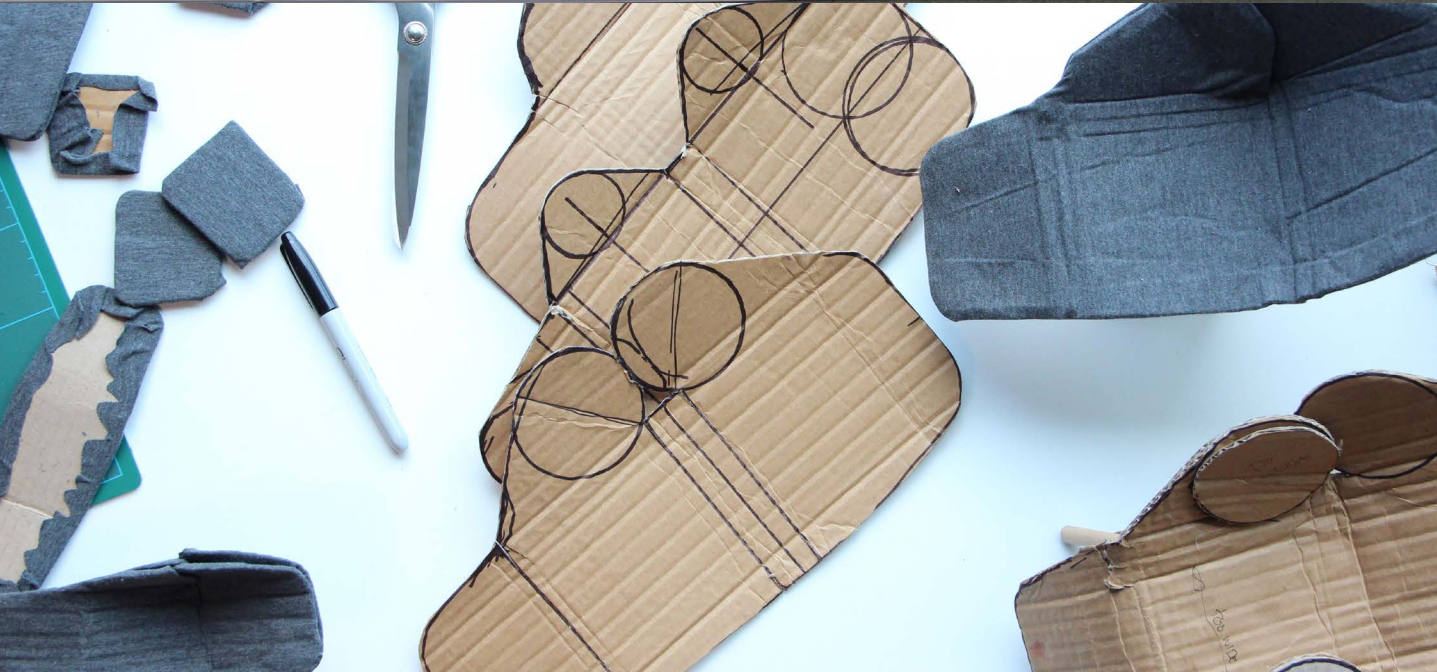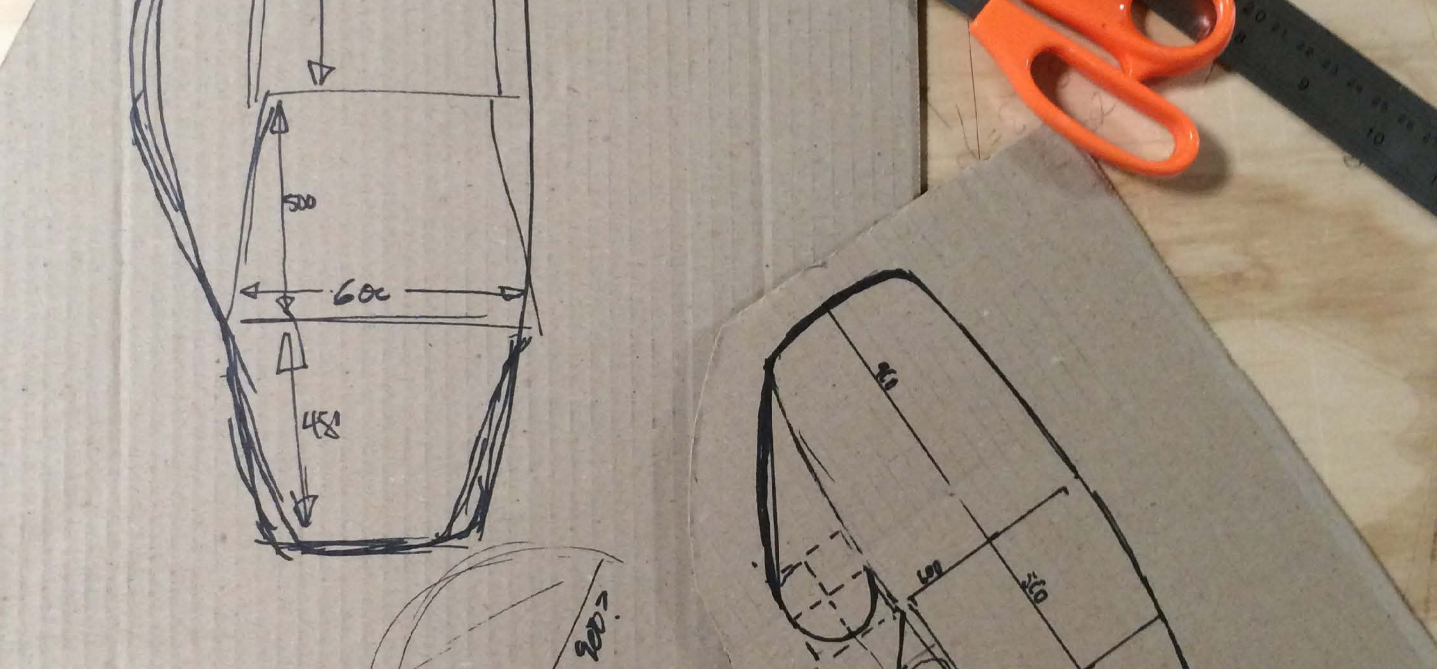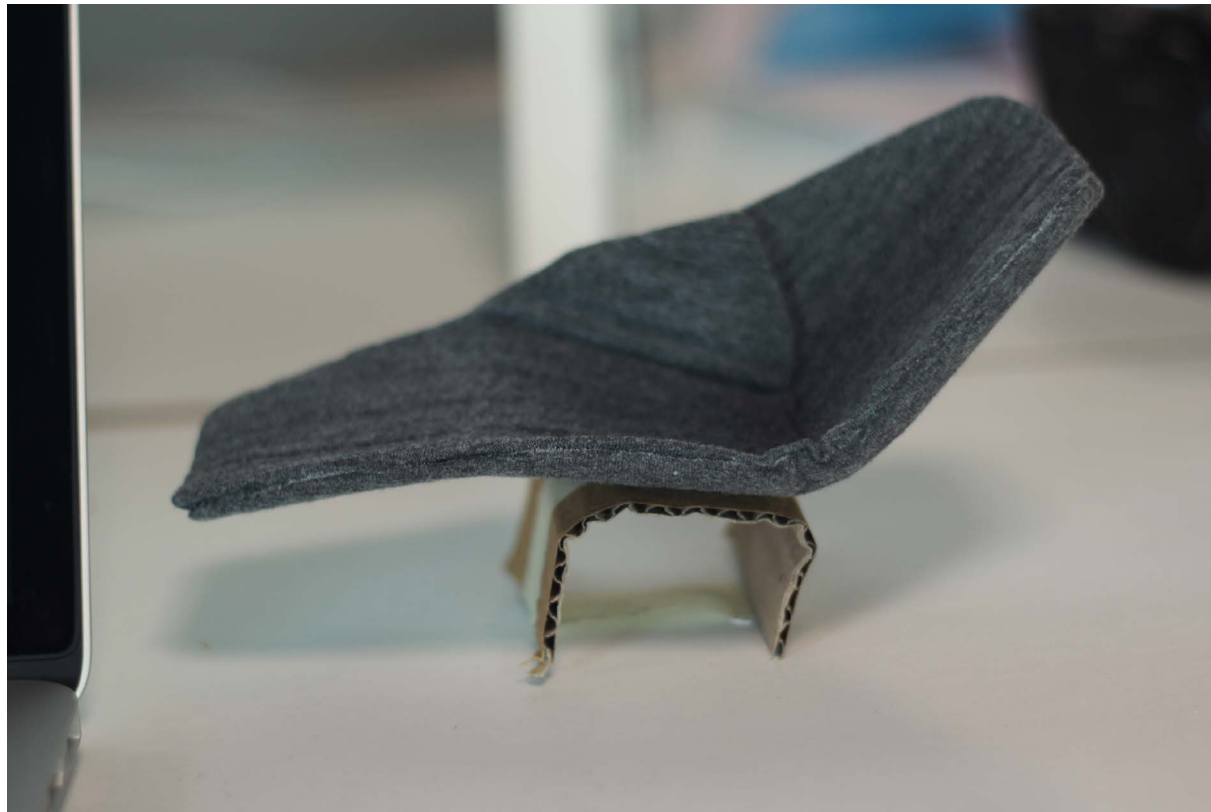
Prototyping

Through this prototyping medium I was able to create shapes and contours which had more curvature. This was something I had struggled with before but I used rudimentary upholstering to bring a level of materiality into the process which helped to visualise concepts better, however I felt I was missing the thickness of foam.[157]

157 Neri Oxman, "Structuring Materiality: Design Fabrication of Heterogeneous Materials," Architectural Design 80, no. 4 (2010).

Reflection
'Still missing the Zing'

158 Lidwell, Holden, and Butler, Universal Principles of Design, Revised and Updated: 125 Ways to Enhance Usability, Influence Perception, Increase Appeal, Make Better Design Decisions, and Teach through Design.

Reviewing the work thus far, I felt that I had pushed asymmetrical designs as far as possible and a meeting with two nurses helped to confirm that asymmetry was not the answer. Symmetrical shapes are simpler and can help convey balance, harmony, and stability.[158]   The nurses exposed the flaws of an asymmetrical design and the problems it would pose for staff which created more design constraints. At this stage, I felt that the designs made so far were not true to the needs of the patient. The designs needed to respond to insights drawn from the user and their experiences, not from my assumptions.
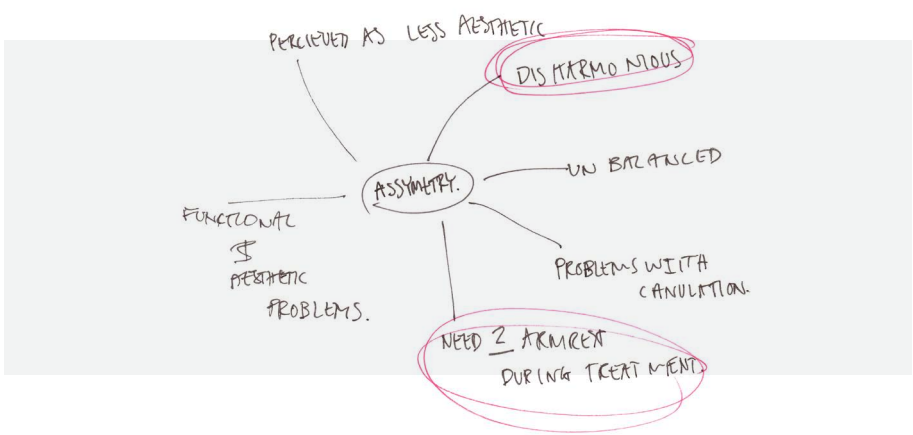
7

Patient Questionnaires
Visually engaging Questionnaires
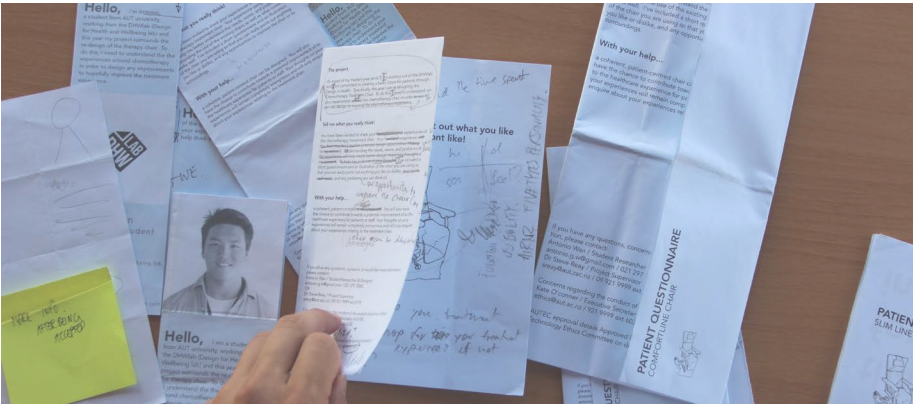
Intro

At this stage in the process, I still didn't feel like I understood the patient experience. To address this problem, I created a questionnaire asking patients about their experiences. In previous experience, questionnaires did not yield quality results and in the numbers I needed. To address this problem, I designed a visually engaging questionnaire.[159]

Designing a new Questionnaire

I visually engaging questionnaire was designed to help understand the patient opinion on their; needs, wants, activities, problems and aesthetic value. This questionnaire went through several cycles of review with peers and AUTEC for approval, to ensure the written language was friendly and inviting.

QUESTIONNAIRE

If you wish to participate in this research, please complete the survey, and leave it in the supplied box to be collected. By completing this anonymous questionnaire you consent to participating in this research.

If words cant explain or show what you mean, feel free to draw and make notes on your thoughts of the chair!

1. What do you do during your treatment? is there anything you would like to do that you can't now?

2. Are there any specific problems or issues to do with the current chair's function?

3. If you could change, add or take away something from the current design, what is it and why?

4. What works well about the current chair and what doesn't?

5. How might a well designed chair and or environment improve your treatment experience?

6. What does the current aesthetic (look/style) of the chair make you feel? Is it appropriate for the treatment experience? If not what do you think would be more appropriate?

Thanks for your time!

...y think!

...your experiences of the
...r. Your experience using
...nderstand the needs, wants,
...use of the existing chairs
...s well. I've included a short
...on of the chair you are using so
...anything you like or dislike, and
...he chair or its surroundings.

...air can be designed. You
...ntribute towards a potential
...are experience for patients
...experiences will remain
...ll only enquire about your
...tment chair.

...u like or dont like!

PATIENT QUESTIONNAIRE
COMFORTLINE CHAIR

Rooms 2, 3, & 4

Hello, I'm Antonio, a student from AUT university, working from the Design for Health and Wellbeing lab, and this year I am re-designing the therapy chair. To do this, I need to understand your chemotherapy treatment experiences to improve the treatment experience.

Antonio Wan
AUT Master of Art & Design Student

antonio.g.w@gmail.com
021 297 3063

DHW LAB

PATIENT QUESTIONNAIRE
SLIM LINE CHAIR

Rooms 5 & 6

---

thank you

the chair will help me better understand the needs, wants, and problems surrounding the use of the existing chairs as well as what currently works well. I've included a short questionnaire and an illustration of the chair you are using so that you can really point out anything you like or dislike, and any opportunities to improve the chair or its surroundings.

With your help...

a coherent, patient-centred chair can be designed. You will also have the chance to contribute towards a potential improvement of to the healthcare experience for patients or staff. Your thoughts on your experiences will remain completely anonymous and will only enquire about your experiences relating to the treatment chair.

Point out what you like or dont like!

ALSO FOOT
REST (ADJUSTABLE
AS DESCRIBED
ON PICTURE.

ADD HOOK HERE SO
CAN HANG BAG OR
CLOTHING

HEIGHT OF SEAT
SHOULD NOT CHANGE
DESPITE MAKING BASE
(RE WHEELS) HIGHER

BASE OF CHAIR
HIGHER OFF GROUND
SO HOSPITAL WHEELED
TRAY CAN FIT UNDER
FRAME SO TRAY CAN BE
CLOSER TO PATIENT

MAYBE
ADJUSTABLE FOOT
REST ADDED TO
CHAIR

SAME COMMENT APPLIES
TO RAISED HEIGHT OF
CHAIR BASE AT ENABLING
IV POLE BASE TO BE
CLOSER TO PATIENT CHAIR
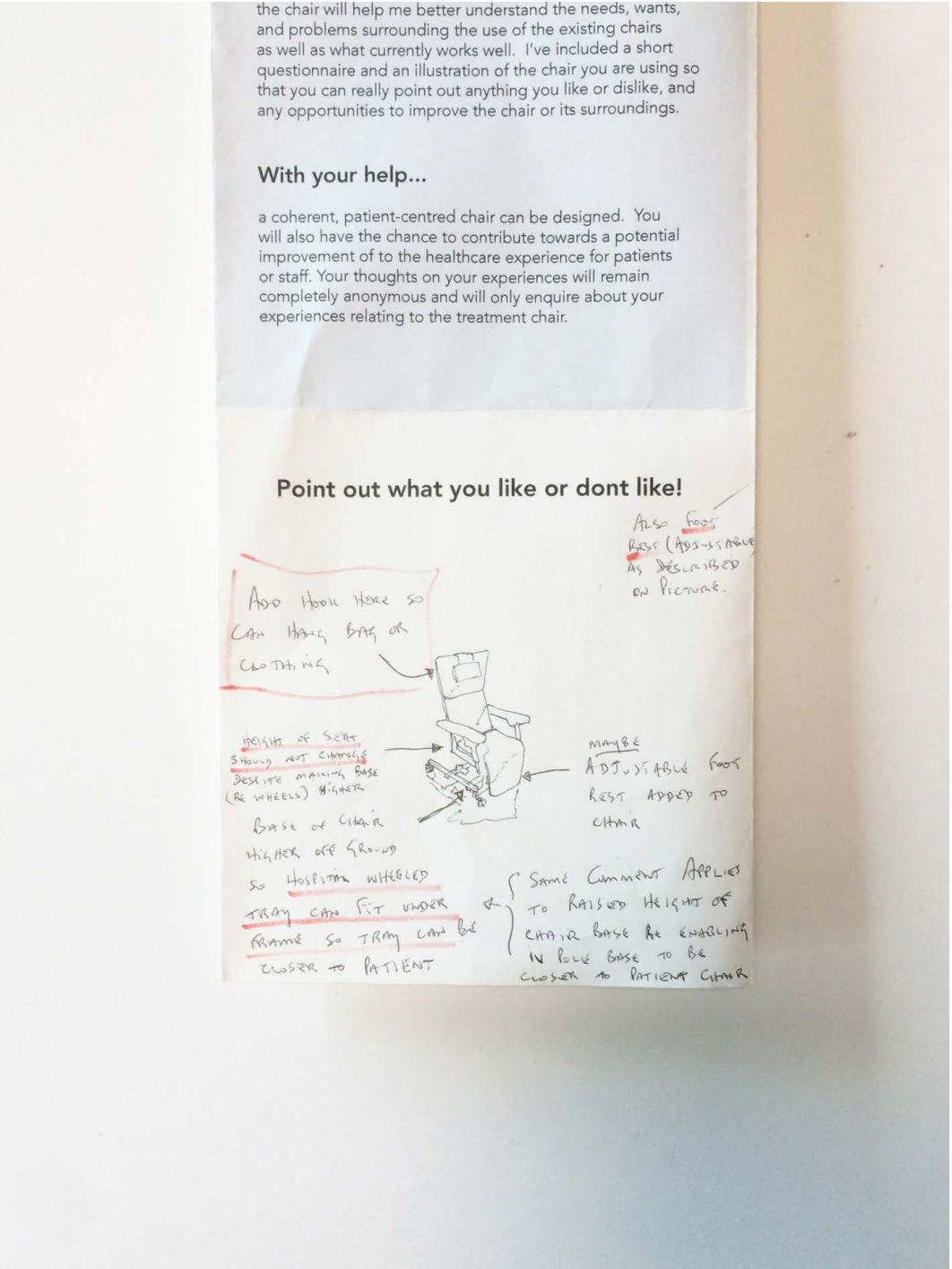
Summary
What happenned.

160 Ibid.

Based on previous experience in the DHW Lab I predicted it would take two weeks for 25-30 questionnaires to be completed. Questionnaires were considered a slow and ineffective research method, however, thanks to the help of oncology staff nearly forty questionnaires were completed by the end of the second day. The design's visual probe proved successful as several of the questionnaires were answered purely with drawn or annotated responses.[160] The feedback often highlighted functional problems patients experienced with the current chairs and often suggested different ways of solving the problems.

Feedback or Fiction

Within the feedback certain written cues stood out to me. The cues being... "the patient this..." or "the patients that...". This lead me to believe a few of the questionnaires were completed by the staff or guest persons as it took a functional, work environment orientated perspective.[161] Reflecting on the questionnaire design, I realized that the questionnaire neglected the voice of the guest. The guest is the primary source of companionship for the patient and could have given great insight into wider chemotherapy experience.

161 Sanders and Stappers, Convivial Design Toolbox: Generative Research for the Front End of Design.

Aesthetics

Reviewing the data gathered on the patient perspective of aesthetics, I found that there was little feedback on aesthetics. There was even less feedback on their feelings or emotional experiences. This could have been because people aren't often asked to share opinions on the aesthetic or emotional which potentially could have made the questions difficult to respond to. The patients who did give feedback on aesthetics revealed their opinion on the current aesthetic of the chair and suggested aesthetic improvements that could improve their experiences.

What do patients like to do?

Reviewing the feedback on the activities patients liked to during treatment allowed me to map the activities on a spectrum between private and social behaviors. Most patients displayed a mix of private and social behaviors. This could have a relationship with the duration of the treatment.

What's good now?

There was little feedback on what patients thought was currently acceptable or good. Most of these points were contradictive as many patients viewed them as problems instead of good features. Comparing feedback on "the good" and "the problems" it was clear that there are far more problems than successes within the current design.

Problems and Causes

Here, patient feedback focused on identifying problems with the current chair presented several themes design flaws of the existing design which made the chair unintuitive to use. This is because the chair is highly engineered which gave little consideration to ergonomics and usability. The chair's design failures created unhealthy interactions between products of the oncology space. This effected the experience of the chair and the surrounding products.

Needs and Wants

I mapped the needs and wants which responded to problems identified by patients. There were three reoccurring themes which the needs/wants related to. Firstly, suggestions on how the environment could improve to suit the needs of the patient. Secondly, the general physical experience of the chemotherapy chair. And finally, suggestions which related to accessories for a chemotherapy chair design.
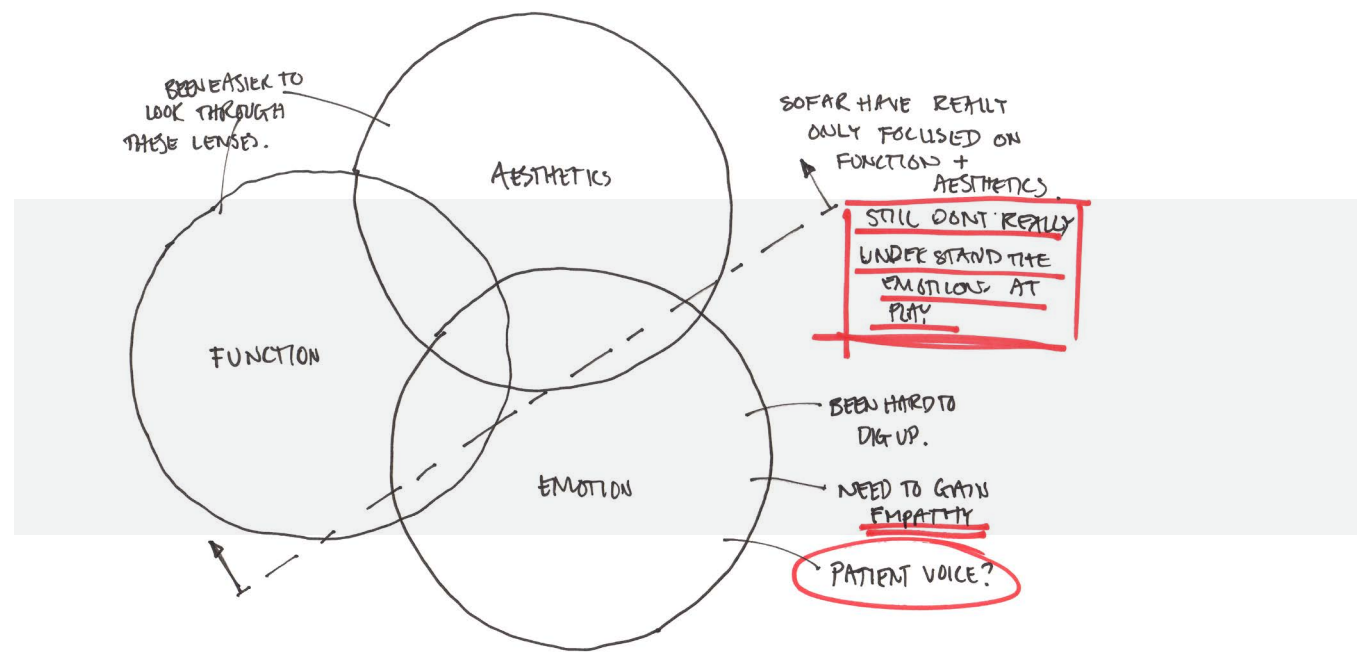
Reflection
Resetting the foundation

This cycle of research debunked the myth within the DHW Lab that 'questionnaires don't work' and proved that a visually engaging questionnaire yielded more meaningful feedback. Feedback revealed problems and suggestions on the chair's function and usability, however, there was little feedback on aesthetics and emotions. It became clear that people found it difficult to engage aesthetics as a topic however the patients who understood aesthetics and emotion contributed valuable, informative and insightful feedback on their aesthetic and emotional needs. This feedback could inform a next design phase, and would allow designs to answer the aesthetic needs of the user however, I still felt weary of not empathizing with the emotional experience.

8

The Plan
Generation from Locution
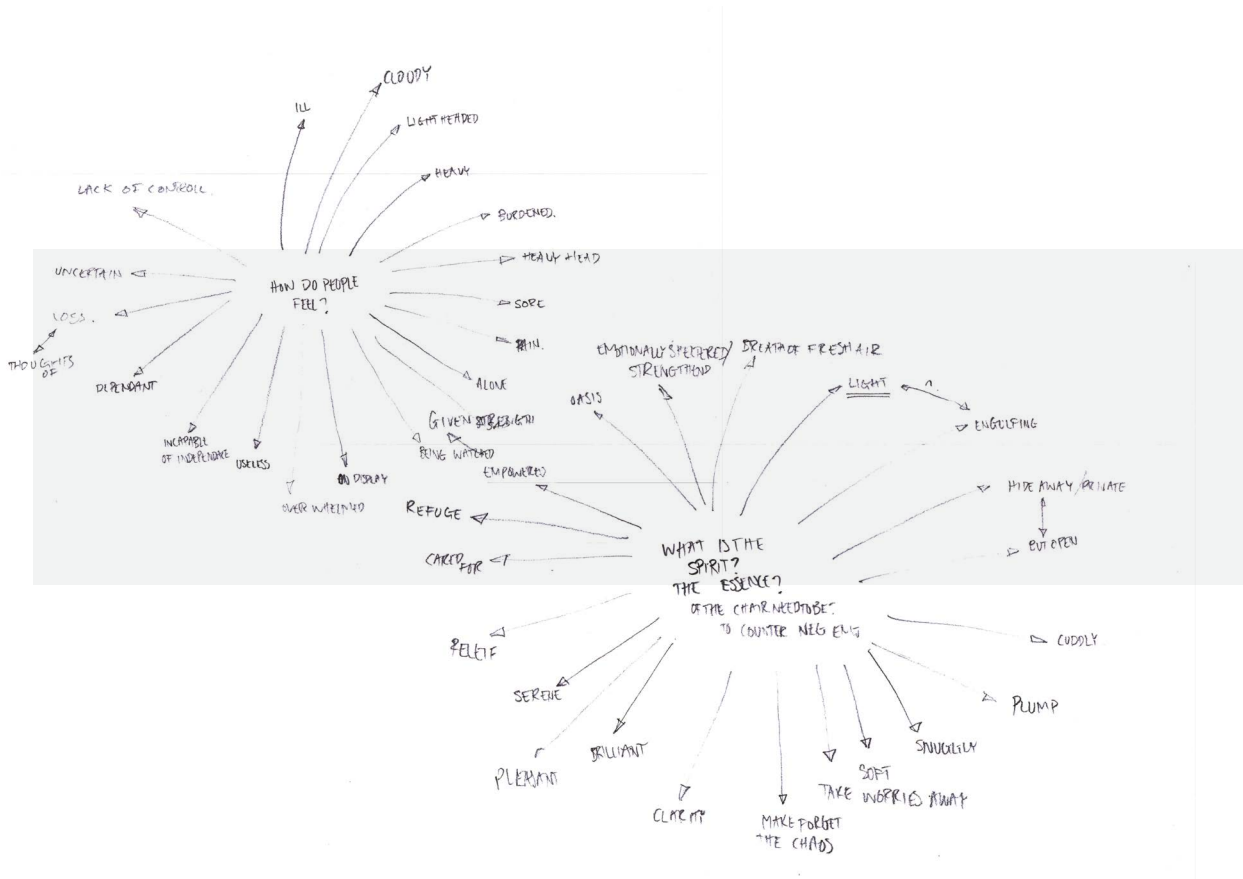
Sketches

In this cycle of research, the insights gained in patient questionnaires informed idea generation which focused on creatin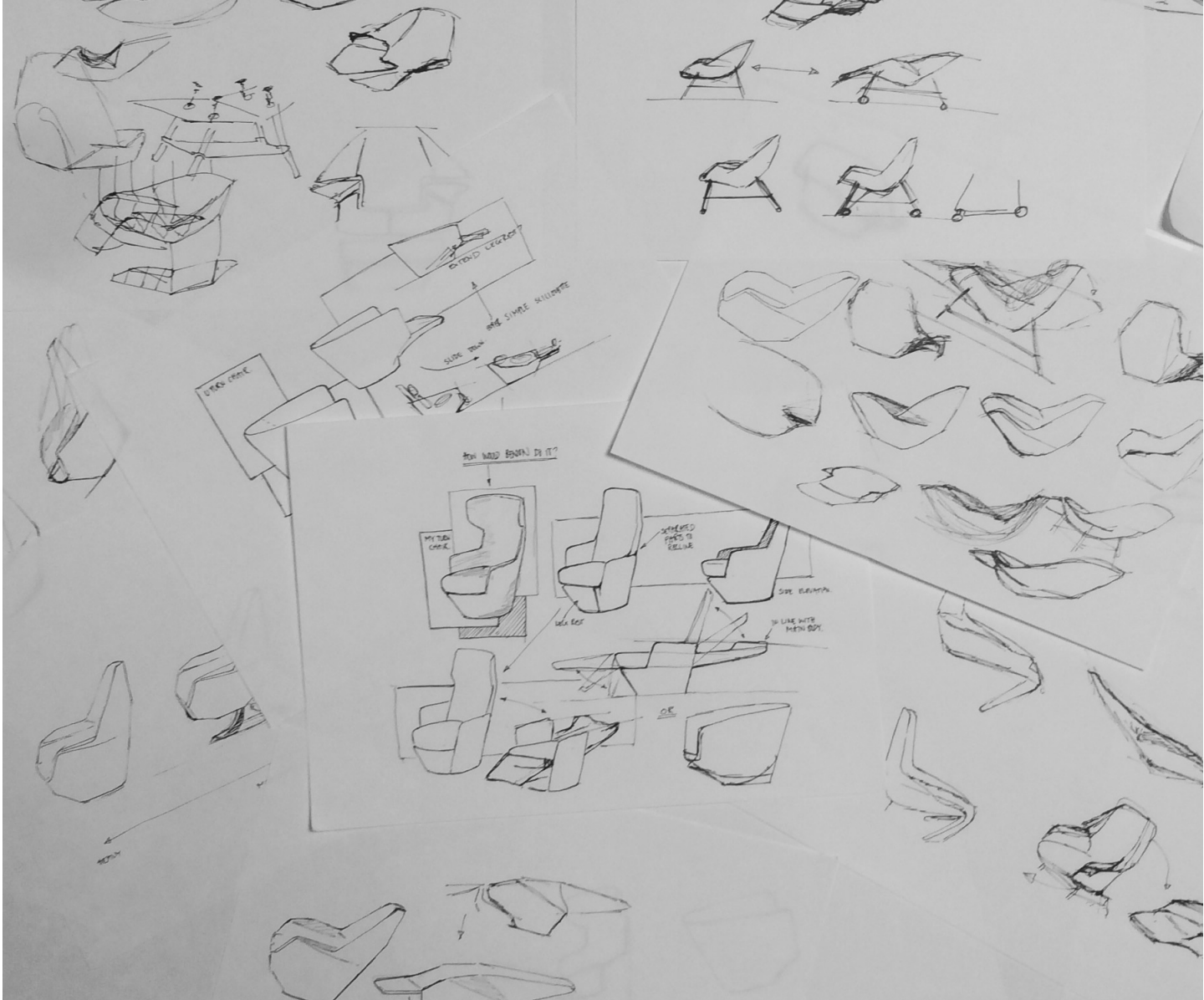g aesthetically pleasing forms in sketch and 3d models. I brought materiality and functional limitations into the prototyping think-scape to produce more refined models.

Reviewing the insights drawn from the questionnaires mostly showed face-value, incremental design suggestions which made me feel unequipped to give form to a product situated in an emotionally charged space. To remedy this, I positioned myself in the patient's emotional state of mind to help generate a map of expressions or words which represented the needs of the patient. This helped to give certainty over the emotional direction of designs and prompted a series of generative design methods.

Here sketches were used generatively to explore potential forms surrounding the notion of support and communicating care. I sketched each form in inclined and declined positions to ensure the chair was aesthetically pleasing regardless of its position. This revealed that the movement of the chair shifted physical and visual weight which created disharmony and surface disruptions in certain positions of recline.[162]

162 Amy Frearson, "Simplicity Is the Key to Excellence" Says Dieter Rams," (25 February 2017 2017), https://www.dezeen.com/2017/02/24/dieter-rams-designer-interview-simplicity-key-excellence/.

Positions of Vulnerability
Asking too much
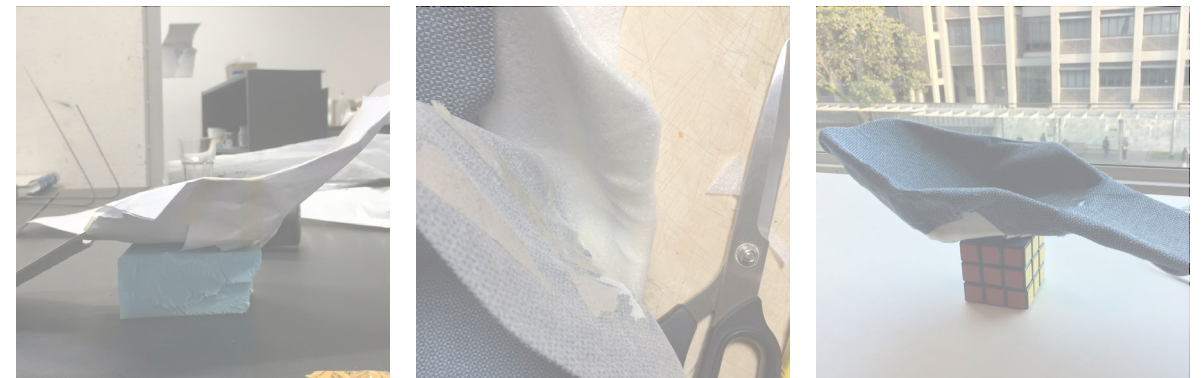
163 Rosalie Francis Ewer, Ethology of Mammals (Springer, 2013).

The chemotherapy chair is subject to the functions of a chair, seat, armchair, and at times a bed. This brings complexity and compromise the the design because the expectation is to function on multiple levels.

I revisited previous insights and realized I had overlooked several details. I knew that patients wanted to have control over privacy or sociability during treatment and had assumed that a rigid form would accommodate both ends of the spectrum. This was not the case as patients want or need to be private or social at different times and in different positions. When patients are lying down, it is a position of rest in which they are exposed, and as mammals vulnerable.[163] When the patients are reclined, they can be sociable and interact with others which is the position of awareness. This eureka moment gave form to designs which shifted from sociable to private depending on the patients position and vulnerability. This showed me that both the visual and functional were intertwined and contributed to the emotional experience.

Development Prototyping

Although initial asymmetrical designs proposed interesting ideas like providing privacy, choice and control through physical form, the practicality of asymmetrical designs did not meet the specifications provided by. Functional constraints helped to guide the prototyping from rough asymmetric forms towards refined symmetric designs.

Surface Tension
Surfaces of Support
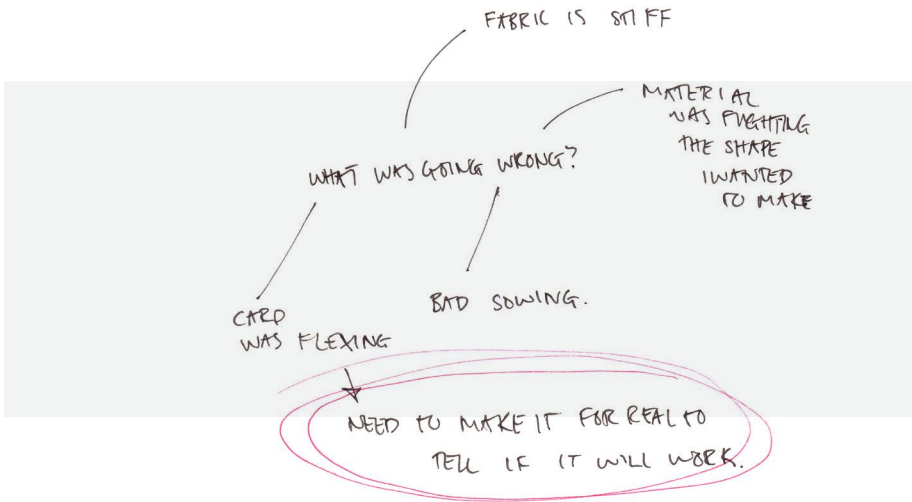
Prototyping helped develop the designs and began to incorporate foam and fabric to produce more realistic models. Trying to accommodate for the various positions of vulnerability revealed that fabric would fight itself as there was tension on the surface of the fabric. This prompted exploration and research on existing textiles which could be used.

Reflection
Not sure. I need validation

9

Revisiting previous research sparked inspiration to overcome the battle between visual harmony and a moving form. I felt the current concept had potential, however lacked refinement. I needed to gain user feedback to validate the concept before developing it any further. I needed to engage chemotherapy patients for feedback which presented research, design, and hospital challenges. This involved navigating academic and healthcare systems as I needed internal ADHB support for ethical approval by AUTEC.

Planning
Staff Consultation

FEED BACK BOARD.

PRODUCT PROBE

INFORMATION LEAFLET.

TO DO LIST.
- VISIT clinical engineering.
- CHECK IN WITH JEFF
- EMAIL CANCER SOCIETY
- EMAIL VICKI ONE LAST TIME
- USER ENGAGEMENT

INTERVIEWS.   - TIME?
- 5-10 MIN MAX.
- ACTIVITY BASED Q.   - PRIVACY.
- POSITION BASED Q.   - SOCIAL
- LENGTH OF TREATMENT.   - ARMREST.
- WHAT IS THE IDEAL CHAIR?
- 'WHAT DO YOU WANT TO DO   FUTURE
  THAT YOU CANT NOW?'
- GUEST / ASSYMETRY

FEEDBACK BOARD
- OUTSIDE ENTRANCE
- 'PROP 54'
- SET TIME.

TITLE
- EX. WHAT DO YOU THINK?...
FEED BACK BOARD.

ABOUT THE JOURNEY PAMPHLET.

BLURB / DES. JOURNEY

MY VISION PAMPHLET. MODEL

PROBE 1: FEED BACK STAND (MODIFIED)

PROBE 4: INTERVIEW.

USER ENGAGEMENT.

PROBE 2: INFO PAMPHLET.
- DESIGN JOURNEY.
- MY VISION
- MY WORK.
- LAB VISIT INVITE
- CONTACT ME.

PROBE 3:
THE ARTIFACT.
- PHYSICAL MODEL.
- FULL PACKAGE
- SUIT OF PRODUCTS FOR EXPERIENCE.
- REPLICATE SPECIFIED

CAN WORK TOGETHER

9M² IN NEW SPACE.

To gain concept feedback and achieve a level of emotional resonance with the patients, I needed to personally engage chemotherapy patients.[164]
To do this I needed approval from ADHB staff to gain access to these patients. I generated three methods for user engagement which I thought would help me gain the validation and feedback I needed. This included a feedback stand, product probe, information leaflets, and patient interviews. The consultation discussed how I should practice research in the working environment and approved the methods of patient engagement. This meant I did not rely on one single method of patient feedback. The consultation helped work out conditions which considered the working environment and ethical scope of both ADHB and AUT.

164 Martin L Hoffman, "Interaction of Affect and Cognition in Empathy," Emotions, cognition, and behavior (1984).

Summary
The Exposed Experience

WHAT I THOUGHT I WOULD GET vs WHAT I ACTUALLY GOT.

- FEEDBACK ON CONCEPT/
  AESTHETICS
- EMOTIONAL RESSONANSE

- FEEDBACK ON CONCEPT/AESTHETIC
- FUNCTIONAL FEEDBACK
- EMOTIONAL DEEP EMOTIONAL & PERSONAL CONNECTION WITH USERS THROUGH ENGAGEMENT
- DESIGNERS OFFERING HELP :)
- STAFF AND PATIENTS RECOGNISING PROBLEMS.
- SENSE OF MOOD.
- GREATFULLNESS...
- DESIGN CRITISISM...
- PERSONAL CRITISISM...
- PROFESSIONAL CRITISISM...
- PARTICIPATORY IDEATION
- PATIENT OBSERVATION.

165 F Ioannidou and V Konstantikaki, "Empathy and Emotional Intelligence: What Is It Really About?," International Journal of Caring Sciences 1, no. 3 (2008).

166 Hoffman, "Interaction of Affect and Cognition in Empathy."

Initially I thought research findings would give emotional empathy, validation and feedback on the concept, however, I received much for than this. I spent several weeks within the oncology space with my ideas and concepts which made for a very exposed and vulnerable experience. During my time there I had positive and negative highlights, even having a designer offer his connections and knowledge to help develop the concept. However, I also had my work and professional practice criticized, even I was criticized on a personal level. Despite the level of exposure and vulnerability, I felt that it was inevitable and necessary to gain feedback and validation to progress the design. Revealing my cards to uncover truths turned those criticisms into constructive insights.

The most important outcome of this experience was the meaningful and personal connection I made with patients.[165]   As this created a turning point within the project, where I began to truly empathize with the patients which could only be achieved through direct interaction, connecting and bonding with the user.[166]   This heightened my emotional sensitivity of the patient's emotional experience and made me feel a sense of duty to provide these people with something better.

Participatory Design

During the patient interviews, some patients even suggested some ideas. I found it helpful to sketch ideas to help elaborate on the patients' ideas which resulted 'back and forth' corrections over these drawings. Patients often started with functional ideas and expressing different ideas they had for the chair, however, I tried to steer the interview into the topic of aesthetics. I did this by asking how a design would provide care, privacy, and support. The results of this was not as constructive as I had hoped, however, it did produce very engaging interview for both myself and the patient.

167 Bruno, Surface: Matters of
Aesthetics, Materiality, and Media.

Sensing Mood - Languages

During quieter times in the oncology reception, I was able to observe the patients in the waiting area which revealed their mood through their body language, tone of voice, and expressions.[167] This helped gain a sense of the 'mood' of the space and brought a much more powerful realization that these patients, are people. They are fathers, mothers, sons, daughters, brothers, sisters, and grandparents. Their emotions and moods transcend through the space, connections and bonds which goes beyond the hospital experience.

The Results
Generating Personas

168 Marie G Rudden, "The 'Secret Cocoon': Fantasies About the Private Self in the Absence of Consensual Reality," The International Journal of Psychoanalysis 92, no. 2 (2011).

From the interviews conducted, I was able to generate personas based on the patients and people I interviewed. These helped to explain their points of view and feedback on the concept. The results highlighted some insight to improve the emotional and aesthetic experience. Most patients understood there were functional problems and queried how I had solved them. This made it difficult to validate the concept as some patients would dismiss the design if it 'didn't work'.

I noticed a clear separation between those who could communicate emotional or aesthetic needs, with no middle ground. Perhaps this is because aesthetics is a lucid concept which can be difficult to grasp, whereas functional matters are tangible and easy to understand in comparison. The feedback gained mostly consisted of suggestions for accessories, functional or environmental feedback. This made it difficult to make any further design decisions based on this feedback as I was left to sift through the date for aesthetic of emotional feedback. Within the aesthetic feedback, the concept was well received. Patients thought it felt cocooning and gave a sense of safety.[168] They liked the flexibility between privacy and sociability. Also leading to explain that 'anything is better than (what they have) now'.

Lifts and Stairs →

Way Out →

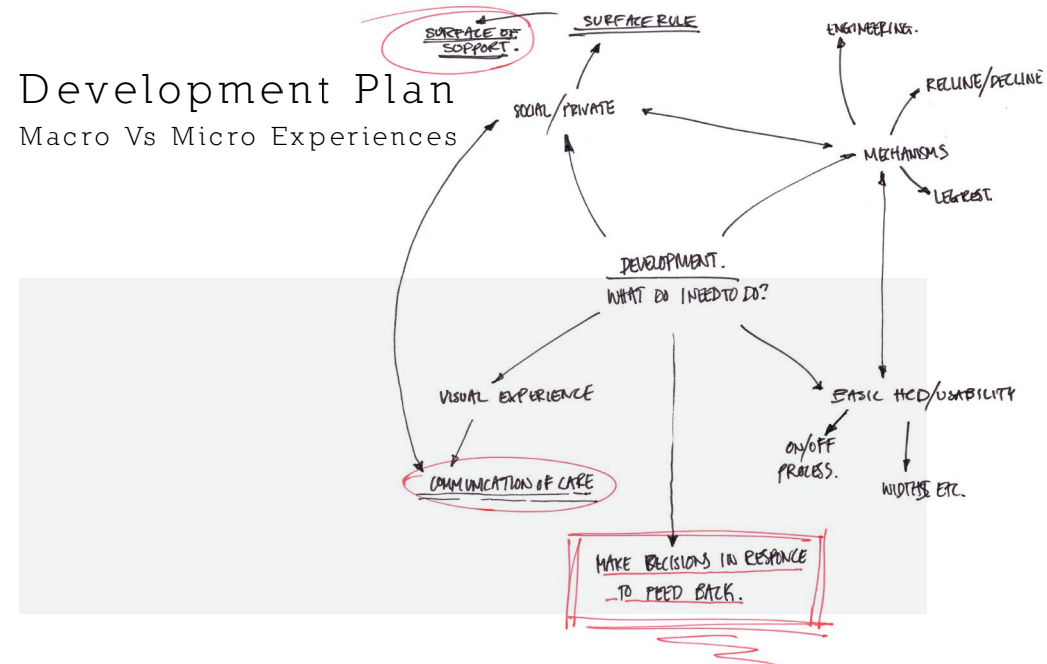Help us design a new chemotherapy chair

10

Development Plan
Macro Vs Micro Experiences

Entering a stage of development, I needed to prototype the design with more definition. To do this, I needed to develop reclining mechanisms, social/privacy experience, and basic usability to create the aesthetic experience.
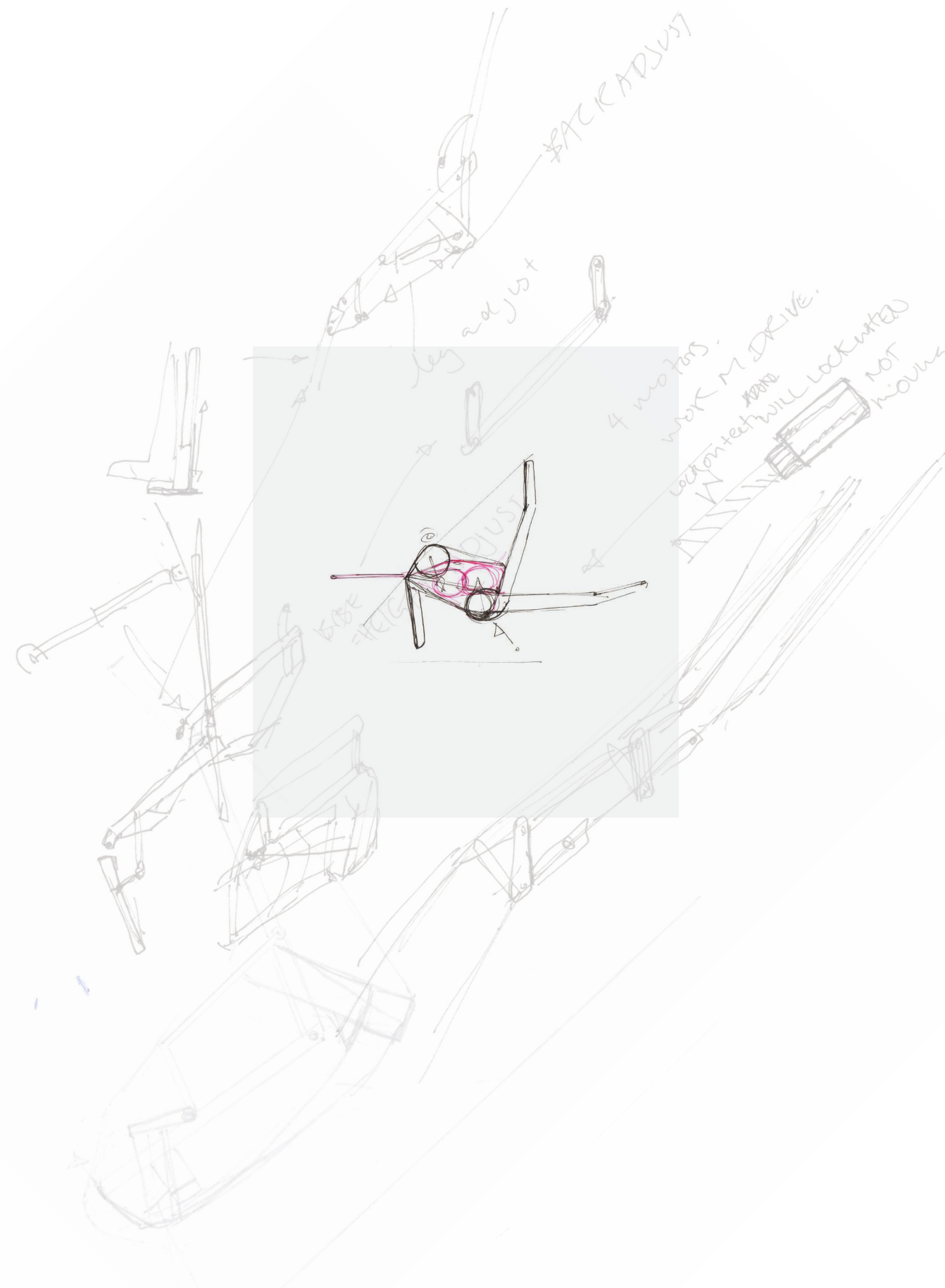
Movement Mechanism

A new mechanism had to be developed to allow for the form, interaction, and movement of the concept designed. This is because any existing parts that could have been used were either unavailable locally, or would compromise the design. This prompted a cycle of development in functional design which would affect the emotional experience.

Social / Private Experience

To provide control and flexibility, the mechanics of the social/privacy wings needed development. This enabled the patients the choice to be sociable and private during different positions of recline or decline.

Aesthetic Experience

Developing the aesthetic experience required a series of sketching, and prototyping to help bring to life a form in full size. This was then critically analyzed against the notion of 'communicating care', providing physical, emotional and sensory support. From here the concept could be refined.

Movement and Mechanisms
Development

Previous models had taken on a mechanism which pivoted off a fixed point. However, a key insight had been brought to light during patient feedback.

- "WE GENERALLY FEEL QUITE NAUSIOUS.
- SO THEY JUST SHOVE US SOME ANTI NAUSEA PILLS. BUT LYING ALL THE WAY DOWN MAKES ME FEEL NAUSIOUS

This particular patient reminded me of the extreme side effects of chemotherapy, and how they are remedied. Explaining that patients can generally get nauseous from treatment, and the movement of declining on the existing chairs increase the nausea.

This helped to develop a frame/mechanism which moved the distance of the user's head closer to the fulcrum point to minimize the distance of recline or decline in hopes to reduce nausea. This shift also meant that functional improvements could be made by distributing the load of the user over several pivot points throughout the chair and allowed the frame to bare the weight of the user instead of the linear actuator. This allowed for a smaller, lower cost linear actuator to be used whilst allowing the same adjustability as the existing chairs.
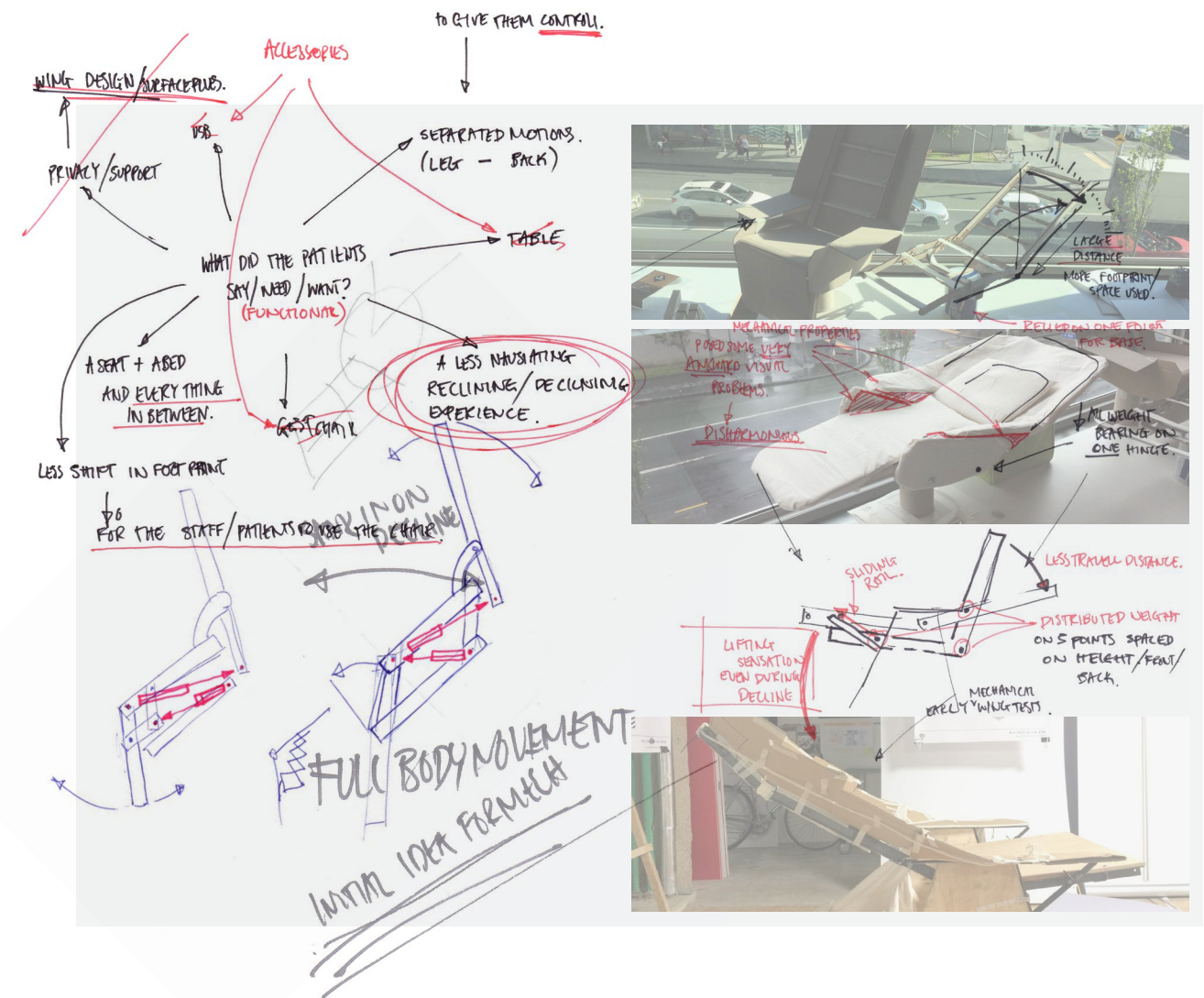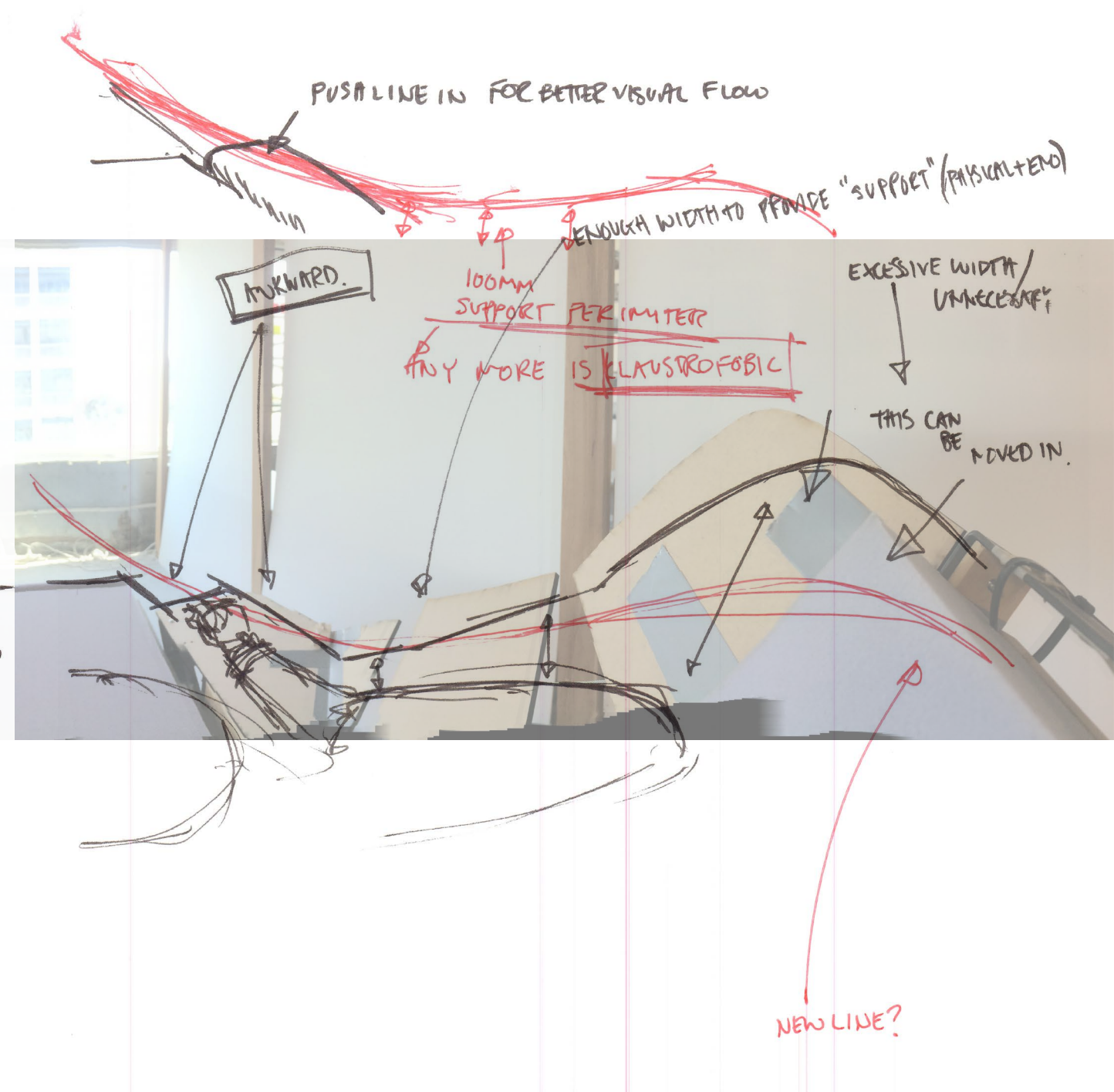
Surface Development
Enabling Private and Sociable Behaviours
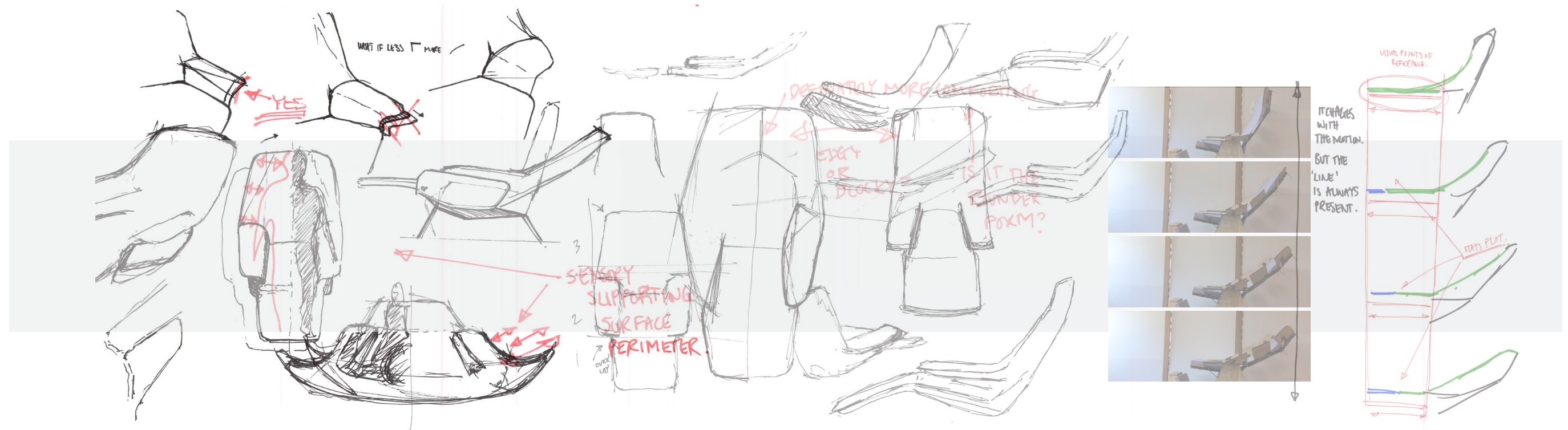
This phase focused on developing a surface which provided sensory, physical, and emotional support. Analysis of previous models revealed that a perimeter of surface surrounding the users body would provide a sense of support, however, previous model dimensions were over exaggerated which created unnecessary large surfaces which exaggerated the privacy in the concept. Variations of the side panels were tested to strike a balance between privacy and sociability. During testing, I kept in mind that staff need to maintain visuals of the patients face at all times for safety reasons. This helped progress the design towards a more refined shape which better suited the needs of the user. This provided the patient with control over enabling privacy, and enabling sociable behaviors.

PUSH LINE IN FOR BETTER VISUAL FLOW

ENOUGH WIDTH TO PROVIDE "SUPPORT" (PHYSICAL + EMO)

EXCESSIVE WIDTH/ UNNECESSARY

AWKWARD.

100MM
SUPPORT PERIMITER

ANY MORE IS CLAUSTROFOBIC

THIS CAN BE MOVED IN.

NEW LINE?

Reflection: Whilst sitting on the this mock up, the movement and interaction of the model functioned as desired. It gave me a sense of envelopment during declined positions, and also opened in the reclined positions. While the sensory experience enabled both the ideas of sociability and privacy, I felt that the dimensions of the form was over exaggerated. So instead of privacy, and a sense of personal space, I felt claustrophobic and trapped. Instead of open-ness and sociability, I felt exposed and vulnerable. This surface perimeter was put in place to help a patient feel supported, instead the large dimensions overstimulate the sensory experience. This affected the emotional experience in a negative way.

STRAIGHT OR CURVED FOLD?

FOLD EDGE'
CURRENTLY FEELS TOO
STRAIGHT/AWKWARD

ITS A WIERD COMBO

WIDER/THINNER?

THE WEIGHTING OF THE WINGS FEELS OFF

DIMENSIONS

BALANCE

SEAMLESSNESS.

AREAS THAT NEED REFINEMENT. ─── RADIUS'

EDGY

PROPORTION

FLOW

CURVY

VISUAL MEANING

LESS VISUAL WEIGHT UP TOP.

LIGHT UP TOP BUT
HEAVY IN THE MIDDLE

TOO HEAVY

THE CURRENT PROTOTYPE

NEED TO FLOW BETTER

ENVELOPE.

WILL INDENT? CORNER

CURRENT.

SKIMPS

TOP HEAVY.

UNBALANCED
VISUAL WEIGHTING

PULL
WIDTH OUT.

AWKWARD
VISUAL GAPS

ONLY A LITTLE
HARMONIOUS
DOWN BUT
NOT UP

MORE OPEN &
INVITING FEEL.

FUNCTIONALLY.
NOT WIDE ENOUGH

THIS SURFACE NEED REFINEMENT

MAKES IT
FEEL SAFER

ENVELOPE

CURRENTLY VERY LINIAR

FLAT

PARALLEL
MEET POINTS

MORE COMPELLING
THAN

EMOTIONAL DISTANCE

NEEDS.
CURVATURE

TO ANGULAR

Prototype
Development

A mockup of the concept was made using more realistic materials which could bear the weight of a user. This allowed me to loosely create a pattern and upholster the mock up and brought the form to life in full scale. This allowed me to analyze the rights and wrongs with the form, function, and experience.

Form

This current model was constructed with a focus on the 'surface of support', however negated other surfaces on the chair. This meant the surfaces where the user would touch and feel were more developed than the other areas of the chair which made the chair look disproportionate.

Function

The majority of the engineering took place on CAD which made it difficult to experience the functional outcome when it was made. This meant certain dimensions and movements were incorrect including an uncomfortable neutral position and a limited range of decline. However due to the engineering, users could effortlessly recline or decline without assistance.

Experience/Interaction

Interactions between user and product was let down by basic ergonomic issues. The three main problems included, the seating height, neutral seating position, and arm rest height, which made moving, sitting, and lying down uncomfortable.
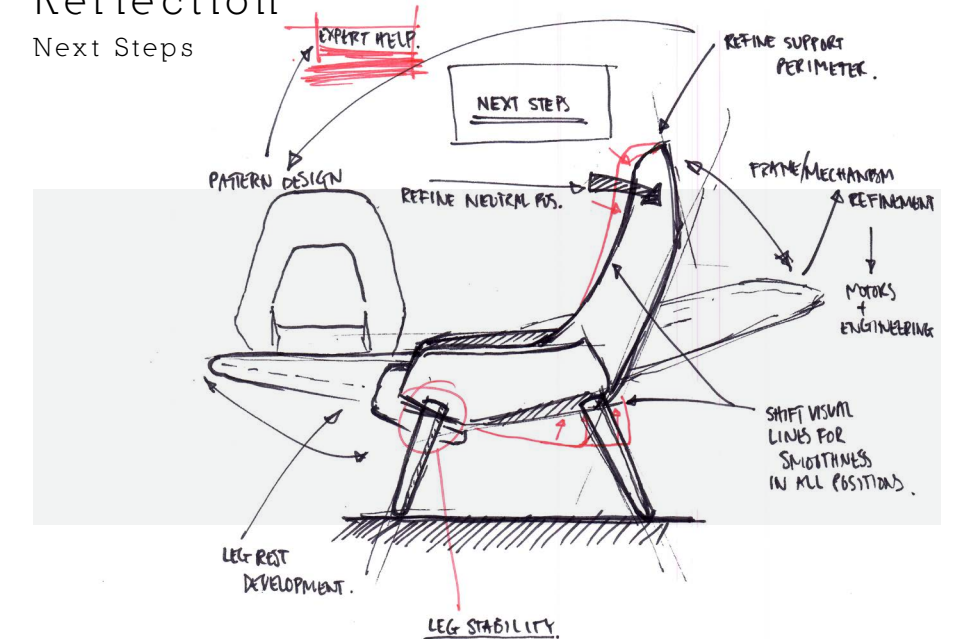
Annotations on photographs (left):

TESTING SOME NEW LINES TO BRING VISUAL HARMONY TO THE FORM

THE FLOW IS THERE. BUT THE FORM IS NOT

NEED TO REFINE VISUAL SENSORY SUPPORT PERIMETER

NEED TO GET EXPERT HELP

REFLECT.

CURRENTLY SAGS.

NEED STM LOGIC TO VISUAL RULING

Reflection
Next Steps

Sketch annotations: EXPERT HELP. / NEXT STEPS / REFINE SUPPORT PERIMETER. / PATTERN DESIGN / REFINE NEUTRAL POS. / FRAME/MECHANISM REFINEMENT / MOTORS + ENGINEERING / SHIFT VISUAL LINES FOR SMOOTHNESS IN ALL POSITIONS. / LEG REST DEVELOPMENT. / LEG STABILITY.

169 Frearson, "Simplicity Is the Key to Excellence" Says Dieter Rams."

Analysis and reflection revealed there were areas of the chair which needed refinement to provide a surface of support and enable social and private behaviors. These areas included, the physical dimensions and functional design. These areas would in turn affect the interactions between product and user and I needed to ensure these interactions did not impact the experience negatively.

Form

The current model's form had areas of disharmony as the frame lacked refinement. This created protrusions which disrupted the flow of surfaces. The form, flow of visual lines, and silhouette need to be refined to create a visually pleasing object.[169]

Function

To remedy the issues within form and usability, dimensions within the framework of the seat needed further refinement. This would allow for better ergonomics and a smoother declining motion.

Aesthetic Experience

Up until this point, I had carried out the fabrication and general making. However, I felt I needed expert help to produce an upholstered prototype as this is not my area of expertise. I needed to refine the thickness, level of comfort, and visual experience.
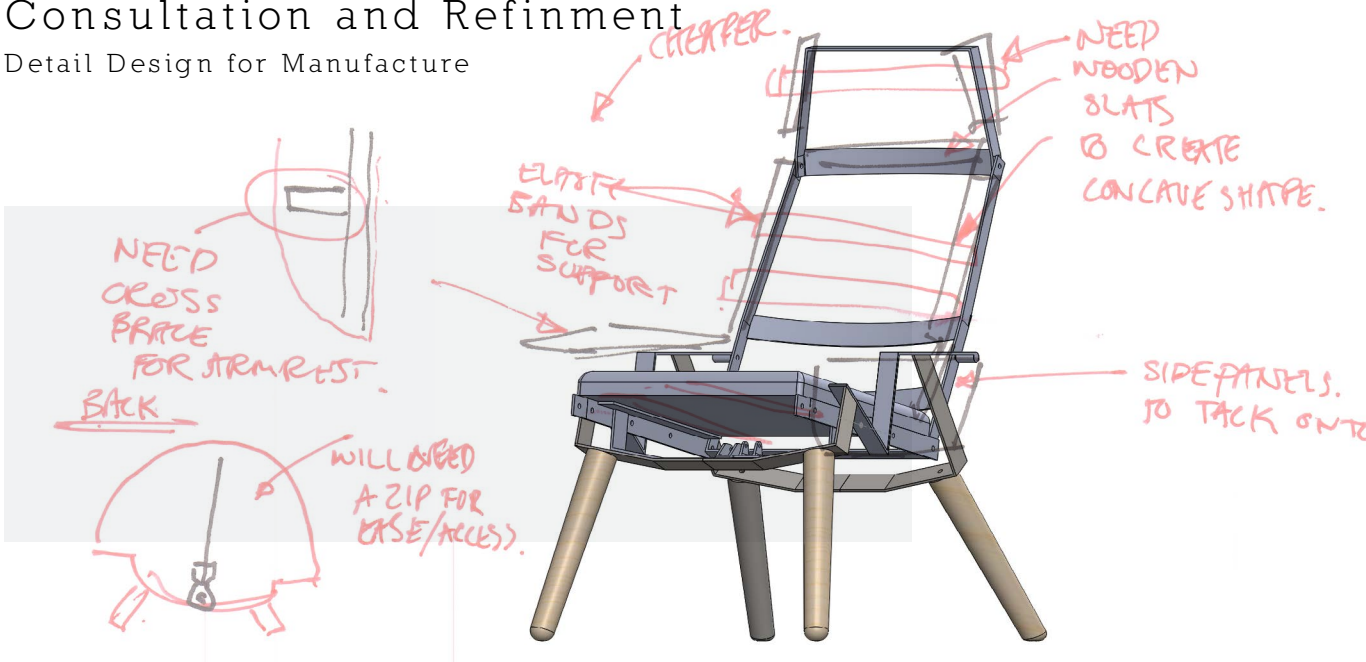
11

Consultation and Refinment
Detail Design for Manufacture

CHEAPER.

NEED WOODEN SLATS TO CREATE CONCAVE SHAPE.

ELASTIC BANDS FOR SUPPORT

NEED CROSS BRACE FOR ARMREST. BACK

SIDE PANELS. TO TACK ONTO

WILL NEED A ZIP FOR EASE/ACCESS).

Before building the final prototype, I gained expert advice on the manufacturing needs of upholstery. Finding an upholsterer, however, who would take on a one off, university, research driven, project was not as easy as I had anticipated. Two months was spent trying to find a company, or person who could and would help with this prototype. With most turning me down without hearing about the project. Until meeting the gentlemen at Bruce Withers upholstery. They had listened to me and the project. It seemed that the individuals I spoke to had cancer specific knowledge which would come into play when giving advice on materials and processes to provide the 'right' kind of comfort for the patients. And so they took me and the project on.

Speaking with the upholsterers helped make changes to the chair's frame work to help achieve the concave shapes of the chair. By working with these experts, I was able to discuss the different methods or approaches to create the final form and frame. Their knowledge on textile properties, manufacturing processes, foaming and comfort helped inform the next generation of frame design, foam and textile pattern design. Areas of the current prototype which needed attention to meet manufacturing requirements included aesthetic refinements, functional fabrications, motors and mounts, accessories, and working drawings to communicate the ideal end result for the upholsterers to use.
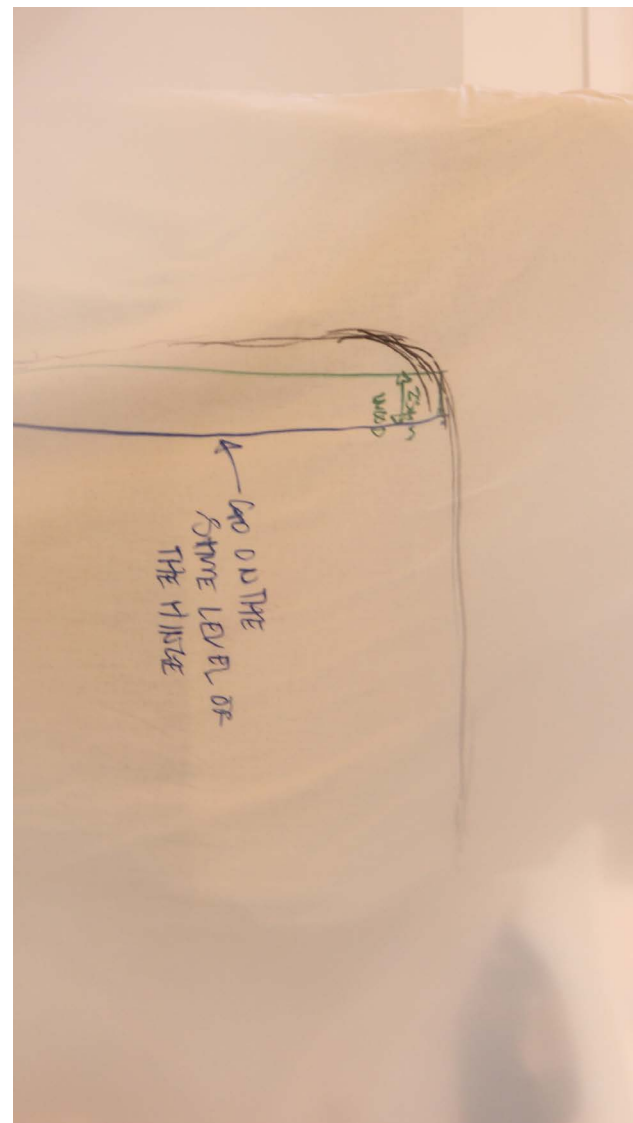
Manufacturing Requirements

The main concern of the upholsterers would be the lack of wood as traditional upholstery uses wood to tac foam and fabric onto. Existing recliners on the market have a machine-bent, tubular design with foam formed around the frames (much like the Dnske Mobler - Stressless recliner), however, this manufacturing method is out of the scope of this research. With the advice and notes drawn on the older prototype, I was able to remodel the seat frame with the proposed changes to allow for the complex concaving shape I wanted to achieve. This was helpful as I was able to show the upholsterers this model for approval and or any other minor changes needed before proceeding to making the final frame.

Detail Design
Aesthetic Refinment to Functional Fabrication

170 Ibid.
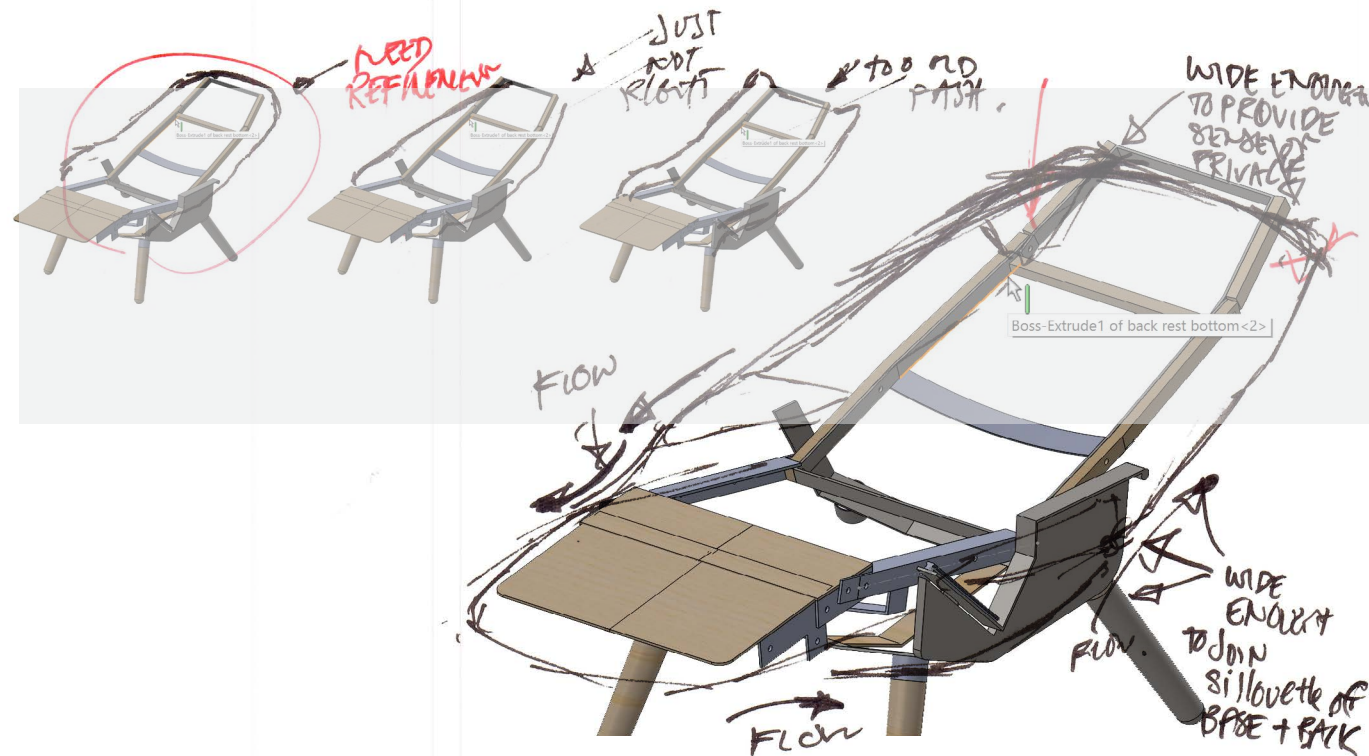
Aesthetic Refinement

Analysis of the previous prototype revealed the shape and silhouette still required refinement. The dimensions needed to strike a balance between enabling sociable and private behaviors. To do this a series of sketch, model making, CAD work, and full scale prototyping were used to give form to the chair. Whilst refining the chair's aesthetic, I needed to ensure the form was visually balanced, surfaces and lines met despite which position of recline or decline.[170]

Functional Fabrication

In the ideal situation, I would design the frame using a machine bent tubular design with the help of engineering experts. This would help determine the right materials to use to provide maximum structural integrity to the frame design. This would provide a much leaner manufacturing process and provide strength where it is needed instead of over engineering. This however, is out of the scope of this masters year. Instead I have designed the frame out of flat and angle steel bar, which I was capable of cutting, bending and welding to a degree of accuracy (1-2mm/1-3degree tolerance) which was acceptable for a prototype. These were skills I had also learned from previous prototypes and had grown certain efficiencies around the processes.
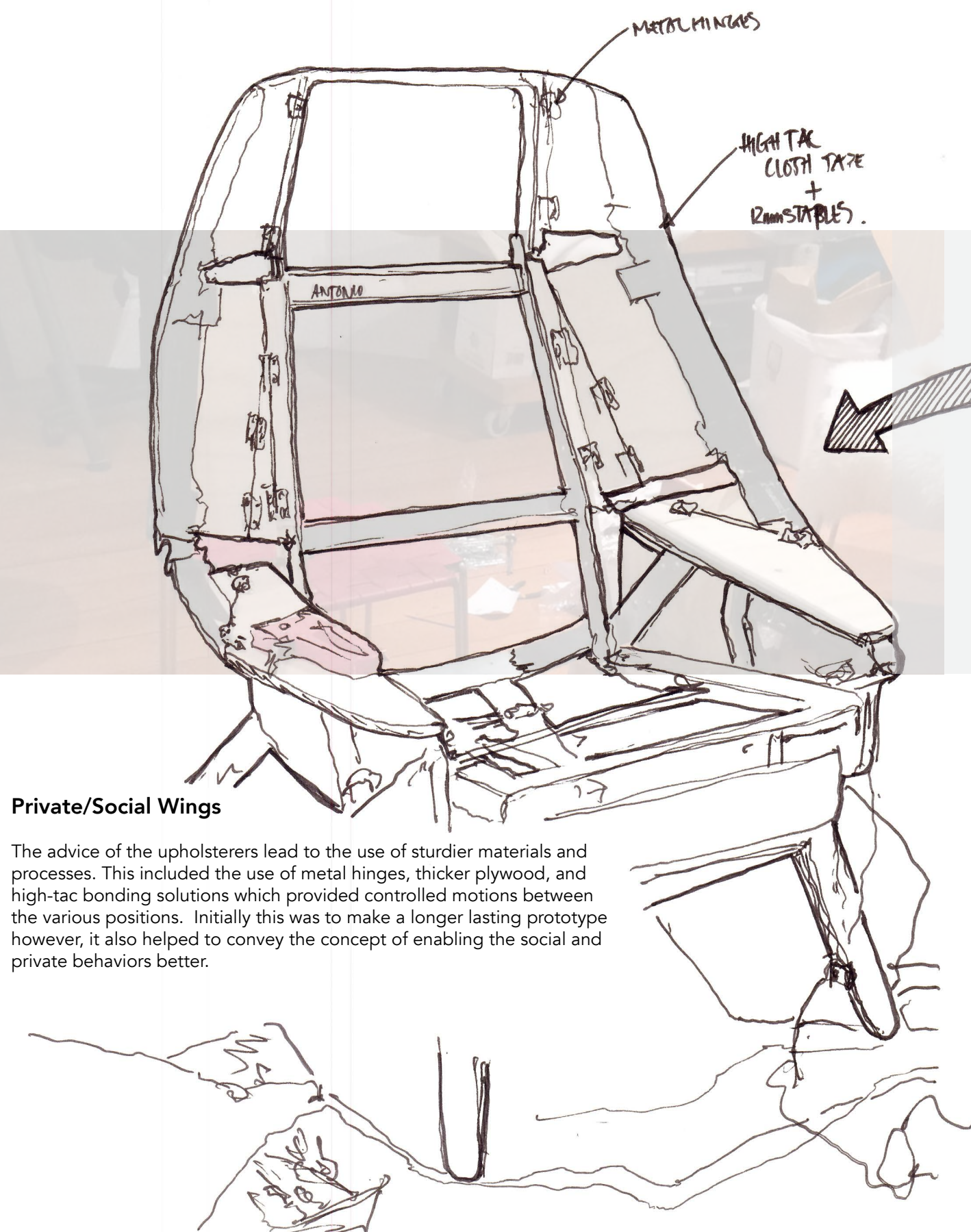
Motors, Mounts & Motion

In order to refine the declining experience, I researched various different motors, mounts, and sliding rails. I found that the quality of these parts were either poor and did not meet the functional load requirements of this chair, or overly strong exceeding the necessary load strength. I opted for better quality parts as they gave the smoothest reclining experience. This included Hiwin linear actuators which are known for being compact and reliable. Hiwin actuators are already being used in health care around the world. According to the staff at linear motion, the rails are rated to hold 800kg per rail despite their compact design.

METAL HINGES

HIGH TAC
CLOTH TAPE
+
12mmSTAPLES.

ANTONIO

INTERACTION MECHANICS.

UP RIGHT = SOCIAL
+
OPEN

DECLINED/RELAXED
+
ENVELOPED = PRIVATE

BUT CAN ALSO BE PRIVATE/SOCIAL IN
RELAXED/DECLINED
POS?

MOVING THE HEADREST
MECHANICALLY ADJUSTS THE
PRIVACY/SOCIABILITY.

Private/Social Wings

The advice of the upholsterers lead to the use of sturdier materials and processes. This included the use of metal hinges, thicker plywood, and high-tac bonding solutions which provided controlled motions between the various positions. Initially this was to make a longer lasting prototype however, it also helped to convey the concept of enabling the social and private behaviors better.
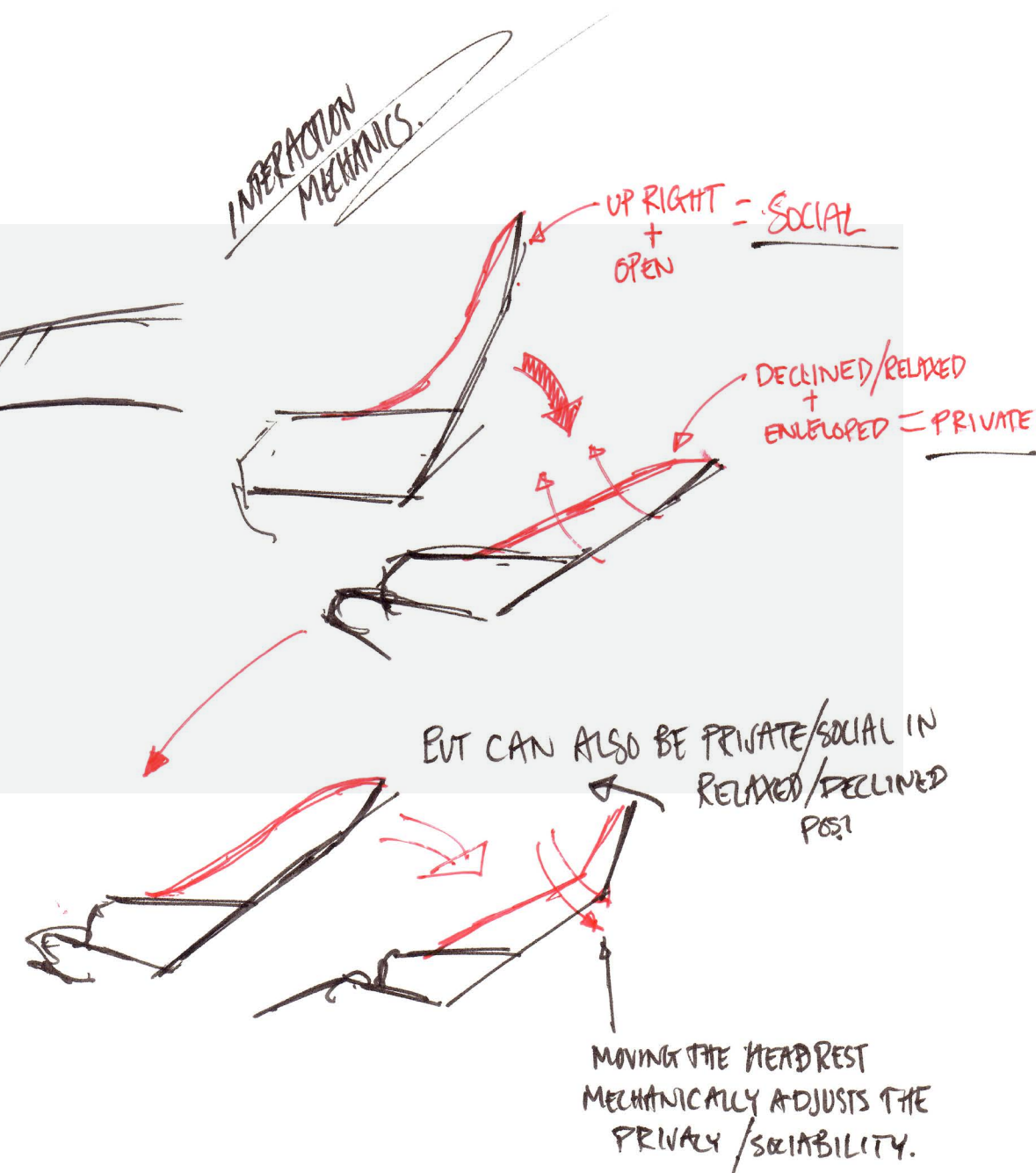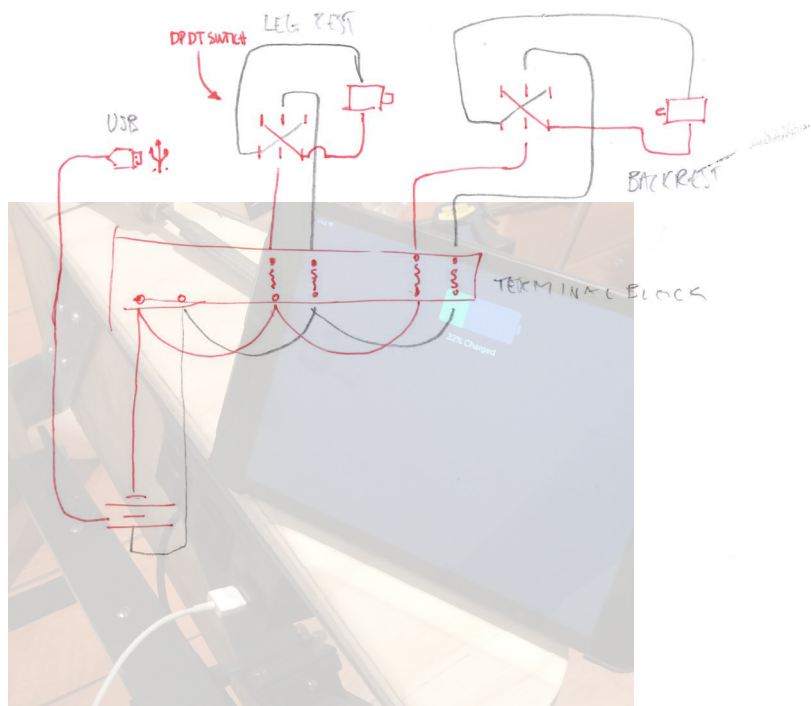
Power to the Acc.

As the motors require power, I was able to draft a basic wiring diagram which was approved by the staff of Linear motion. There is even an option of adding a battery pack for the chair to run off without mains power, however, this is out of the scope of for the prototype. Using my own wiring diagram and parts instead of off the power supplies allowed me to bring an accessory to the chair. I was able able to wire in a USB port as this was one of the key 'wants' of the patient identified during earlier research. Bringing this accessory gives patients, the option to bring their personal technologies to help bring positive distraction through technological means.
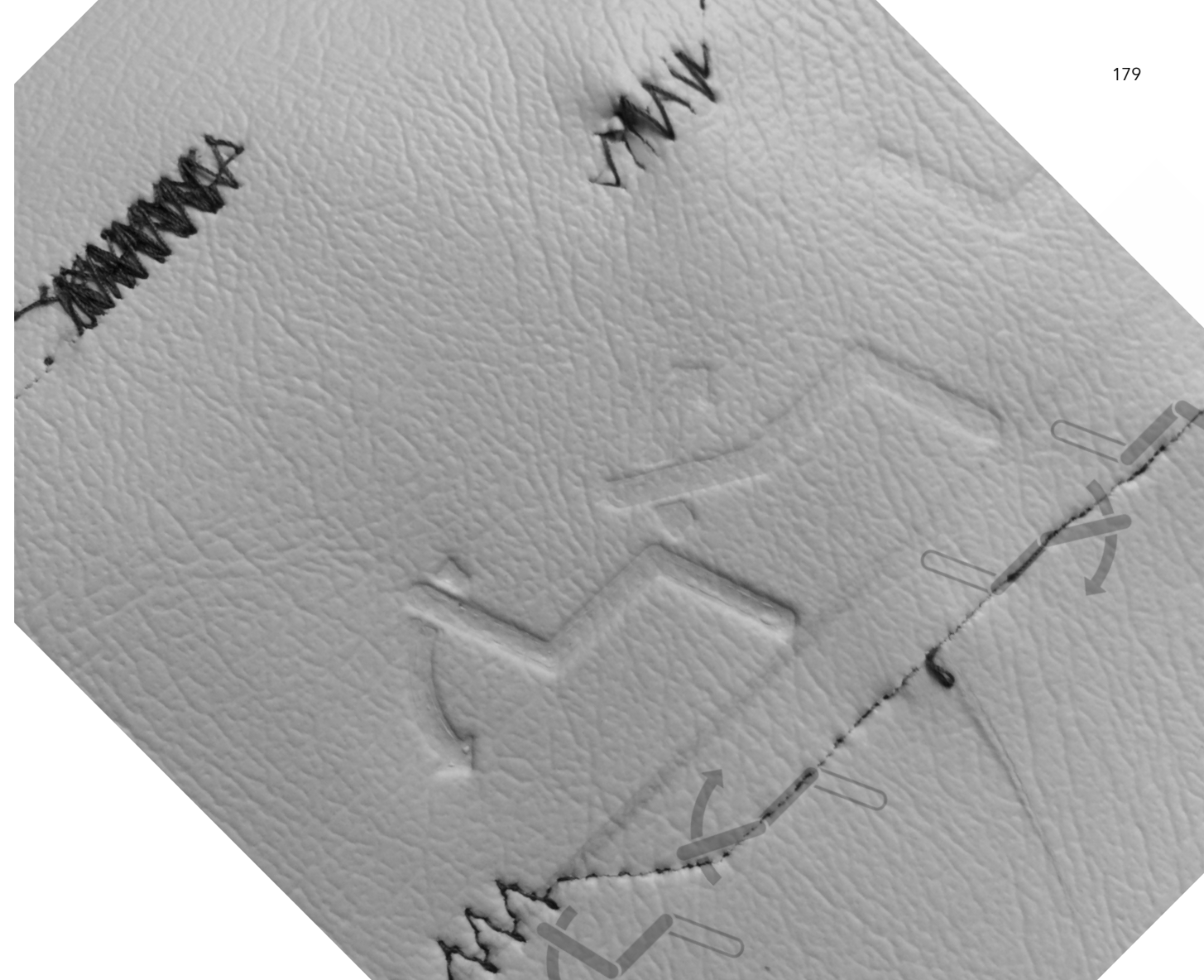
Embossed Instructions

An initial insight into the basic use of the existing treatment chairs revealed that the control panels were unclear and difficult to use. Touching on this problem, I generated very simple symbols which were not overlaid with confusing graphic illustrations. These symbols were embossed into the vinyl on the inside of the armrest, conveniently located right by the armrest.
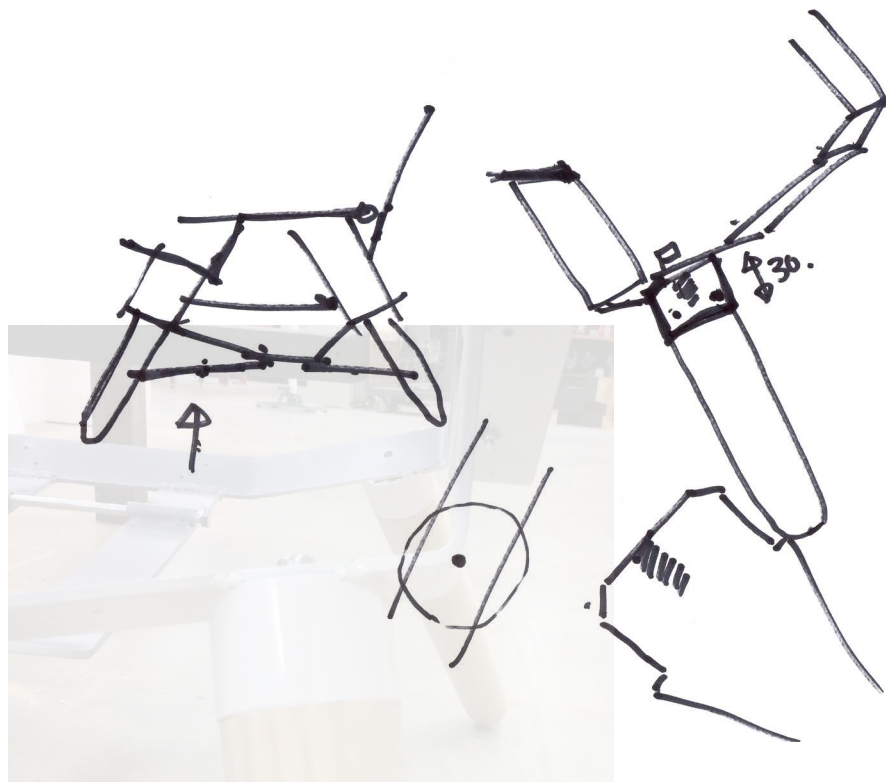
Structural Refinement

Certain areas of the chair frame required more strength to accommodate the variety of patient weights. The legs were the main issue to holding an excess of 80KG. There needed to be some form of bracing to structurally re-enforce the legs. A variety of methods including cross bracing, dowelling, and sleeving were used to test the most effective method of bracing. In the end, sleeving the wooden legs provided the most strength. This area of refinement relied on trial and error, as even asking engineer-minded peers for advice would leave them unsure. I tested each bracing method and evaluated them based on the flex and movement when put under load.
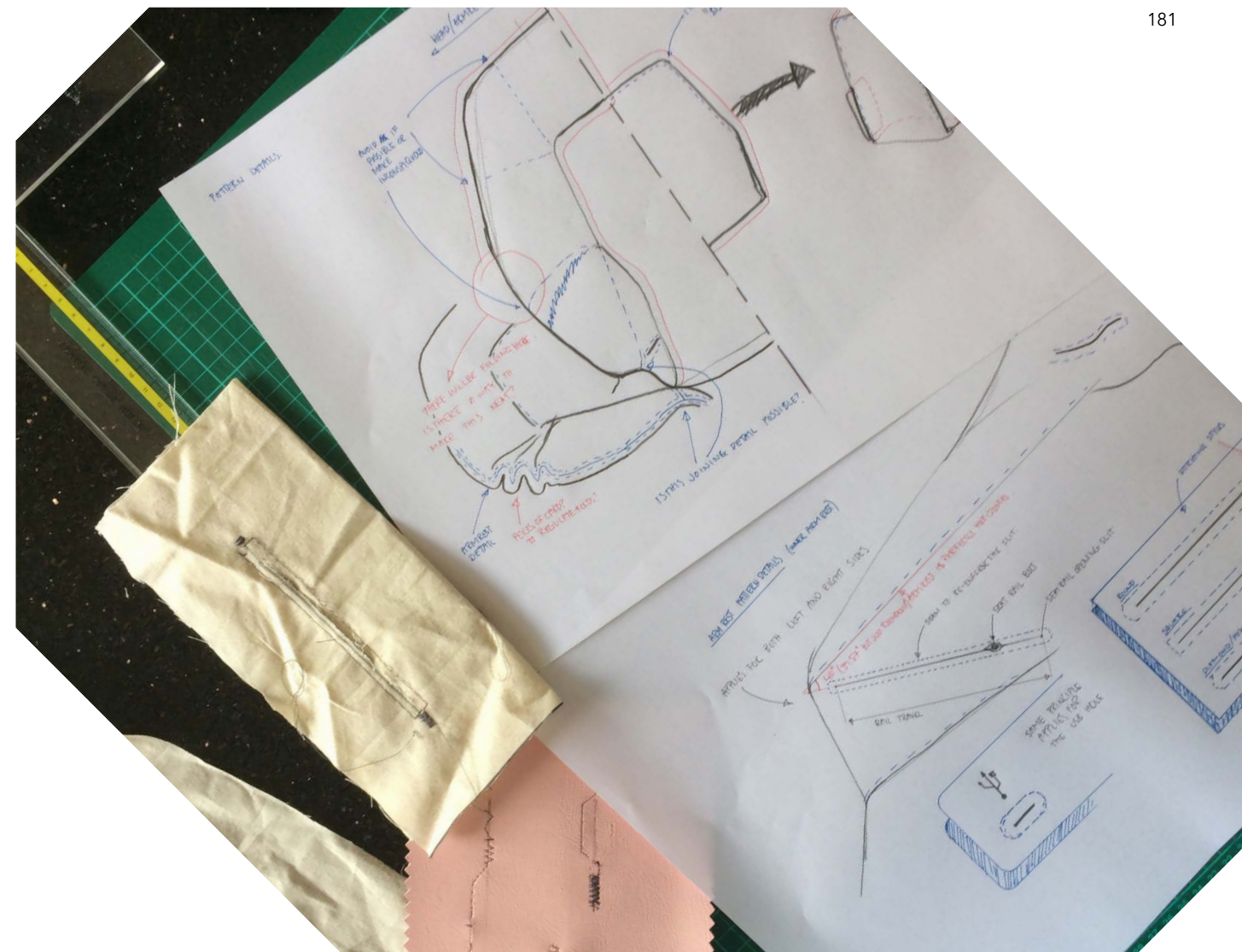
Working Drawings

The final phase of refinement was creating working drawings for the upholsterers to work from. These drawings were drafted to show stitching styles, possible shapes for patterns, and other details. The upholsterers explained that the more information on what I wanted the upholstering to look like, the easier it would be for them to manufacture it. Because of this, I proceeded to lift specific dimensions and angles from the CAD model to provide specific information which was helpful to the upholsterers during pattern making, a process which typically relies on trial and error.

Discussion

Discussion
New Knowledge

The nature of this research design project was explorative and highly iterative. The initial outlook on the project sought to improve the emotional empathy of product aesthetics in oncology to improve the emotional experiences of chemotherapy patients during treatment. Initially the project scope appeared to be well defined with focus on aesthetics and emotions but as the project progressed the scope of the research grew and so did I. My design processes within this master's research was exposed and left me vulnerable, but was necessary for me to resonate with the patient experience and to bring quality care to the patients.[171] Regardless of the level of exposure and vulnerability I had to experience, it was clear that interacting and connecting with patients helped to deliver empathetic design outcomes true to the needs of the user.[172] Only now can I relate to the etymology of 'passion' which in old Latin is defined as 'to suffer, or to endure'. I am more passionate about design as a form of delivering care to people than I ever have been before.

New Knowledge

With the completion of this research-design project, a conclusion to the research question can be made. The initial supposition which relied on methods without patient engagement theorised that aesthetic design could improve the emotional resonance of the chair's aesthetic and therefore their emotional experience. By using the human centred approach and engaging the patients, I began to develop a deep level of empathy for the users and a greater understanding of their needs.

This final outcome is symbolic of the care and support needed to improve the emotional experiences of chemotherapy patients within Oncology Day stay. 'Feel' chair was the emotional empathetic design response to this notion. The process of chemotherapy is considered a possible curative measure, however the effects of this treatment and the overall cancer experience forces an abject lifestyle and emotional complications onto each patient and their loved ones. The current chair design may add to the emotional stresses of the cancer experience without providing the care they need. Creating a product which provided support and communicated care during treatment makes it easier for patients to cope with the emotions and side effects of chemotherapy.

171 Ioannidou and Konstantikaki, "Empathy and Emotional Intelligence: What Is It Really About?."

172 Fisher Jr and Stenner, "Integrating Qualitative and Quantitative Research Approaches Via the Phenomenological Method."

The Process

173 Bate and Robert, Bringing User Experience to Healthcare Improvement: The Concepts, Methods and Practices of Experience-Based Design.

Through contextual and design research, the treatment chair was identified as a key touch point within the chemotherapy experience. Research on existing chairs revealed systemic, infrastructural and organisational issues surrounding the management of oncology equipment which ultimately lead to performance, aesthetic experience, and engineering problems.[173]   As the research progressed it became clear that the chair's current state of aesthetic was not communicating care at a level patients needed for a good emotional experience. This meant that there needed to be a strong consideration for aesthetics, its meaning, and affect. This being said, the design efforts also needed to focus on the product's performance and engineering to create a good design within a healthcare environment. By using HCD and 'care' as the theoretical foundation of the research I was able to identify the true needs of the patient, their ideal experience and then design for that. Research revealed that patients needed; flexibility, welcoming, compassion, empowerment, family centeredness, culturally supportive, and nourishment. These ideas were applied to the design process, used in combination with product aesthetics, engineering, and performance to communicate the feeling of care and support. This revealed alternative functions and aesthetic to address the emotional needs of the chemotherapy experience.

Recommendations for study

This research has shown the difficulties in creating meaningful, human-centric experiences within healthcare systems. Incremental or lack of innovation within the healthcare organisation, procedural and systemic structure of the ward resulted in designs which were incompatible with the emotional and functional needs of the experience. Navigating the ethical requirements as they were readjusted meant using design and research tools to work concurrently with the ethical boundaries. Because of this, the efficiency of the research was inconsistent and was at times ineffective until the project lead to patient engagement. This is where the project met a turning point as I was able to connect and bond with the patients during user engagement methods. This helped give form and function to a complex design within time frame of the master's year. As I now have a more cohesive understanding of the healthcare and academic structure, I would be more efficient and effective if I were to repeat this project. I would direct the project towards designing the oncology experience holistically which would help to create design consistencies between products in the space.174

Initially there was little internal recognition over the issues identified by the research. This however changed as the research progressed. The phenomena of care and progressive recognition of design failures shifted the staff opinion on design as a profession in healthcare. As the project progressed staff members helped me and the research navigate the bureaucratic, administrative, and ethical complexities to help me gain acces to the patients, resources, and time in the space to help improve the experience.

174 Lidwell, Holden, and Butler, Universal Principles of Design, Revised and Updated: 125 Ways to Enhance Usability, Influence Perception, Increase Appeal, Make Better Design Decisions, and Teach through Design.

Discussion
Next Steps

For further development of this design, the below steps should be considered to refine the product to suit healthcare requirements within the oncology space.

User Feedback

The chemotherapy chair design needs patient feedback to validate the concept and aesthetic, or point out potential flaws. This would involve a series of user testing sessions with chemotherapy patients during chemotherapy. In these sessions, I would interview, observe and critically analyse the patients as they experience the design to discuss improvements. This feedback would segue into the next cycle of design development.

Aesthetic Refinement

The aesthetics and experience need to be further refined to ensure they suit the emotional needs of patient. This involves critically analysing and refining the aesthetic to allow it to communicate care, and support.

Market Considerations

The design of this chair was originally tailored specifically towards the needs of patients in oncology, however, I feel it also has potential in the furniture market. The product could be engineered differently with one version to suit hospital requirements, and one to suit home. Determining the market or markets the chair is catering to will determine the design and the engineering changes that will need to be made

Engineering Considerations

For the healthcare market certain features need to be added to meet needs of the working healthcare requirements. To meet these requirements, I need to work with engineers to test and improve the structural integrity of the frame, integrate a mechanism to accommodate the trundleberg position, adding castor rollers and locking mechanisms.

Surrounding Experience

As the human centred design framework focuses on designing the experience, this chair is a small part of that experience. The chair was the main touch point for chemotherapy patients, however there were many other products or surrounding designs which affected the end experience. These artefacts included the IV pole, storage units, guest chairs, environments, privacy partitions, table unit etc.

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Apendix

3

6N – Medical Oncolgy

TREATMENT ROOM 1

G028

Latex
Biogel
Surgeons

Latex
Biogel
Surgeons

Latex
Biogel
Surgeons

BD PosiFlush™ SP
30 Single Use Syringes

EXTRAVASATION KIT
Restock after use

Baxter
Hazardous Drugs Spill Kit

3 mls   5 mls   10 mls

Systolic   Diastolic

Diastolic

Pulse Rate

MAP

V100

Oncology Day Stay

NEEDLES
LAB TUBE

LUER ADAPTER
VACUTAINERS
CANNULA

BAG SPIKES
EXTENSIONS

FEELS LIKE A COMPLETE MESS.

NOT ENOUGH LIGHT.

ALOT WERE BROCKEN

DONT KNOW WHAT TO LOOK AT. SO MUCH CLUTTER.

RANDOM ARTWORK.

FREE DRINK AND FOOD.

NOTHING LOOKS PURPOSEFULLY PLACED.

BAD SIGNAGE

MASKING TAPE?!

UN PROFESSIONAL CRAPTSMAN SHIT.

TREATMENT ROOM 1
G02B

DONATION BASKET OF BEANIES.

DONATIONS PLEASE

TUCKED UNDER CHEAP/CLUTTERED RECEPTION DESK.

THESE TROLLEYS HOUSE MEDICATION FOR STAFF

USED IN ROOMS DURING TREATMENT

NONE OF THE CHAIRS FACE THE VIEW

GREAT VIEW

'UNITS' DONT DISPLAY ANY INFORMATION FOR PATIENT.

GUEST CHAIRS CRAMMED.

ONLY USUALLY, EMOTIONALLY AND PHYSICALLY SOFT

OLD STYLE CHEMO CHAIRS

AKA. LAZY BOYS.

NO SPACE FOR BELONGINGS.

LOOKS EMPTY BUTFULL. WHEN STAFF AND PEOPLE ARE IN THE SPACE.

PLASTIC PILLOWS.

FACING EACH OTHER NOT THE VIEW?.

NO SOURCE OF LIGHT

STAFF ROLEY CHAIRS AROUND.

LOOKS LIKE A 50'S MOVIE SCIENTIFIC MAD LABOTOMY EXPERIMENT.

NO SPACE FOR GUESTS

WHAT IF THEY DON'T FIT IN THE CHAIR?

LACK OF BENCH SPACE FOR STAFF.

LIKE A CARSHOW.

HAZARDOUS DISPOSAL BINS ARE MOBILE AND HIGH RISK.
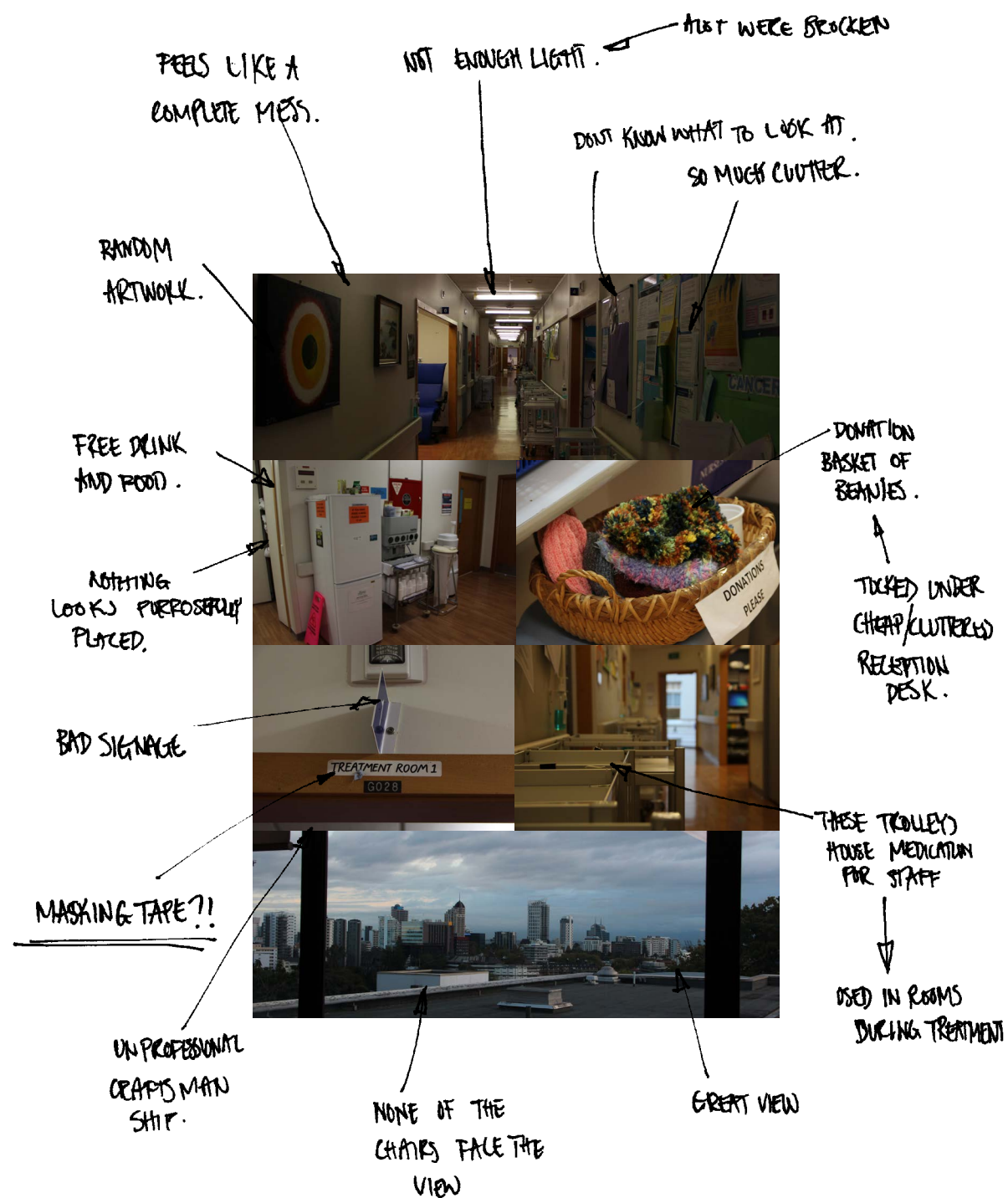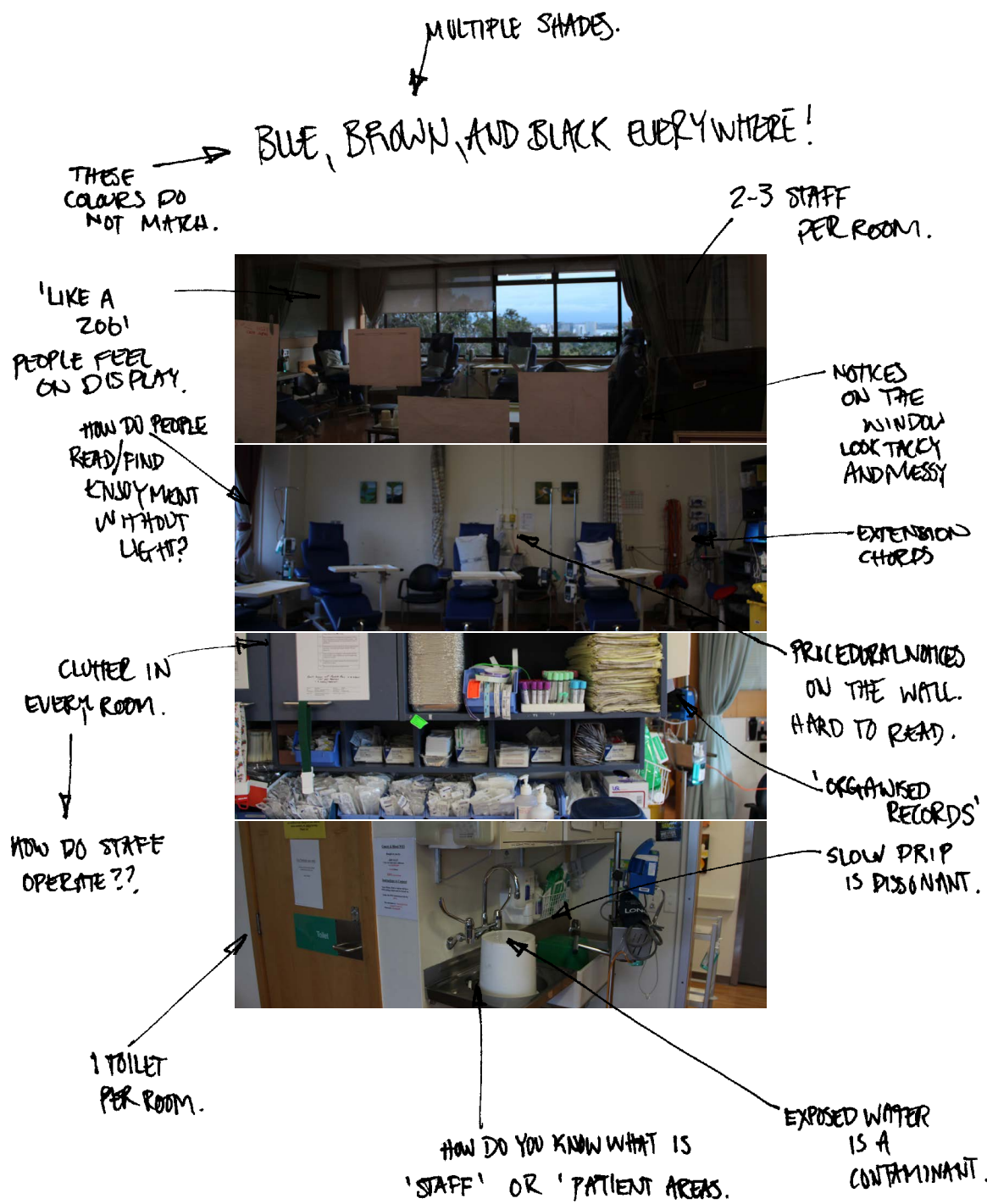
The Existing Space Summary
The snowball effect.

These visits revealed many wider problems within the space and it became clear it was outdated and needed redesigning for increased patient intake. Staff acknowledge these problems and have grown efficiencies around poorly designed products, using makeshift changes to meet health and safety regulations.[175]

The most shocking point made was they "outgrew the space at least 10 years ago" so rooms are technically over capacity by two or three people. The products surrounding each patient's treatment include a; chair, guest chair, IV pole and pumps, side table and staff chair. These products are necessary to the delivery of chemotherapy however, they create an overcrowded room which patients, staff and guests have to weave their way through.

175 Bryan Boyer, "Creating New Opportunities and Exposing Hidden Risks in the Healthcare Ecosystem."

MULTIPLE SHADES.

BLUE, BROWN, AND BLACK EVERYWHERE!

THESE COLOURS DO NOT MATCH.

2-3 STAFF PER ROOM.

'LIKE A ZOO' PEOPLE FEEL ON DISPLAY.

NOTICES ON THE WINDOW LOOK TACKY AND MESSY

HOW DO PEOPLE READ/FIND ENJOYMENT WITHOUT LIGHT?

EXTENSION CHORDS

CLUTTER IN EVERY ROOM.

PROCEDURAL NOTICES ON THE WALL. HARD TO READ.

'ORGANISED RECORDS'

HOW DO STAFF OPERATE??

SLOW DRIP IS DISSONANT.

1 TOILET PER ROOM.

HOW DO YOU KNOW WHAT IS 'STAFF' OR 'PATIENT AREAS.

EXPOSED WATER IS A CONTAMINANT.

SUPPLIES MIXED WITH DOCUMENTS.

ANOTHER MAKE-SHIFT DESK.

BLINDS DRAWN.

2 SINKS?

POWER CHORDS EVERYWHERE.

CLUTTER INVADING THE SPACE.

ESPECIALLY THE GUEST SPACE

UNITS NEED CHARGING.

ALL THE 'POSITIVE DISTRACTIONS' ARE COVERED BY CLUTTER.

I WOULD FEEL VERY CLAUSTROPHOBIC

NO MORE THAN 850mm Apart

PAINTING OF WHATS OUTSIDE THE WINDOW.

COVERED BY CLUTTER.

POINTS ARE EASY TO ACCESS BUT LOOK LIKE A CHEAP INSTALL.

STEEL

PLASTIC

CASTOR

METAL

COLD, HARD MATERIALS.

VAC PUMP?

THINGS OFF THE WALLS.

EQUIPMENT RELATED CLUTTER.

STAFF MAINLY
ON THE RIGHT.

VERY ADJUSTABLE.
BUT VERY HARD TO ADJUST.

TOILET AREA.
HIGH
TRAFFIC.

NO LIGHT.

LOOKS LIKE
AN OPERATING
CHAIR.

EST.
6M² per
CHAIR STATION.
5m² FILLED
WITH STUFF.
1M² FOR
MANOUVERING.
AND STORAGE.

CRAMPED
STATION.

STICKY
FAUX LEATHER.

DOES THIS
INFORM THE
STAFF AND KEEPS
THE PATIENT
INFORMED?

TANGLED
EQUIPMENT
MAKES IT
DIFFICULT
TO
MANOVER.

FADED
WHITE PLASTIC.

POWDER COATED
STEEL

PLASTIC
CASTORS.

PLASTIC

A MERIAD OF CHORDS AND
CABLES.

CHORDS.
FOR THE ROOM

CAN'T REACH
THE CONSUMABLES
WITH STUFF
IN THE WAY

WATER &
BISCUITS
TO COMBAT
DRY MOUTH.

RIGHT NEXT
TO THE
THROW-UP-CUPS...

VERY HARD
TO READ
CONTROLLS.
VERRY SMALL
SYMBOLS

VELCRO ONTO
THE ARM REST.
WHERE THE
ARM IS
SUPPOSED TO
GO.

HAND-SANITIZER
EVERYWHERE

WITH
A 'QUALITY
CABLE TIE INSTALL'

2 CABLE TIES

COMMON
THEME OF
'QUICK, CHEAP'

WHERE IS THE VISUAL CONSISTENCY?

THE STYLE?

STORY?

WRONG HEIGHT CHAIR FOR STAFF

STAFF CHAIRS. LOOK FUNNY.

FEELS VERY CHEAP

LOOKS LIKE A FLOPPY FRUIT ROLL UP.

PLASTICY LEATHER.

STANDARD 'MEDICINE' BLUE

DOESNT REACH IDEAL DESK

HOSPITAL PILLION? WHY?

FLUIDS FLYING EVERYWHERE.

CONTROL INSTRUCTIONS LOOK LIKE SCRATCHED PLASTIC

DARK COLOURS ARE EASY TO CLEAN BUT LOOK DEPRESSING.

CONTROL IN A VERY ANNOYING PLACE.

ONLY TV IN THE AREA.

LOOKS VERY DATED.

OLD CHEMO (CHAIR)

NORMAL LAZY BOYS.

IV POLE IS AN 'INCOMPLETE DESIGN'

ATTEMPTS OF CREATING A COMMUNAL SPACE

'UNITS' DONT DISPLAY
ANY INFORMATION FOR PATIENT.

GUEST CHAIRS CRAMMED.

ONLY VISUALLY, EMOTIONALLY
AND PHYSICALLY
SOFT

OLD STYLE
CHEMO CHAIRS
↓
AKA.
LAZY BOYS.

NO SPACE
FOR
BELONGINGS.

LOOKS
EMPTY BUT FULL.
WHEN STAFF
AND PEOPLE ARE
IN THE SPACE.

PLASTIC PILLOWS.

FACING
EACH OTHER
NOT THE
VIEW?.

NO SOURCE
OF LIGHT

STAFF
ROLEY
CHAIRS
AROUND.

NO SPACE
FOR GUESTS
↓
WHAT IF THEY
DON'T FIT IN
THE CHAIR?

LOOKS LIKE
A 50'S MOVIE
SCIENTIFIC MAD
LABOTOMY
EXPERIMENT.

LACK OF BENCH
SPACE FOR STAFF.

LIKE A CARSHOW.

HAZARDOUS DISPOSAL BINS
ARE MOBILE AND HIGH RISK.

Page 1 (left)
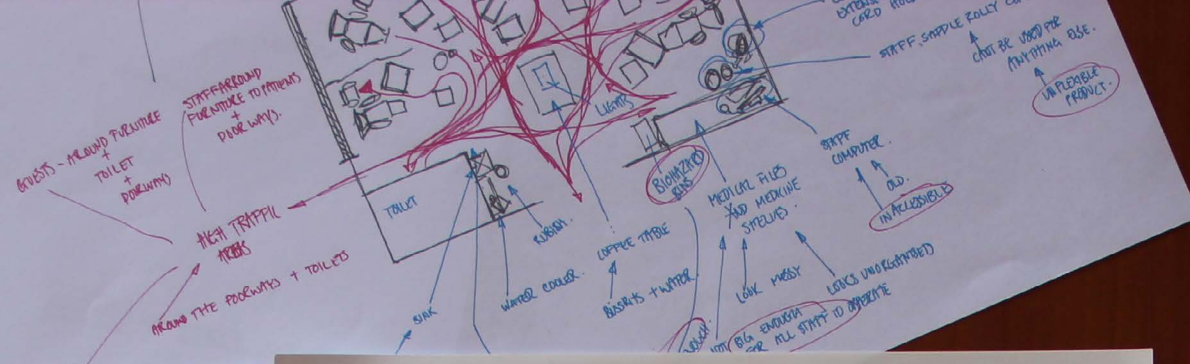
TUESDAY 26 JULY 2016. 7:00am

"GRAND TOUR"

WHAT HAPPENED?

- VICKI FORGOT
  - SHE ATE BREAKFAST
    - WEET A BIX.
- SUGGESTED LOOKING AT THE NEMSCHOFF CHAIR
  - MADE FOR PRIVATE CARE.
  - "HORRIBLE LOOKING".

- PATIENTS WILL COME IN ON TWO OCCASIONS.
  - ASSESMENT DAY
  - TREATMENT DAY
- ASSESMENT DAY. → 1-5 DAYS → TREATMENT DAY.
  - COME IN   BEFORE   - ALLCUTE UNWELL PATIENTS
  - RECEPTION   GO STRAIGHT TO ACCUTE
  - WAIT   - RECEPTION
  - BLOOD CHECK / DOCTOR   - WAIT
  - LEAVE   - NURSE TAKES THEM TO
                                      CHAIR
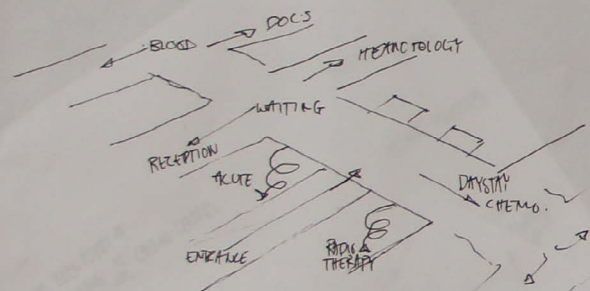   - TREATMENT
                                    - LEAVE

Page 2 (middle)

TREATMENT TYPES.

- HEMOTOLOGY
- CHEMOTHERAPY ──────→ "ABOUT 28% OF PATIENTS HAVE COMBINED TREATMENT"
- RADIO THERAPY.   "25% AND GROWING"
- ACCUTE

"THESE PATIENTS ARE THERE USUALLY 6-9 HRS"

RADIO THERAPY NEEDS TO HAPPEN WITHIN 2 HOURS OF CHEMOTHERAPY.

RADIO THERAPY
- DOWN STAIRS
- RECENTLY RE DONE
- RADIOTHERAPY MACHINES ALSO "HORRIBLE"
- AND "UNCOMFORTABLE"

THROUGH OUT ON COLOGY

WAITING CHAIRS ARE SOMETIMES ON BLOCKS!
- TO MAKE IT EASIER TO GET IN AND OUT OF

ACCUTE

STAFF STUFF

COMFORTLINE
SUN LINE
80G STANDARD
HOSPITAL RECOMENDED!

BEDS

LAZYBOYS

BEDS

Page 3 (right)
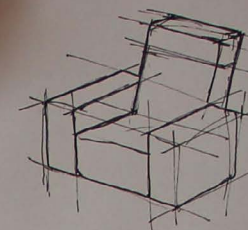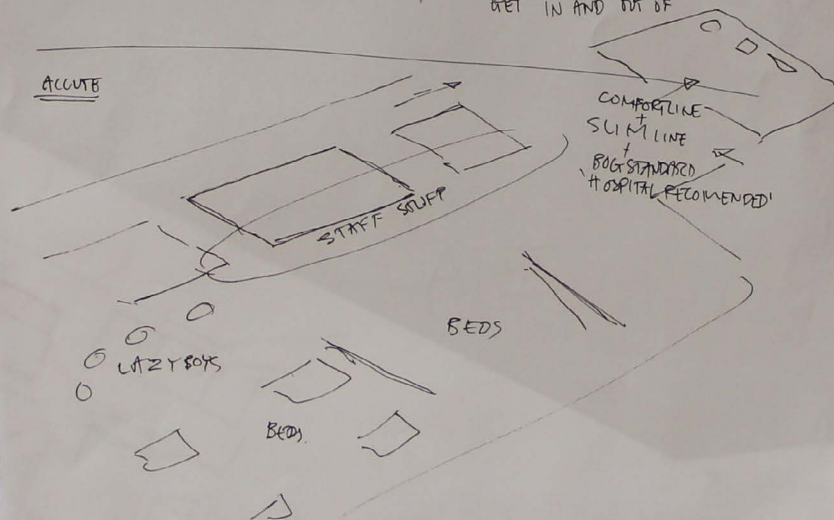
← HOSPITAL RECOMENDED.

← TOO LOW

← DOES NOT FALL TO TRENDLEBERG

MANUAL.
- LEGS TOO HIGH

TRENDLEBERG

→ GET BLOOD PRESSURE UP
- RESUS / CODING

CHEMO

- NURSE TAKES THEM / ALLOCATED CHAIR FROM RECEPTION
- SIT DOWN FOR OBSERVATION & ASSESSMENT
- SOAK HANDS "AND BUMP HEAD"
- CANULATE
- HOOK UP TO PUMP
- FLUIDS
- CHEMO
- WAIT
- GO HOME
  - SOME GO HOME WITH A PUMP.

THEIR CHAIRS MAINTANANCE

- USE 'TECH MED SERVICE'
- CLINICAL ENGINEERING GUY SAID THEY COULD SERVICE BUT DIDNT KNOW WHERE TO FIND PARTS.
- ELECTRIC STUFF IS TESTED YEARLY.
- USE WIPES ONLY

TREATMENT TYPES.
- HEMOTOLOGY
- CHEMOTHERAPY
- RADIO THERAPY.
- ACUTE

"ABOUT 25% OF PATIENTS HAVE COMBINED TREATMENT"
"25% AND GROWING"

"THESE PATIENTS ARE THERE USUALLY 6-9 hrs"
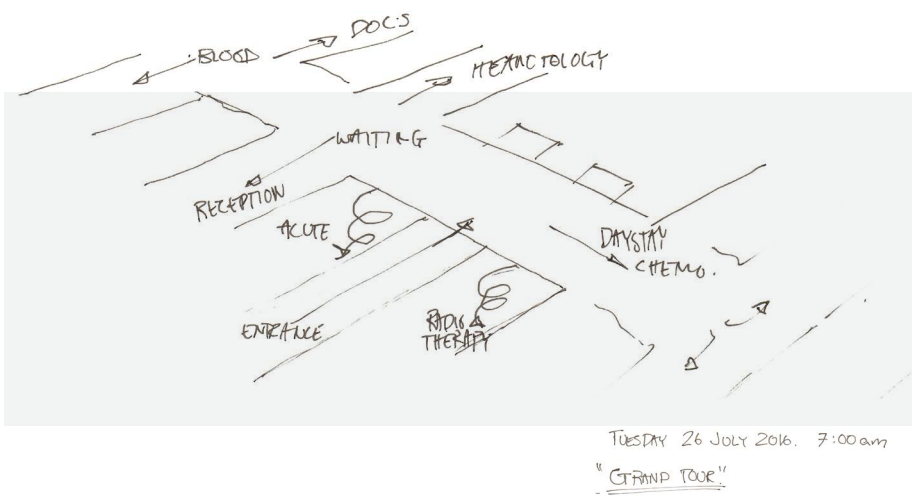
RADIO THERAPY NEEDS TO HAPPEN WITHIN 2 HOURS OF CHEMOTHERAPY.

THROUGH OUT ON COLOGY

WAITING CHAIRS ARE CUT SOMETIMES ON BLOCKS!
- TO MAKE IT EASIER TO GET IN AND OUT OF

STAFF STUFF

COMFORT LINE SLIM LINE 800 STANDARD HOSPITAL RECOMENDED!

BEDS

O LAZY BOYS

BEDS.

The Grand Tour
The Overview

TUESDAY 26 JULY 2016. 7:00am
"GRAND TOUR"

With the charge nurse's help I gained an understanding of the chemotherapy treatment from a clinical perspective. This included a 'grand-tour' of the; reception, bloods and doctor's, chemotherapy, radiotherapy, haematology, and acute treatment rooms. She shared knowledge of the patient journey, managerial and clinical systems whilst explaining the compromises and decisions made to manage the any problems.
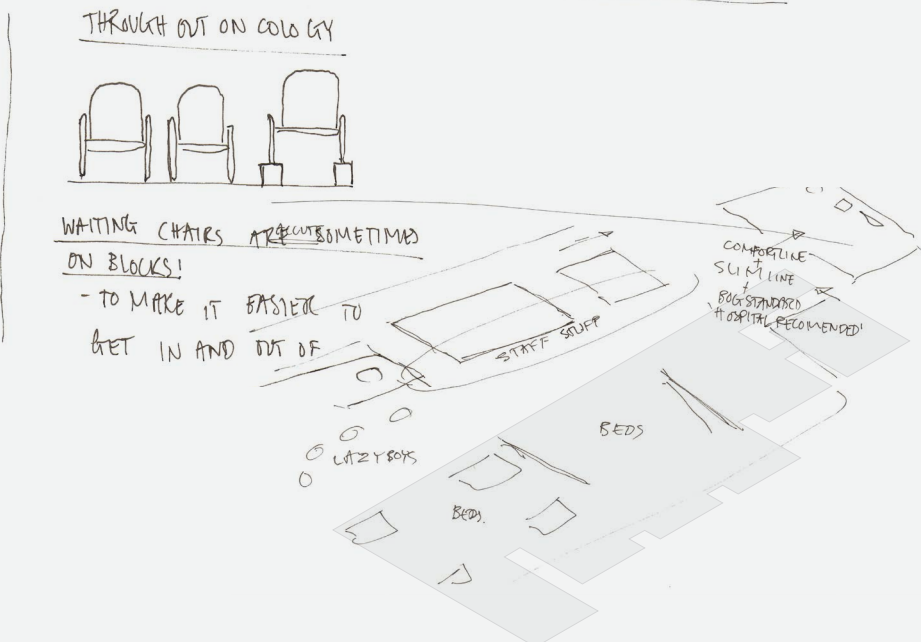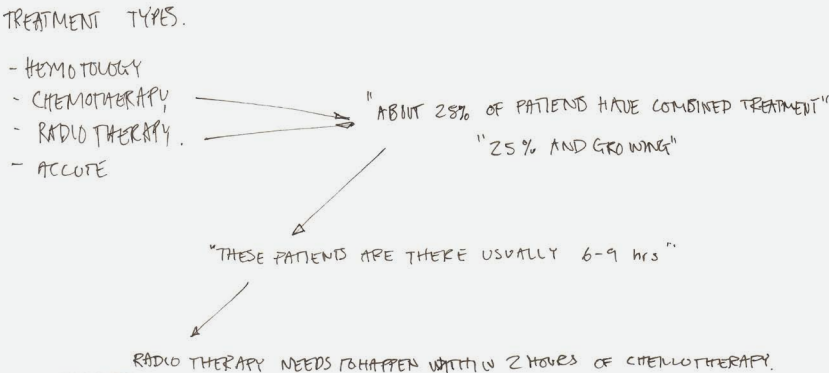
Treatment types and rooms

This oncology centre provides haematology, chemotherapy, and radiotherapy and approximately "25% of patients have combined treatment". It was clear that the renovations in the radiotherapy ward were up to standard as it had no physical or clinical issues. The staff had contradicting views on the renovations however there is no doubt that it improved the patient experience.

Handwritten annotations on left diagram:
EYE BAGS
JUST TIRED
EMOTIONALLY TIRED
NO SMILES ON PEOPLES FACES
THE EMOTIONAL CHARGE IS INTENSE!
THE HOSPITAL STANDARD CHAIR IS SUPER BASIC.
BIG HOSPITAL BEDS STARING AT EACH OTHER
EERIE.
VERY CLINICAL
ACUTE ONCOLOGY DAY STAY.
ALL YOU HEAR IS SILENCE.
SUBTLE BEEPS
FOOTSTEPS.
DISSONANT
EARY SILENCE
THE SPACE IMIDIATELY FELT SERIOUS.
ALMOST ER.LIKE

Handwritten annotations on right diagram:
HOSPITAL RECOMMENDED.
TOO LOW
DOES NOT FAIL TO TRENDLEBERG
MANUAL. - LEGS TOO HIGH.
TRENDLEBERG
GET BLOOD PRESSURE UP
RESSUS / CREDIAC

Acute Chemotherapy

I then visited acute chemotherapy, a space reserved for patients who are very unwell on their treatment day. This revealed the intense emotional charge of chemotherapy. To find acute chemotherapy involved several meandering hallways with little signage to direct patients through the underground tunnels. When I walked into the space I could sense an immediate shift in mood. The hospital beds, medical equipment, flickering fluorescent lights and pale faces projected emotional exhaustion through the airspace.[176] The combination of physical, audible and emotional stimulation of the space felt overwhelmingly dissonant of the needs of the patient.

176 Bruno, Surface: Matters of Aesthetics, Materiality, and Media.

177 CL Ostrow, "Use of the Trendelenburg Position by Critical Care Nurses: Trendelenburg Survey," American Journal of Critical Care 6, no. 3 (1997).

Details of day stay

Here I discovered a different treatment chair which was recommended by the hospital but was surprisingly inappropriate for the job. It didn't meet the health and safety regulations and emergency protocols within chemotherapy treatment and didn't achieve basic ergonomics. Staff mentioned that these were the most uncomfortable of the three chairs despite the product theoretically being equally capable of providing measurable healthcare outcomes as purpose built chairs.

The Trendelenburg position is essential to treating allergic reactions to chemotherapy medication or low blood pressure. This position, however, has been a topic of controversy as some experts say the use of this position is ineffective for anaphylactic shock.[177]

Product Analysis
Analysis Guidelines

FOCUS ON EACH CATEGORY AT A TIME TO CRITICALLY ANALYSE AND GAIN CLARITY.

LOOKING THROUGH THESE LENSES WILL EXPOSE 'LENS SPECIFIC' PROBLEMS AND INSIGHTS. INSTEAD OF JUST PROBLEMS AND INSIGHTS

FUNCTION

AESTHETICS

EMOTION
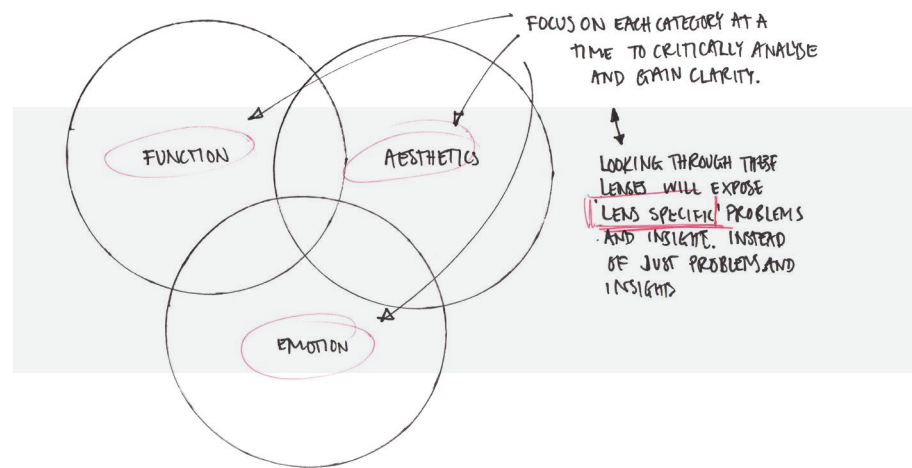
I grounded my methods to the three factors which contribute to good design in healthcare; performance, engineering and aesthetics of experience. To answer my research question I focused specifically on the relationship between aesthetics and emotion but it was inevitable that I would eventually need to explore functional and engineering design problems.
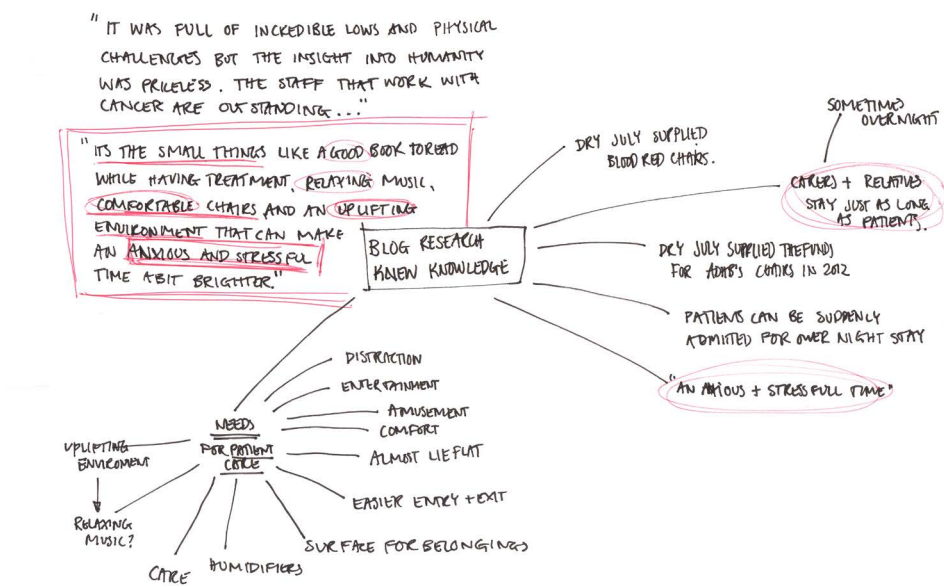
This revealed a clear, methodical process of conducting analysis making it easier to compare and contrast products. Looking through different lenses of analysis helped to show different pictures.

Blog Research
The Current Chairs

" IT WAS FULL OF INCREDIBLE LOWS AND PHYSICAL
CHALLENGES BUT THE INSIGHT INTO HUMANITY
WAS PRICELESS . THE STAFF THAT WORK WITH
CANCER ARE OUTSTANDING . . . "

" ITS THE SMALL THINGS LIKE A GOOD BOOK TO READ
WHILE HAVING TREATMENT, RELAXING MUSIC,
COMFORTABLE CHAIRS AND AN UPLIFTING
ENVIRONMENT THAT CAN MAKE
AN ANXIOUS AND STRESSFUL
TIME A BIT BRIGHTER."

BLOG RESEARCH
KNEW KNOWLEDGE

DRY JULY SUPPLIED
BLOOD RED CHAIRS.

SOMETIMES
OVERNIGHT

CARERS + RELATIVES
STAY JUST AS LONG
AS PATIENTS.

DRY JULY SUPPLIED THE FUNDS
FOR ADULTS CHAIRS IN 2012

PATIENTS CAN BE SUDDENLY
ADMITTED FOR OVER NIGHT STAY

" AN ANXIOUS + STRESSFULL TIME"

NEEDS
FOR PATIENT
CARE

DISTRACTION
ENTERTAINMENT
AMUSEMENT
COMFORT
ALMOST LIE FLAT
EASIER ENTRY + EXIT
SURFACE FOR BELONGINGS

UPLIFTING
ENVIROMENT

RELAXING
MUSIC ?

CARE   HUMIDIFIERS

I narrowed the focus of analysis to the current chairs which were purchased in 2013 by staff as a result of charitable donations from Dry July. These were supplied by Bionic Medizintechnik GmbH who specialize in development and manufacturing of therapy chairs for use in dialysis.[178] This new information prompted several different strands of investigative research.

178 Bionic - JMS, "Company,"
accessed 2017. http://www.bionic-jms.
com/company/.

Figure 1. Dry July NZ. 2013
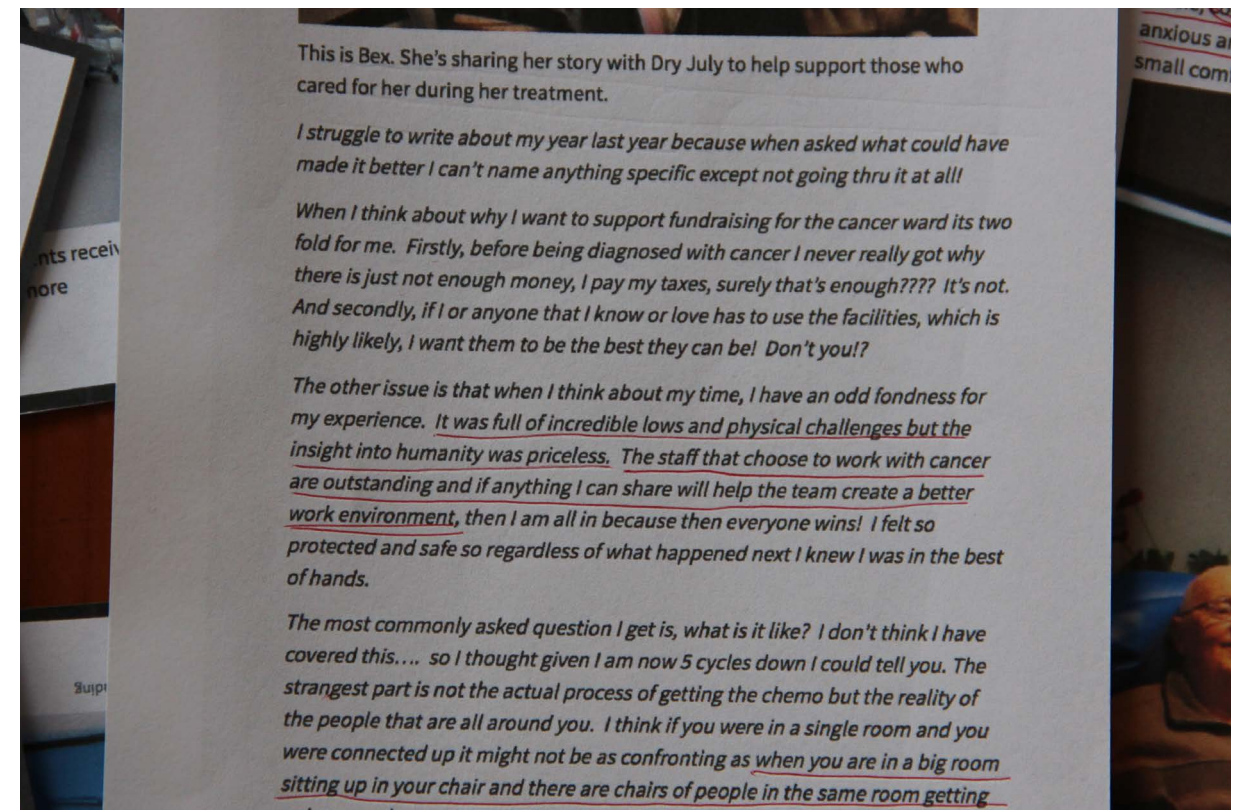
Blog Research

Dry July's blog posts included different stories from patients throughout their cancer treatment which provided insight into their emotional experiences.

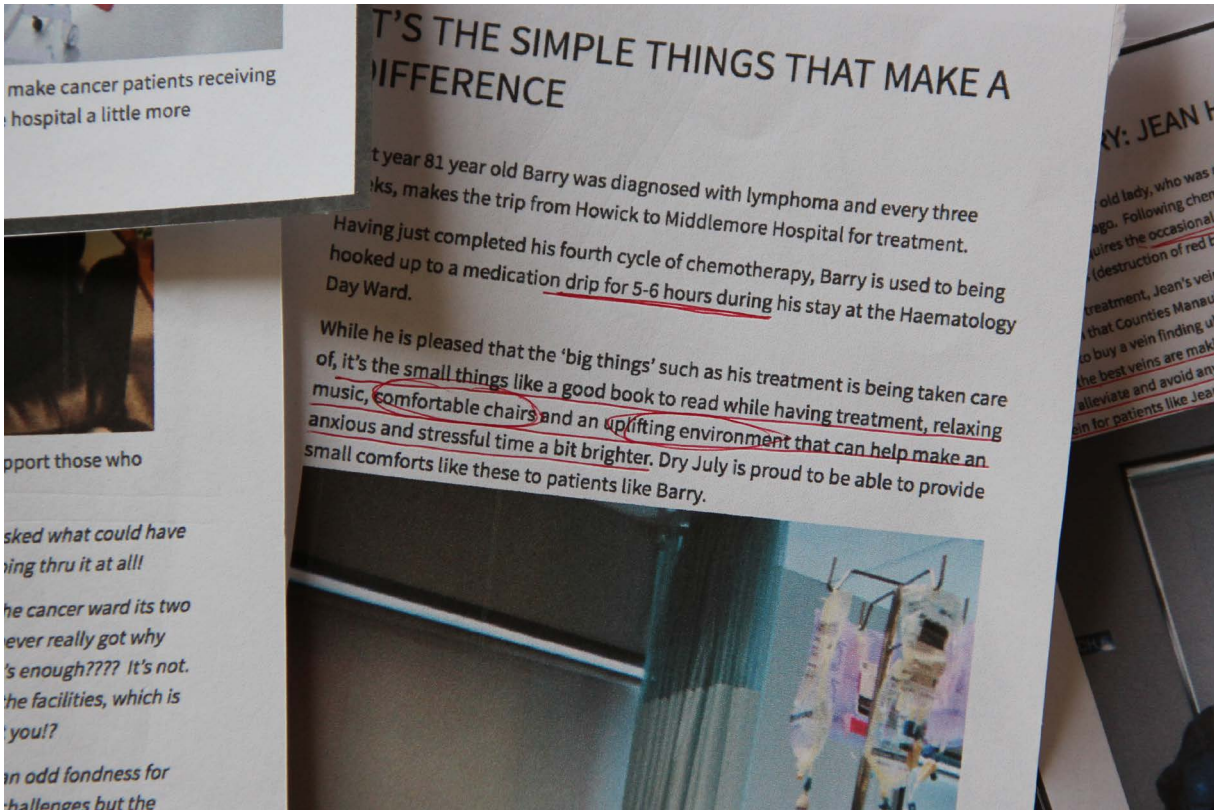"It was full of incredible lows and physical challenges but the insight into humanity was priceless."

IT'S THE SIMPLE THINGS THAT MAKE A DIFFERENCE

...make cancer patients receiving ...hospital a little more

...t year 81 year old Barry was diagnosed with lymphoma and every three ...ks, makes the trip from Howick to Middlemore Hospital for treatment.

Having just completed his fourth cycle of chemotherapy, Barry is used to being hooked up to a medication drip for 5-6 hours during his stay at the Haematology Day Ward.

While he is pleased that the 'big things' such as his treatment is being taken care of, it's the small things like a good book to read while having treatment, relaxing music, comfortable chairs and an uplifting environment that can help make an anxious and stressful time a bit brighter. Dry July is proud to be able to provide small comforts like these to patients like Barry.

...pport those who

...sked what could have ...ping thru it at all!

...he cancer ward its two ...ever really got why ...'s enough???? It's not. ...the facilities, which is ...you!?

...an odd fondness for ...hallenges but the

"...it's the small things like a good book to read while having treatment, relaxing music, comfortable chairs and an uplifting environment that cn help make an anxious and stressuful time a bit brighter."
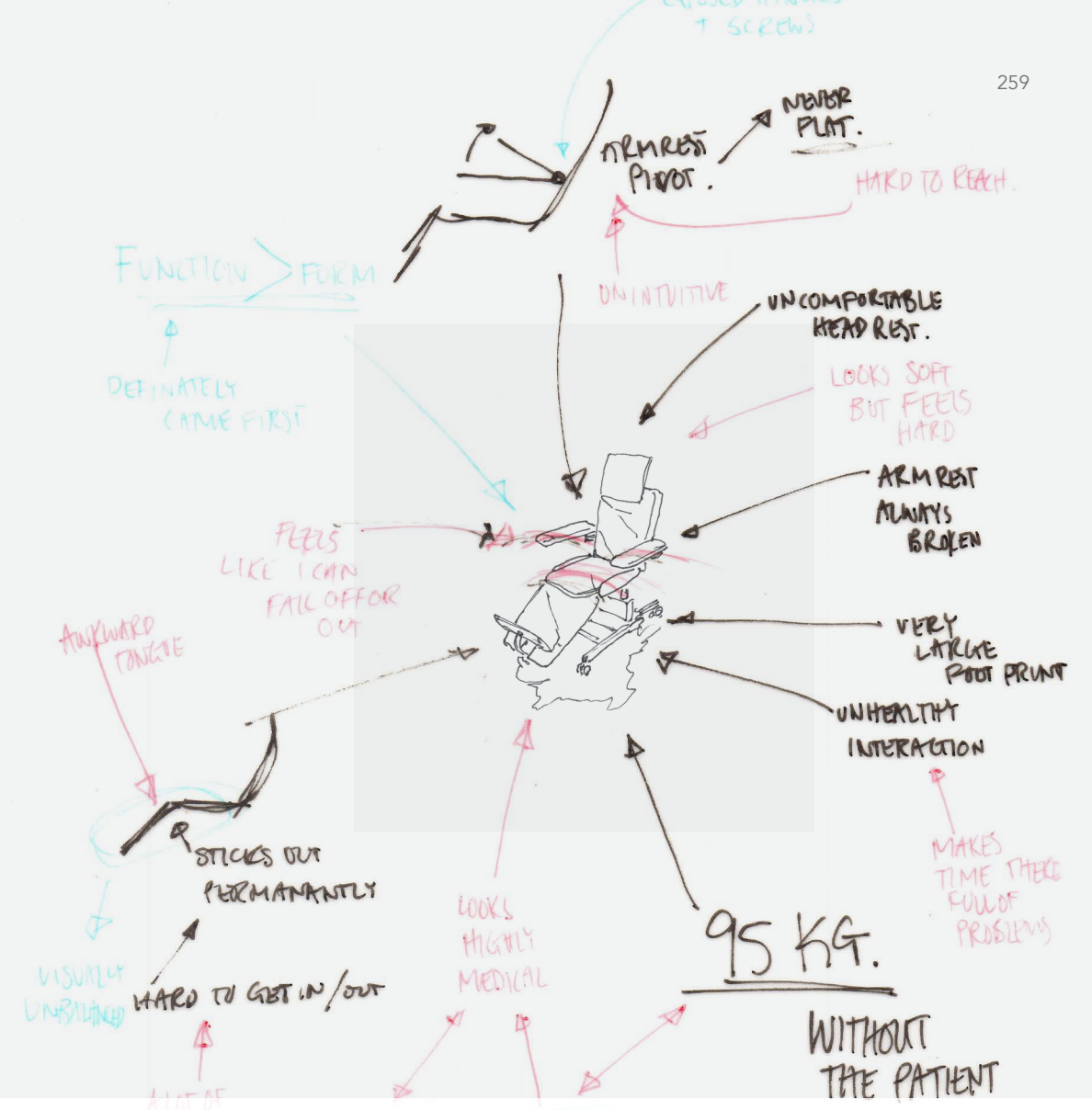
Product Analysis
Existing Chair Designs
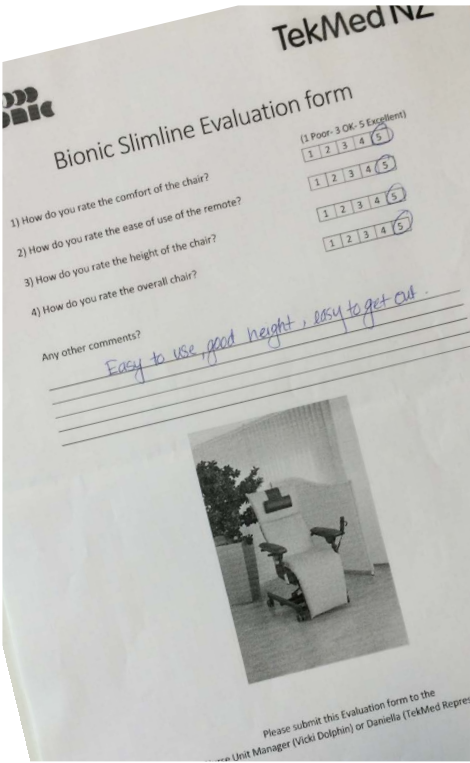
I viewed these products through both, functional, aesthetic and emotional lenses helping identify problems within the existing chairs so they could be changed. While I sourced existing feedback, I felt that it would be more useful to create an engaging questionnaire which asked in-depth questions.

FUNCTION > FORM

DEFINATELY CAME FIRST

ARMREST PIVOT.
NEVER FLAT.
HARD TO REACH.
UNINTUITIVE
UNCOMFORTABLE HEAD REST.
LOOKS SOFT BUT FEELS HARD
ARM REST ALWAYS BROKEN
FEELS LIKE I CAN FALL OFF OR OUT
AWKWARD TONGUE
VERY LARGE FOOT PRINT
UNHEALTHY INTERACTION
STICKS OUT PERMANANTLY
LOOKS HIGHLY MEDICAL
MAKES TIME THERE FULL OF PROBLEMS
95 KG.
WITHOUT THE PATIENT
VISUALLY UNBALANCED
HARD TO GET IN/OUT
LOOKS/FEELS HEAVY

Analysis - Comfortline Therapy Chair

In comparison to the comfort-line this chair is the cheaper, less desired option due to limited functionality and options for positioning patients. It shared common problems to the Comfort-line and did not serve the needs of the patient who had less choice and control over their body position.151 This chair set the minimum standard for chemotherapy chairs, in terms of its function.
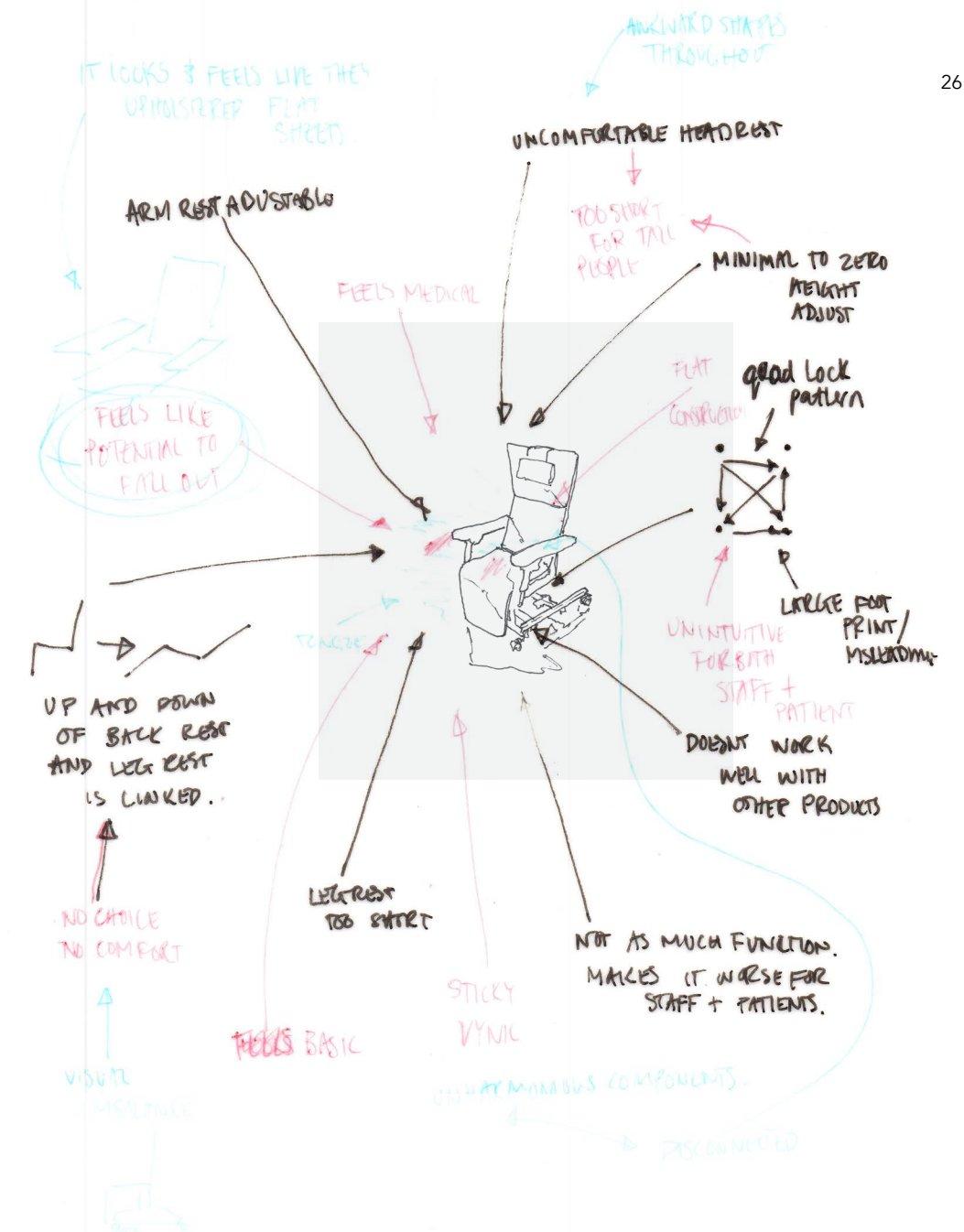
Analysis - Slimline Treatment Chair

179 Wang et al., "Cancer Treatment Environments: From Pre-Design Research to Post-Occupancy Evaluation."

In comparison to the comfort-line this chair is the cheaper, less desired option due to limited functionality and options for positioning patients. It shared common problems to the Comfort-line and did not serve the needs of the patient who had less choice and control over their body position.[179] This chair set the minimum standard for chemotherapy chairs, in terms of its function.
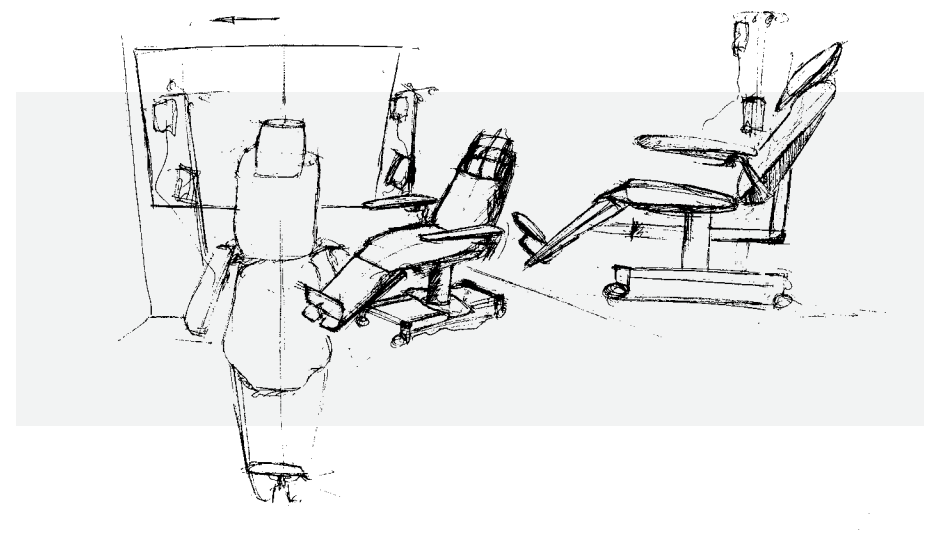
Analysis - T600

STH recognized the T600 Medical Treatment Chair as the most capable chair which are currently in use in other oncology centers they designed. As I do not have access to this chair, I had use detailed drawings and brochures to analyze and draw comparisons to the Comfort-line and Slim-line. Analysis uncovered that functionality, usability and ergonomics of this the t600 was better than the other two. Accessible armrest controls, or fold-out tables and wider arm rest, seemed to provide a more pragmatic approach to providing the physical needs of the patient. Although the overall aesthetic still feels like an engineered product, the chairs also attempted to hide away mechanisms to improve the visual experience.

4

Case Studies

How to Curate Aesthetic Experiences.

I wanted to learn how to effectively project insights from the research for design methods into design. I conducted two case studies which involved designers curating specific emotional experiences through aesthetic. Analysis of how designers used their craft to convey a specific experience revealed that in order to create objects that curated emotional experiences, I must first understand the experience I was trying to create. This would help articulate a design cues to emanate the feelings, emotions and memories which surround the experience.

Garage Italia MX-5

This special edition car was the outcome of a collaboration between Mazda and Garage Italia. This created car which used visual, tactility and materiality to reflect the specific experience of 'the long summer sunset'. Garage Italia used colours, blending techniques, and different materials throughout the vehicle to allow certain memories, past experiences, familiar visuals to emanate from the cars visual aesthetic. They used "bright orange tones that fade into indigo to replicate long summer sunsets" which not only remind me of the sunset, but also what a long summer sunset means to me. To me a long summer sunset means a cool breeze as it settles over the hot sandy beach, onward looking over the water with friends and family. A very specific collection of memories, a sense of fondness and familiarity generated from well selected colour palette and materials.

Hella Jongerious

Hella Jongerious is an award winning designer in a constant pursuit for the perfect colour palette. Looking at her impressive portfolio, she has touched in many areas of design included, fashion, textiles, product, furniture, and interiors. Her work with colour texture and fabric helps to create an aesthetic which curates the emotional experience. An example of this is the KLM Boeing 787 project. Jongarious set out to redesign the interiors of the Boeing 787 aircrafts interior spaces to feel more personal and "homelike". Through user research, she found "Air travellers often feel like insignificant cogs in a well-oiled machine, where every seat is identical except for the number". She focused on improving the passenger experience by creating a sense of aesthetic unity, familiarity of home, and the materiality appeal.

5

8

Maintanance Matters

Antimicrobrial Conundrum

I visited oncology staff to investigate healthcare approved textiles, however, staff were only able to provide information on cleaning and maintenance of the chair. They explained that they prefer vinyl textiles as chairs need to be thoroughly and quickly cleaned between patients, often several times a day. Further investigation revealed that staff use Clinell's 'universal wipes' to clean these chair and that the vinyl generally begins to crack after 3 years of use. Cross checking this information with brochures from Bionic revealed that this was not the recommended cleaning procedure, which could be why the vinyl is cracking sooner than expected.

Other maintenance problems surfaced while speaking with staff. The main maintenance problem related to replacing or fixing broken parts as parts for these chairs cannot be sourced locally. Bionic is a German company that use different series fittings and parts which meant parts needed to be shipped from Germany. This not only took time but also cost more than sourcing parts locally.

Further investigation to healthcare grade materials lead me to Textlia, a company provides a range of textiles already used within medical environments in New Zealand today. The visit to Textilia helped identify specific materials, maintenance procedures, and the available colors. Speaking with the textiles experts confirmed that Clinell 'universal wipes' were not the ideal cleaning method for vinyl as they were potentially made to bring harshness to combat tougher environments.

Hospitals in New Zealand are limited to anti-microbial fabrics to meet health and safety standards. This however provides a very limited color palette and the textiles feel very hard. Alternate options included Marino wool, however, the practicality would rule this option out. This meant I needed to use stiff fabrics to mimic the anti-microbial textiles to replicate the material properties of vinyl.

The Halcyon Collection

Linden
Lavender HPL03

Aspen
Lavender HPA02

Blossom
Lavender HPB02

Cedar
Lavender HPC02

Poplar
Lavender HPP02

Linden
Berry HPL03

Blossom
Berry HPB02

Cedar
Berry HPC03

Poplar
Berry HPP03

Aspen
Berry HPA03

Linden
Petal HPL01

Aspen
Petal HPA01

Blossom
Petal HPB01

Cedar
Petal HPC01

Poplar
Petal HPP01

Linden
Almond HPL10

Aspen
Almond HPA10

Blossom
Almond HPB10

Cedar
Almond HPC10

Poplar
Almond HPP10

Linden
Nutmeg HPL12

Blossom
Nutmeg HPB12

Cedar
Nutmeg HPC12

Poplar
Nutmeg HPP12

Aspen
Nutmeg HPA12

Linden
Tiger-Lily HPL11

Aspen
Tiger-Lily HPA11

Blossom
Tiger-Lily HPB11

Cedar
Tiger-Lily HPC11

Poplar
Tiger-Lily HPP11

Citronella

Lime

Grasshopper

Smoke

Shell

Soda

Coconut

Lemoncello

Carnival

Bubblegum

Primrose

Plum

Regal

Atlantic

Emerald

Cactus

Brazil

Latte

Sand

Soy

Sorbet

Tangerine

Mink

Lilac

Blue Heaven

Ocean

Mussel

Caribbean

Spinach

Coffee Bean

Bark

Nougat

Chai

Flame

Cameo

Rhubarb

Fudge

Grape

Nautical

Jeans

Iceburg

Courgette

Charcoal

Night

Sambuca

Tobacco

Maple

Pinot

Cinnamon

Fudge

Grape

Nautical

China

at work
with
Inside

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3 October 2016

Stephen Reay
Faculty of Design and Creative Technologies

Dear Stephen

Re: Ethics Application: **16/150 Infusion Chair - Emotional resonance of aesthetic experience.**

Thank you for your request for approval of amendments to your ethics application.

I have approved minor amendment to your ethics application allowing changes to the data collection protocols (short interviews with patients and feedback display board).

I remind you that as part of the ethics approval process, you are required to submit the following to the Auckland University of Technology Ethics Committee (AUTEC):

- A brief annual progress report using form EA2, which is available online through http://www.aut.ac.nz/researchethics. When necessary this form may also be used to request an extension of the approval at least one month prior to its expiry on 16 May 2019;

- A brief report on the status of the project using form EA3, which is available online through http://www.aut.ac.nz/researchethics. This report is to be submitted either when the approval expires on 16 May 2019 or on completion of the project.

It is a condition of approval that AUTEC is notified of any adverse events or if the research does not commence. AUTEC approval needs to be sought for any alteration to the research, including any alteration of or addition to any documents that are provided to participants. You are responsible for ensuring that research undertaken under this approval occurs within the parameters outlined in the approved application.

AUTEC grants ethical approval only. If you require management approval from an institution or organisation for your research, then you will need to obtain this.

To enable us to provide you with efficient service, please use the application number and study title in all correspondence with us. If you have any enquiries about this application, or anything else, please do contact us at ethics@aut.ac.nz.

All the very best with your research,

Kate O'Connor
Executive Secretary
Auckland University of Technology Ethics Committee

Cc: Antonio Wan, antonio.g.w@gmail.com; Amanda Smith; Reid Douglas

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12 May 2016

To Auckland University of Technology Ethics Committee (AUTEC),

I am writing to support Antonio Wan's research project "Infusion Chair - Emotional Resonance of Aesthetics Experience". Our department agrees to facilitate data collection for Antonio's project through acting as a point of contact with the patients visiting the Chemotherapy Day Stay for chemotherapy treatment. We are happy to approach the patients on Antonio's behalf and distribute the anonymous patient questionnaire.

I understand that this research will be carried out following sound ethical principles and that participant involvement in this research study is strictly voluntary and provides confidentiality of research data.

Signed: _____   Date: _13_/_5_/_16_

Vicki Dolphin
Clinical Charge Nurse - Chemotherapy Day Stay
Regional Cancer and Blood Service
Buildings 7 and 8, Auckland City Hospital
2 Park Road, Grafton
Auckland 1023

PATIENT QUESTIONNAIRE
SLIM LINE CHAIR
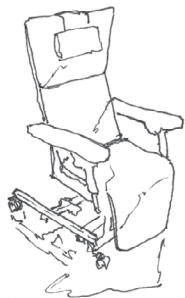
Hello, I'm Antonio, a student from AUT university, working from the Design for Health and Wellbeing lab, and this year I am re-designing the therapy chair. To do this, I need to understand your chemotherapy treatment experiences to improve the treatment experience.

Antonio Wan
AUT Master of Art & Design
Student

antonio.g.w@gmail.com
021 297 3063

Tell me what you really think!

You have been invited to share your experiences of the chemotherapy treatement chair. Your experience using the chair will help me better understand the needs, wants, and problems surrounding the use of the existing chairs as well as what currently works well. I've included a short questionnaire and an illustration of the chair you are using so that you can really point out anything you like or dislike, and any opportunities to improve the chair or its surroundings.

With your help...

a coherent, patient-centred chair can be designed. You will also have the chance to contribute towards a potential improvement of to the healthcare experience for patients or staff. Your thoughts on your experiences will remain completely anonymous and will only enquire about your experiences relating to the treatment chair.

Point out what you like or dont like!

QUESTIONNAIRE

If you wish to participate in this research, please complete the survey, and leave it in the supplied box to be collected. By completing this anonymous questionnaire you consent to participating in this research.

If words cant explain or show what you mean, feel free to draw and make notes on your thoughts of the chair!

1. What do you do during your treatment? is there anything you would like to do that you can't now?
    _____
    _____
    _____
    _____

2. Are there any specific problems or issues to do with the current chair's function?
    _____
    _____
    _____
    _____

3. If you could change, add or take away something from the current design, what is it and why?
    _____
    _____
    _____
    _____

    What works well about the current chair and what doesn't?
4. _____
    _____
    _____
    _____

    How might a well designed chair and or environment improve
5. your treatment experience?
    _____
    _____
    _____
    _____

    What does the current aesthetic (look/style) of the chair make
6. you feel? Is it appropriate for the treatment experience? If not what do you think would be more appropriate?
    _____
    _____
    _____
    _____

    Thanks for your time!

Antonio Wan.