DESIGNING EQUITABLE HEALTHCARE

Master Thesis

Noa Smolenaars

Author
Noa Smolenaars

Mentor
dr. Tilde Bekker

Second Assessor
dr. Yaliang Chuang

Third Assessor
dr. Panos Markopoulos

External Mentors
dr. Eva Deckers
Daisy O'Neill

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Eindhoven University of Technology
Department of Industrial Design
Design Leadership & Entrepreneurship (DLE)

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catharina
een santeon ziekenhuis

This master design thesis is part of my Industrial Design master graduation project 'Designing Equitable Healthcare' at Eindhoven University of Technology. This project builds upon my experiences as healthcare designer and my 11-month internship at Catharina Ziekenhuis Eindhoven, where I had the opportunity to bring innovation to life through hands-on experience in hospital practice.

Throughout my bachelor of Industrial Design, my curiosity for designing women's health deepened and I graduated designing for women who had thrombosis at a young age. By working closely with women and bringing their voices and perspectives into a rehabilitation trajectory, sensitivities were shared and captured that had never before been made into general practice. Through the platform I designed for Thrombosis patients, I observed this shared frustration of vague bodily complaints, misinformation, 'having tried everything' and a sense of hopelessness when navigating through healthcare systems as a woman. As a designer, I saw opportunities to bring women's experiences into practice, women-specific health information and research, focusing on what exists and improve to support women in healthcare practice. There is just that one question that is difficult to answer:

HOW DO WE DESIGN FOR WOMEN'S HEALTH?

Navigating through the complexity of women's health, aiming for real-world implementation is not as utopian as I thought it would be. There were little tangible design approaches that focus on equity in healthcare PRACTICE. It wasn't until I read 'Feminist Designer: On the personal and the Political in Design' by Alision Place (2023), that I found a foothold of what designing for women's health could entail. From there, I incorporated my passion for visualizing and made it my mission to create a tangible framework for other designers who are designing for healthcare practices to integrate equity and female perspectives.

My experiences at Catharina Ziekenhuis Eindhoven have been an invaluable opportunity to emphasize the significance of real-world impact of designing for women's healthcare. This project enabled me to be part of hospital practice and develop a framework for designers how to go from a concept to actual implementation. With my passion for bringing women's health into general hospital practice, I am excited to continue my work as a freelance healthcare designer in thrombosis and cardiovascular care, enabling me to apply feminist design practices throughout the healthcare continuum.

I hope you enjoy the read as much as I did the journey,

Noa

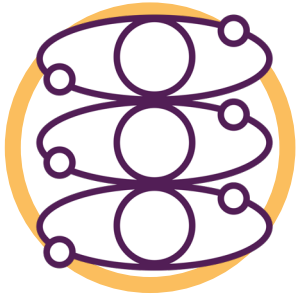
Abstract

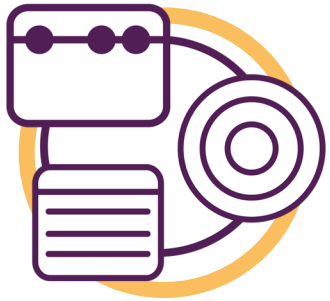
Inequity has impacted and decided many aspects of women's healthcare culture, treatment and organization. To explore how we can design for women's health and bring design approaches into hospital practice, I re-envisioned with a Feminist Design Lens how healthcare can be delivered through three design approaches: (1) ecosystem mapping, (2) care pathway design and (3) service blueprint. By bringing equitable design approaches into healthcare practice, I introduced a practical design framework with real-world examples of designing for women with heart failure at Catharina Ziekenhuis Eindhoven (CZE).

Through critical reflection I found that women's cardiovascular health is seen as an alternative knowledge source and is difficult to implement in dominant practice. In three co-creation workshops with healthcare professionals, I found that visualizing care pathways and facilitating value-based discussions are key to enhance regional and multidisciplinary collaborations and innovation in hospital practice. From practice, I learned that actual implementation happens in the service blueprint where innovation can be integrated in hospital practice. As a result, I designed a visual care pathway for patients with cardiovascular diseases used at CZE and I implemented improvements for gestational diabetes patient information in the remote monitoring application.

Opportunities for improved women's cardiovascular care arise in designing gender sensitive technologies, generating data-driven insights to better understand and address the unique challenges and trends of women's heart failure, actively advocating for women's health throughout care processes and remote monitoring technologies, and by providing accessible visualizations of care pathways to patients.

Table of Contents





Introduction

Gender Inequity in Healthcare Systems.

While health systems strive to provide effective healthcare, they also reflect gender inequalities and biases ingrained in restrictive gender norms (Hay et al., 2019). As a result, women are burdened by the health system's limitations, affecting both access to and quality of healthcare. Two decades worth of cross-national research unveils the global and entrenched gender disparities within our healthcare systems (Syed, 2021). Historically, healthcare research has been focused on male, white and healthy bodies, causing gender inequality in various healthcare areas amongst which prevention (López-Alcalde et al., 2019), diagnostics (Ancochea, 2021), treatments (Harris & Douglas, 2000), education and research (Gulati, 2020).

Advancing Women's Health

Increasing efforts recognize women's health is multifaceted, encompassing not only biological aspects, but also socio-cultural, and environmental factors. Crucial for research, innovation and healthcare implementation is collaborating with women to understand their bodies, experiences and needs (Baird et al., 2021; Fitzpatrick & Thakor, 2019; Place, 2023). For example, Erasmus Medical Center will be first to investigate the effects of antiplatelet therapy on menstrual blood loss in collaboration with women who use anticoagulants (Gelberg, 2023). Internationally, there is a new drive to advance women's health such as President Joe Biden's first-ever White House research initiative (The White House, 2023) and the European Commission's strategy for gender equality in research and innovation (European Commission, 2023). Moreover, there is a noticeable increase in companies dedicated to fund women's health research (Baird et al., 2021), educating (HearthLife klinieken, 2023), designing female health technologies (Wiederhold, 2021) and other matters related to women's healthcare and overall well-being (Helder, 2023; Nyssa, 2023).

Financial Impact of Women's Health

Not recognizing and acting on gender inequalities in healthcare is extremely costly. Migraines and endometriosis, two diagnosis which affect women disproportionally, have an estimated cost of 750 billion euros in the EU every year (Care4everyBody & European Union, 2023). The EU researcher quantifying the impact of women's health said: "it was probably one of the most traumatic pieces of work I have ever done in my life", emphasizing the inequity between women's health (Care4everyBody & European Union, 2023). Dutch researchers estimated a total of 2.5-7.8 billion euros a year for women-related healthcare societal costs (Nederlandse Vereniging voor Obstetrie & Gynaecologie & WOMEN Inc., 2023; Van Gestel, 2023). For women, elevated healthcare costs have a socio-economic impact (Syed, 2021), resulting in prolonged suffering (Care4everyBody, 2023), diminished income (Marini & Fan, 1997), restricted career opportunities (Care4everyBody, 2023), and additional indirect expenses as well, which all contribute and sustain the gender gap (Bourgeault, 2010).

Disadvantages in Women's Health.

Historically, the male body has been the default in healthcare diagnostics (Harris & Douglas, 2000; Gulati, 2020). As a result, women are often misdiagnosed (Ancochea et al., 2021; Gesi et al., 2021), experience diagnosis delays (Ghai et al., 2020; Jaffee et al., 2016), mistreated (Bohren et al., 2015), have higher comorbidity with depression (Möller-Leimkühler, 2010), lower advocacy (Dean, 2020) and less likely to be involved in rehabilitation (Hay et al., 2019). Male-based care still lead to women being disadvantaged across the healthcare continuum. In 2017, women globally made up 40% of drug trial participants, leading to underrepresentation and incomplete understanding of the effects of drugs on women (FDA, 2019). Moreover, for endometriosis, a painful condition affecting the lining of the uterus, nearly 75% of women are misdiagnosed and there is a diagnosis delay between 4-12 years globally (DiVasta et al., 2018; Hudelist et al., 2012). Another example is, that only in 2005 the true anatomy of clitoris was discovered, which had limited research in areas among which gender and sexuality studies, psychoanalysis and sexology (Blechner, 2017; O'Connell et al., 2005). Important to note is that female individuals can differ hugely from each other. Research shows breast cancer amongst Black women occurs at younger age resulting in a higher mortality rate than white women, yet preventive diagnostics are still set at older age (Rebner & Pai, 2020). Furthermore, health literacy amongst women has a negative effect on their health, and their ability to navigate through healthcare systems and intergenerational health (Shieh & Halstead, 2009) Lastly, women are less likely to be included in rehabilitation for cardiovascular diseases and more likely to die in heart attacks (Champney et al., 2009; Garcia et al., 2016).

Women's Cardiovascular Care

Cardiovascular diseases have been receiving more and more attention over the past decade. Research shows women experience different symptoms for heart infarcts than men (Maas et al., 2011; Maas 2019; Regitz-Zagrosek et al., 2015), but are still underrepresented in research (Wittekoek, 2023). Highlighting the need for knowledge and improved treatments for female cardiac health in practice (Maas, 2019, Wittekoek, 2023). The gender of the healthcare professional can also affect treatment of women's cardiovascular diseases. Professor of Professional Performance Kiki Lombarts said in a 2024 interview that when a woman with a heart attack arrives at the ER and is treated by a male cardiologist, her chance of dying is three times higher than when being treated by a female cardiologist (Van Gaalen, 2024). Unfortunately, even with these confronting numbers, making changes in practice for improved cardiac care for women remains a challenge. One reason is that the medical system is grounded in its belief in objectivity: deliver care based on impartial tests (Hillman, 2020). Nevertheless, diagnosis tools are trained to the male-default and females with heart failure are perceived as atypical, which prevents objective judgement of care professionals and leads to misdiagnosis, wrong medication and suboptimal care for women. We need to rethink, reimagine and rewrite how we deliver care for women with cardiovascular diseases.

Feminist Perspectives

Previous work in healthcare has shown approaching women's health from a feminist perspective benefits the outcome (Fee & Krieger 2020; Place 2023). Feminism is a framework for equity based on gender, gender expression, sex, and sexuality. Feminist service design is a way of designing systems & services, that question and challenge the dominant patriarchal culture and instead centers the experiences of marginalized groups (Place, 2023; Søndergaard, 2020). Moreover, feminist research explores influences of gender in healthcare such as medication, medical decision making, data-driven healthcare and treatment (Perez, 2019). Feminism also takes a holistic approach for achieving equitable healthcare (Ngozi Adichie, 2013; Place, 2023). Additionally, feminism helps us to understand how we create health inequalities and how to design with equity. We must consider feminist perspectives in clinical practice. Failure to address gender inequities exacerbates biases, not eliminate them (Figueroa et al., 2021; O'Neil, 2017).

Digital Healthcare Transformation

Healthcare is changing in the digital age. This is not without a challenge. Innovating and delivering health services requires considering technological, political, social, cultural and economic factors. Collaboration between hospitals, insurance companies, HealthTech industries and solution providers are key to transform healthcare practices and ensure that the lived experiences and needs of women are aligned in multidisciplinary healthcare initiatives (Elahi et al., 2023). Digital care has found its way into healthcare practices to personalize and alleviate pressure from the healthcare system (Buther & Hussain 2022; Jung et al., 2023; Robert et al., 2021; Thimbleby, 2013). To transform hospital practice, we should revise how healthcare is delivered by actively integrating hybrid care, and not perceiving technology as a one size fits all (Thimbley, 2013). A solution is remote monitoring, which allows hospitals to monitor and deliver care remotely, reducing hospital visits and healthcare costs (Khan et al., 2023; Malasinghe et al., 2019). In hospital practice, remote monitoring is not a challenge of technical development but of technical application involving two essential factors: (1) efficient organization of technology between digital worlds and (2) employing resources to address challenges and realize ambitions. This is especially challenging in healthcare due to privacy risks (Van der Poll, 2023). Meaning technology will not push for transformation, because it is either too complex, too expensive and not meeting the demands of hospital practice.

Role of Designers in Healthcare

Designers have started to play a key role in healthcare transformation. They have essential competences such as understanding users' needs, expectations and experiences (Melles et al., 2020, Patrício et al., 2020). Designers can collaborate with multidisciplinary stakeholders, aligning values of patients, healthcare professionals and society (Melles et al., 2020). Moreover, designers can work in iterative processes with rapid prototyping, early testing and validation. Bringing designers into hospitals helps bridge the gap between technology, healthcare professionals and patients, enhancing transformative changes that foster qualitative and equitable healthcare services aimed at implementation (Shah & Plough, 2022).

Design Approaches in Practice

Common approaches in clinical practice are workflows and service blueprints. Workflows refer to the sequence of steps involved in the delivery of healthcare services, care coordination and resources (Peleg & Haug, 2023). Service blueprints illustrate complex front- and back-ends of service ecosystem including underlying processes, technology and supporting systems (Bitner et al., 2008). Other design approaches in healthcare are ecosystem- and care pathway mapping. An ecosystem maps a comprehensive view of stakeholder networks with entities such as healthcare providers, patients, policies, value flows and interactions (Lingens et al., 2021). Metro Mapping is a structured approach to visualize and contextualize care pathways (Griffioen et al., 2022; Metro Mapping, 2023). In hospital practice, there is little visualization of workflows or service blueprints to coordinate a holistic understanding of healthcare processes and engage healthcare professionals in innovating healthcare. Research advocates for practical methods and approaches tailored to be embedded in healthcare design practice (Vink et al., 2021). Integrating design approaches into clinical practice presents an opportunity to leverage the strengths of design, including collaboration (Nyström et al., 2018), visualization (Griffioen et al., 2022) and implementation (Vink et al., 2021). As illustrated above, there is a need for design approaches that prioritize both equity in healthcare design and implementing design in practice. Rather than developing new methodologies, there is an opportunity to critique, improve and adapt design approaches (Gericke et al., 2020; Place 2023). To go from understanding healthcare processes to equity, design and implementation, practical design examples are essential to illustrate implementation in real-world scenarios (Gericke et al., 2020).

In this Report

For my Final Master Project at Industrial Design, I created a service for designers in hospital practice to design equitable healthcare. By bringing design approaches into healthcare practice, I introduced a practical design framework with real-world examples from hospital practice: an ecosystem, care pathway and service blueprint for women with heart failure from a feminist design perspective at Catharina Ziekenhuis Eindhoven. By introducing designers to a tangible feminist design lens for equitable healthcare, I aim to inspire healthcare designers to critically look at their own work and provide them with accessible design resources for them to use.

In this report, I present an ecosystem, care pathway and service blueprint for women with heart failure along with my design process, methodology and practical insights from hospital practice. By leveraging the power of visualization, co-design workshops and working in a clinical setting, I explored how design approaches can be used to visualize care pathways and enhance collaboration with healthcare professionals. Lastly, I have made multiple implementations to improve patient information at Catharina Ziekenhuis Eindhoven.

DESIGN FRAMEWORK

Design Framework

The Framework for Designing for Equitable Healthcare is based on three widely used healthcare design approaches (1) ecosystem, (2) care pathway and (3) service blueprint, each of which offers strategies and insights to transform healthcare practice (see Figure 1). The framework, integrates feminist principles and is grounded in a feminist design lens, fostering a foundation for equitable perspectives in healthcare design. The framework evolved through my experience at Catharina Ziekenhuis Eindhoven, where I worked as a designer for nearly a year, spanning both my FMP and M2.1. It is the outcome of my work as designer in healthcare practice during this period.

In practice, the framework is not linear. Healthcare designers opt in and out with new insights, challenges and opportunities. Each design approach strengthens the other's outcomes by offering new perspectives and creating a holistic representation of healthcare in practice. Alterations to a care pathway can impact implementations in the service blueprint, and potentially require additional stakeholders in the ecosystem. Similarly, when more healthcare professionals engage in care pathway collaborations, the ecosystem will broaden as new stakeholders become involved.

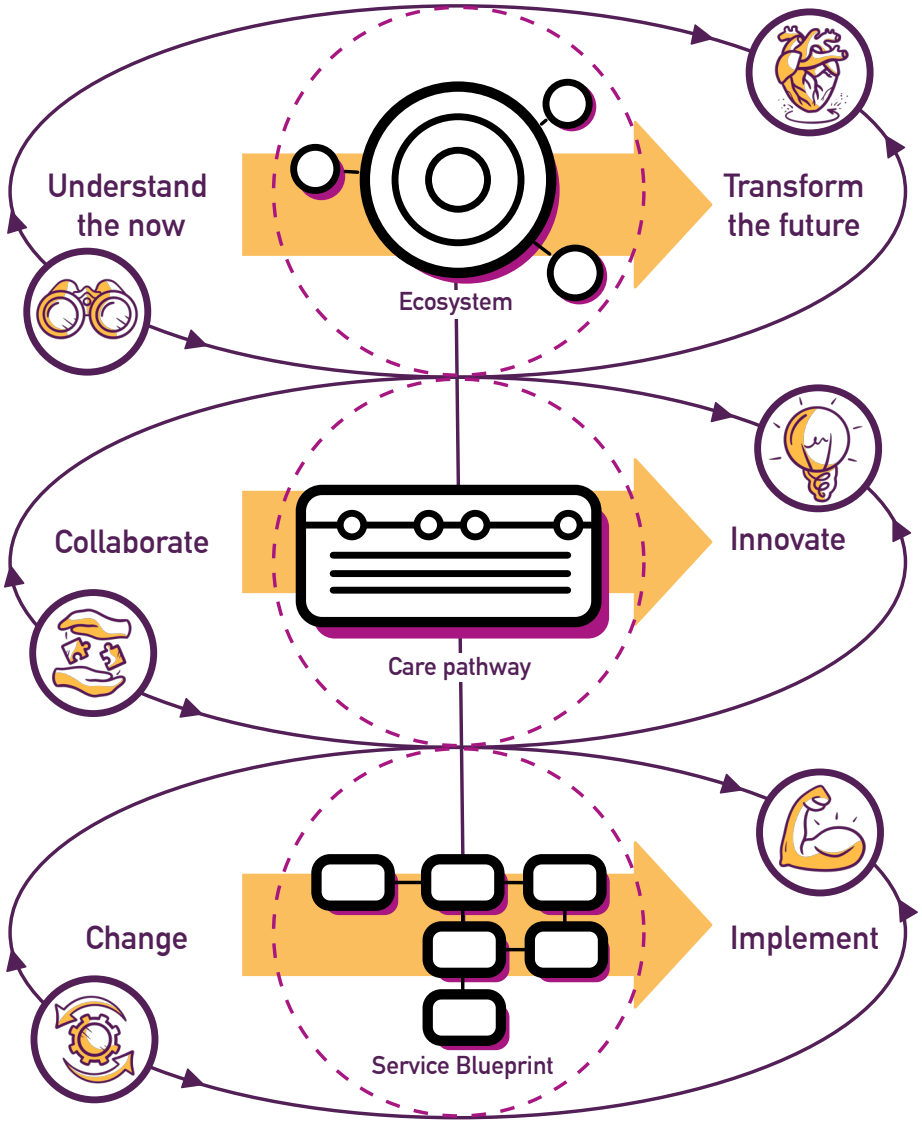
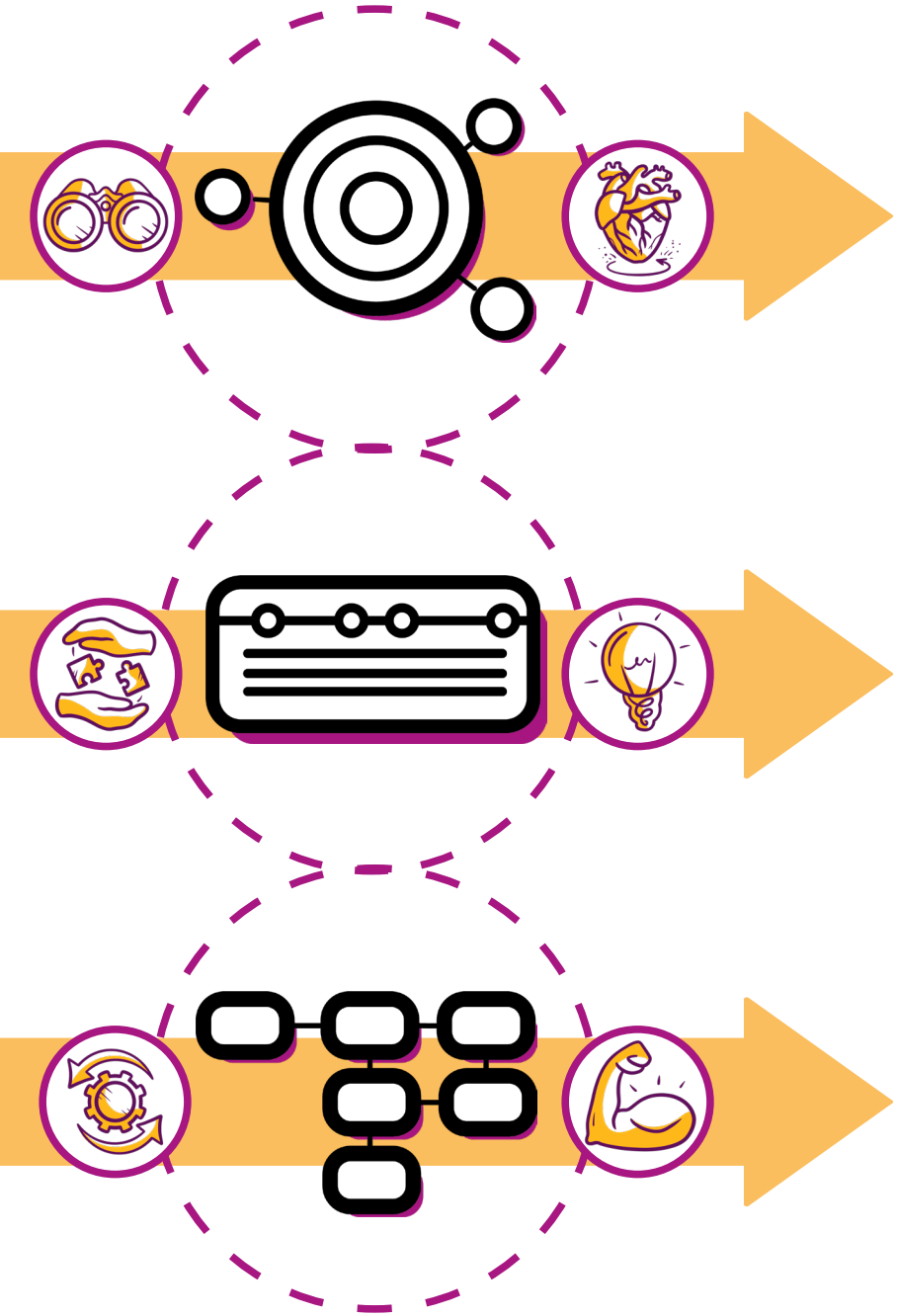


Figure 1 **Framework for Designing Equitable Healthcare**



Envisioning futures

The ecosystem mapping helps designers to take a broader perspective of healthcare design. The design approach aims to engage stakeholders in collaboratively envisioning potential futures. Through the feminist design lens, designers are challenged to explore who they are envisioning for and whose voices and knowledge is overlooked. As a result, the ecosystem has three different layers: the current state, unexplored opportunities and potential futures.

Collaborating in healthcare transformation

Care pathway design provides an overview and context of complex healthcare pathways. The design approach makes it easier for healthcare professionals to engage with healthcare transformation through visualization. Through the feminist design lens, designers are challenged to empathize and collaborate with patients and marginalized voices. As a result, the care pathway enhances communication and alignment among healthcare professionals, ensuring the shared mission towards equitable and digital healthcare transformation.

Implementation in clinical practice

Actual changes in how healthcare is delivered takes place in the service blueprint. Embedding changes in the service blueprint aim to transform day-to-day operations and services in healthcare practice. The design approach focuses on implementing tangible modifications in the way healthcare is delivered. Through the feminist design lens, designers are challenged to implement changes that focus on improved outcomes for equitable healthcare and patient experiences. As a result, the service blueprint is a redesigned workflow detailing the implemented changes in step-by-step healthcare processes.

Figure 2 **Feminist Design Lens for Designing Equitable Healthcare**

Feminist Design Lens

Feminist Design Practices

Applying feminist design practices can take many forms, for me, the most practical way of feminist designing is to consider feminist values and how they translate into practice. Six important feminist values are **knowledge**, **power**, **plurality**, **community**, **care** and **liberation** (Place, 2023). We can embody them as designers, we can make them integral to the design processes, and they can come alive in the services that we design. As designers, this requires us to do deep self-work and reflection and can also be a very meaningful exercise to do as a team, not only on the power of personal identities, but also reflecting on the power that we have in the role of designer. By understanding feminism on a systemic level and zooming in on each design approach we can reach an implementation level of feminist values for equitable care. The Feminist Design Lens and its feminist values are based on the book 'Feminist designer: On the Personal and the Political in Design', by Alison Place (2023).

Feminist Design Cards

Over each design approach you can apply feminist values to design for clinical practice. To introduce healthcare designers to designing equitable healthcare, I created a card deck to apply feminist values to ecosystem mapping, care pathway design and service blueprints (see Figure 2). By introducing designers to a tangible feminist design lens for equitable healthcare, I aim to inspire healthcare designers to critically look at their own work and provide them with accessible design resources for them to use. The deck exists of cards with definitions of the values, positive examples of feminism in design, guidelines for designers and roads to implementation (see Table 1). All cards can be found in Appendix A.

01. Knowledge

Feminist theories of knowledge highlight the systematic disadvantages women and other marginalized groups face in dominant practices and knowledge. This emphasizes a distinction between accepted truths in dominant knowledge and marginalized forms of knowledge. As a designer knowledge is a key component of our process. It's essential to acknowledge that our research is shaped by certain assumptions about knowledge. Therefore, in our processes, we must question where our knowledge comes from, whose knowledge we prioritize and value, and how a scientific epistemology influences our design decisions .

02. Power

Designers, often positioned as an impartial party between stakeholders, academia, and industry, adeptly navigating diverse client and user expectations. Celebrating simplicity places designers above the audience, aiming to educate the masses. This fails to address the designers role as a social and cultural practice within broader power structures. For instance, designing for mental or sexual health face ethical challenges within academic structures. Through the exclusion of certain aspects in healthcare design, marginalized voices are muted. Design choices in health are influenced by power structures, meaning those in power determine intended recipients of healthcare design.

03. Plurality

The design process is traditionally one of simplification, aiming to reduce complicated problems down to a single hurdle. Western technological norms and practices take a universal stance in design. But designing for diverse populations across physical, social, and cultural differences requires the opposite of universalism: pluralism. Pluralist design encourages foregrounding (cultural) difference, engaging with diversity and embracing the margins. Pluralistic approaches center more equitable outcomes by not only catering to a singular dominant narrative or experience, and by re-thinking binaries.

04. Community

Community extends beyond our connection to the world and its people; it encompasses how we relate to each other as designers. Addressing intricate social, political, and environmental challenges demands collaboration. In the ever-evolving field of design, representation, equity, and collaboration are crucial for both individual and collective progress. Our primary goal is to link isolated issues to a collective movement, transforming our field and addressing complex problems together. As designers we can persist in learning, questioning, and speaking out and collaborating in and outside communities.

05. Care

Caring is typically associated with women and tasks in a domestic space of caring for. Feminist theories emphasize care as interdependent and less about predetermined behaviors. Care isn't about following a set of rules. Rather, it involves our responses to connections with others across various situations and over time. It transcends mere moral correctness, encompassing the skills and awareness needed to understand and nurture vital relationships in our daily lives. In design, caring practices should emphasize the continuous, responsive nature of listening, making mistakes, growing and persevering. Starting with ourselves and moving outward.

06. Liberation

Liberation is a common objective in feminism, and amongst others, race, sex and class play key roles. In design practices, it is important ask yourself whose future you are envisioning, and whose power, knowledges and biases do you rely on to imagine these futures? Feminist futures picture possible outcomes as strategies to lead to an 'otherwise', not onward. Contrary, we require learning about the true present by staying with the trouble instead of escaping to imagined futures. Designers can challenge the status quo by facilitating other types of encounters, conversations, and imaginaries, and giving voice to people, things, and animals otherwise marginalized groups.

Feminism in Service Design & 6 Feminist Values.

Examples of Feminist Design in Practice.

Feminist Lens on Design Framework for Ecosystem, Care Pathway & Service Blueprint.

From Feminist Values to Hospital Practices.

Table 1 **Sample of 28 Cards of the Feminist Design Lens**

Feminist Value

Value Description

Design Dimensions

(1) Designer
(2) Design practice
(3) Design

Design Approach

Ecosystem, Care Pathway, Service Blueprint

Framework in practice

Applying the Feminist Design Lens

Figure 3 illustrated healthcare designers using the Feminist Design Lens to challenge their dominant practices. Through the knowledge cards, they realize that working exclusively with healthcare professionals, and as a result patient information aligns more with healthcare-educated individuals than with patients. To address this, they involve patients with lower literacy levels to evaluate and improve patient information. Consequently, they broaden their ecosystem, adjust the care pathway and make changes in the service blueprint. Through practice and real-world examples, healthcare designers understand feminism on a systemic- and practical level and have an accessible tool to design equitable healthcare.

Figure 3 **Feminist Design Cards in Hospital Practice**

DESIGN PROCESS

Understand
Hospital & Women's Health

Explore & Play
Design Approaches & AI

Bridge
Collaboration & Design

Build & Play
Women's Cardiovascular Care

Finish
Design Framework & Lens

- Designer at CZE
  since February 2023
- Healthcare symposia
- Literature study
- Care pathways

- Expert interviews
- AI and storytelling
- Healthcare mapping methods
  e.g. care pathways, service blueprints, patient journeys

- Design feminist lens
- Stakeholder ecosystem
- Co-creation with healthcare professionals

- Re-design healthcare maps with feminist lens
- Design for implementation
- Visual care pathway for patients

- Design Framework
- Card deck feminist lens
- Future of designers in hopsital practice

BE US CA TR MDC DRP

The Design Odyssey Framework

My design process can be best described as an adventurous journey with many discoveries along the way, where decisions are influenced by the reality of design work, my lived experiences, and professional learning goals. The Design Odyssey Framework is based on the reality of design, starting off with a project goal and circling back to earlier stages while exploring, going on side quests, interruptions, modifications, collaborating with experts and learning new things whilst cycling back to earlier stages (Ford, 2022). The Design Odyssey framework can be found in Appendix B.

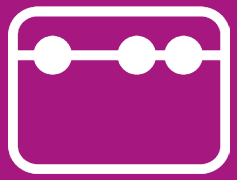
Summary Design Process

At the beginning of my collaboration with Catharina Ziekenhuis Eindhoven (CZE), I defined my project goal as implementing design approaches into healthcare practice. My personal learning objective was learning how to design for women's health and bridge feminist theories into design- and healthcare practices. By working 2-3 days a week at the hospital, I created several care pathways for cardiovascular conditions. Next, I started to explore the role of AI in storytelling, a side quest instigated by a three-day workshop. In this phase, I met many wonderful experts and started to collaborate on bringing design approaches into healthcare practice at CZE. To focus on my learnings, I circled back to my personal goal to bring feminism in healthcare design and strive for equity. I created a feminist design lens, redesigned an ecosystem, care pathway and service blueprint specifically for women with heart failure, evaluated the design approaches with experts and translated care pathways into visualizations for patients as implementation at CZE. To conclude my FMP, I captured my insights and design process in a practical framework, made the feminist design lens tangible and envisioned the impact designers can have on the futures of equitable healthcare.

Final deliverables

To deliver a coherent example of how to design equitable healthcare, my design process is focused on the use-cases of women with cardiovascular diseases, which at Catharina Ziekenhuis Eindhoven (CZE) entails heart failure (HF), cerebrovascular accident (CVA) and cardiovascular risk management (CVRM). For my final deliverables, I created three main deliverables ecosystem, care pathway, service blueprint for women with HF based on the feminist value **Knowledge**. In the next chapters I will illustrate each design approach with the Feminist Design Lens and explain in-depth my design methodologies, results, insights, implementations and recommendations.

Ecosystem Mapping
Page 22



Care Pathway
Page 31

Service Blueprint
Page 40

ECOSYSTEM MAPPING

Methodology

Design Activities

To take a broader perspective in healthcare design I wanted to better understand the context of women's cardiac health for which I used different methodologies. I performed a literature study to explore current challenges in healthcare design. To become knowledgeable in women's cardiac health and feminism, I read several books from cardiologists and feminists (D'ignazio & Klein, 2023; Maas 2019; Perez, 2019; Place, 2023; Wittekoek 2023). Moreover, I attended several symposia to meet healthcare experts, gain new skills and learn about current challenges and opportunities in healthcare. One of my personal development goals was to expand my network of healthcare enthusiasts and explore what kind of design jobs exist in healthcare. Lastly, I conducted expert interviews, because I value new perspectives and wanted to learn from designers' experiences of working in healthcare practice.

Catharina Ziekenhuis Eindhoven

In practice, ecosystem mapping starts out small and includes only CZE healthcare professionals involved in a project. For example, a cardiologist, vascular nurse specialist and cardiac nurse are part of the stakeholder mapping for heart failure. As the project progresses, the mapping will expand and evolve from only internal- to external stakeholders. I envision the ecosystem mapping to start at two levels of detail. One ecosystem mapping is zoomed in as described above and one that takes the broader perspective in healthcare. Both ecosystems can co-exist and inspire each other to consider different stakeholders.

Women with HF

See result on next page (Figure 4)

There is a distinction between accepted truths in dominant knowledge in healthcare & academia and knowledge about women's health. When designing for women's health, knowledge comes from other sources than mainstream practice. Knowledgeable experts in women's cardiac health are viewed as alternative voices and it's difficult for their knowledge to influence or become part of clinical practice. The ecosystem calls for a redistribution of knowledge. In practice, as academia we should ask ourselves how we can include marginalized voices in our education and how we prevent discontinuing generated insights but bring them to practice. Our intentions should go beyond knowledge generation and shift to impact and implementation.

Knowledge - Health care

There is a distinction between accepted truths in dominant knowledge in healthcare & academia. In blue the current knowledge flows are shown. Most knowledge comes from either research, industry or healthcare.

The arrows say:
.... shares knowledge/resources with ...

Voices - Women's health

Currently, knowledge of marginalized voices is overlooked and design choices are influenced. In red, alternative voices of knowledge are shown. There is much knowledge amongst women's health networks, but the knowledge does not find its way down to practice in hospitals easily

The arrows say:
.... voices knowledge to ...

Knowledge - Redistribution

What if we could redistribute knowledge? Whose knowledge should we value, and where does knowledge come from? In green, the redistribution of knowledge is shown. Knowledge from marginalized groups goes to health collaborations and medical professionals. Knowledge will come from all sides and trickle up and down in practice in hospitals.

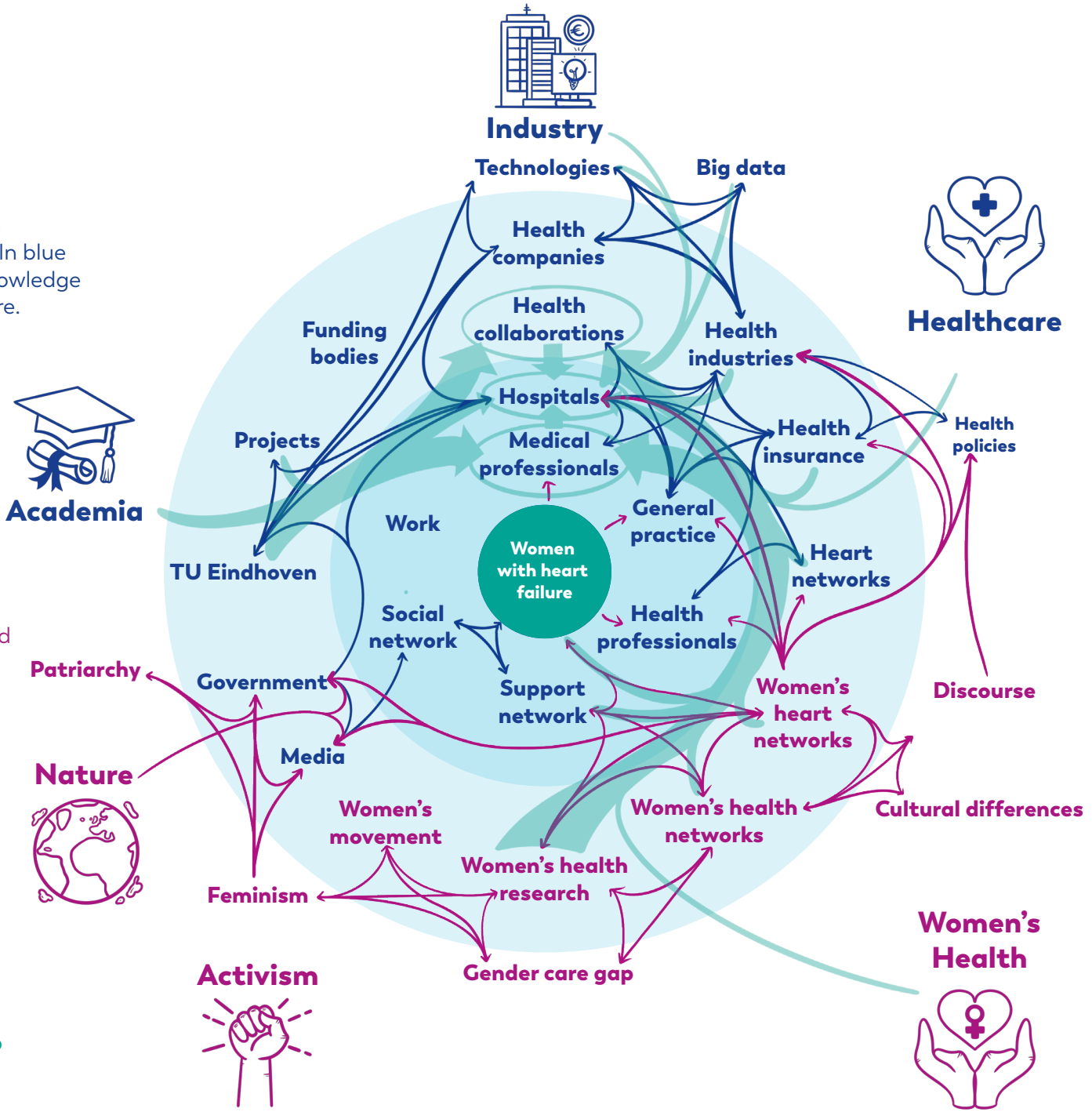


Figure 4 **Ecosystem Mapping for Knowledge of Women with Heart Failure**

Understand

Women with Heart Failure

To understand the context of cardiovascular health amongst Dutch women, two books by Dutch cardiologists formed a foundational guide throughout my project: 'Heart for women' by Dr. Angela Maas and 'Heart/Head connection' by Dr. Janneke Wittekoek. Their knowledge of and voices for women with heart failure helped me understand the difficulty of bridging women's health research to practice and the complexity of the social-historical context (see below). By bringing designers into hospitals, new ideas and innovative solutions can more easily be generated, tested and validated. As a result, I focused on designing healthcare for practical implementation during my internship at CZE. Aiming to understand the needs, expectations and experiences of the hospital and healthcare designers in hospitals.

Dr. Janneke Wittekoek:
"**When it comes to the women's heart, medical science is always behind on new findings in medical practice.**"
(De Jong, N. 2023).

1910
Nr. 1 Cause of Death Women
Cardiovascular diseases (**CVD**)

1920
Torches of Freedom
Cigarette campaign celebrating women's voting rights

1960
"How to take care of your CVD Husband"
And 100 other outdated reasons why women are held responsible for the cardiac rehabilitation of their husband

1980
Increase Stress and Depression
Women should be fit and skinny according to TV and magazines, leading to more eating disorders and CVD among women

1990
First Women's CVD study
Stress and emotional wellbeing is key factor CVD women

2000
Women's CVD Health
Guidelines for CVD prevention for women

2020
Women's CVD Health in Practice
Call for gender sensitive cardiovascular healthcare

(Wittekoek, 2023)

Context Mapping

In addition to acquiring knowledge on women's cardiovascular health and internship direction, I conducted a context mapping of existing companies, designs and other solutions for women's cardiovascular health to identify gaps, opportunities and contributions (see Appendix C). The mapping revealed many informative channels among which books, magazines, platforms and social media, but a lack of implementation in general healthcare practices. Exceptions include clinics for women such as HeartLife in the Netherlands and virtual rehabilitation applications. However, these are either not integrated into mainstream healthcare practices or have subpar UI/UX design, limiting their usage and reach. Moreover, I worked for 2-3 days a week at CZE and attended every Monday stand-up meetings to gain more real-world experience in hospital practice.

Healthcare Symposia

Throughout my FMP, I attended various symposia and events related to healthcare transformation, women's health and emerging technologies (see Figure 5a-c). In total, I visited Nederlands Hart Netwerk (NHN), Metro Mapping (MM) symposia, MedTechDay '23 (MTD), Health Embassy at DDW, (HE) Service Design Days organized by Philips (SDD) and Global Jam Eindhoven with GGD Eindhoven (GJE). My insights were that healthcare professionals are looking for an integrated approach to future-proof healthcare (MTD). Gender differences in cardiology exist in research, but are not implemented in practice (NHN), Healthcare service design is slowly finding its way into clinical practice (SDD). Healthcare professionals across disciplines are looking for tangible ways to collaborate (HE). Health institutions struggle with delivering equitable care (GJE).

Figure 5a **MedTechDay 2023**
(e/MTIC, 2023)

Figure 5b **Global Jams Eindhoven**
(Global Jams Eindoven, 2023)

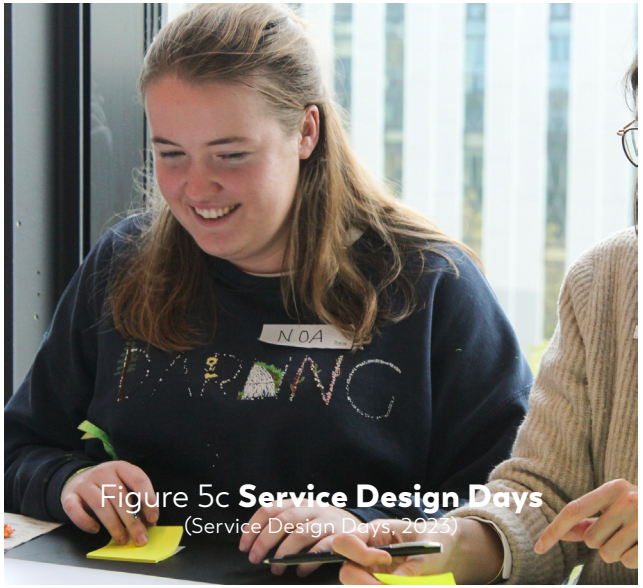


Figure 5c **Service Design Days**
(Service Design Days, 2023)

Explore & Play

Critical Reflection on Design Approaches

Next to my objective to explore the practice relationships, I critically reflected on the design approaches. When designing equitable healthcare, it is important to challenge the dominant culture that often centers experiences of privileged groups in healthcare. As a methodology, I used an ecosystem mapping to contextualize stakeholders for women with heart failure (see Figure 6). The result showed a comprehensive collection of stakeholders. However, the relations and value flows are often surface level with such a mapping. Therefore, I organized a reviewing session with a feminist healthcare designer to review the ecosystem mapping based on (1) positive/negative attributes for HF patients and (2) structural impact/issues. With the insights of the ecosystem, I concluded criteria for the designer, the design process and the design when designing for equitable health with a feminist lens (see Table 2). Layering the ecosystem showed plurality in where and for whom designers create value, where the design process requires a different lens and how to re-design care pathways. Re-designing an ecosystem was a valuable exercise that taught me to look further than perceived superficial value flows. The detailed ecosystem can be found in Appendix D.

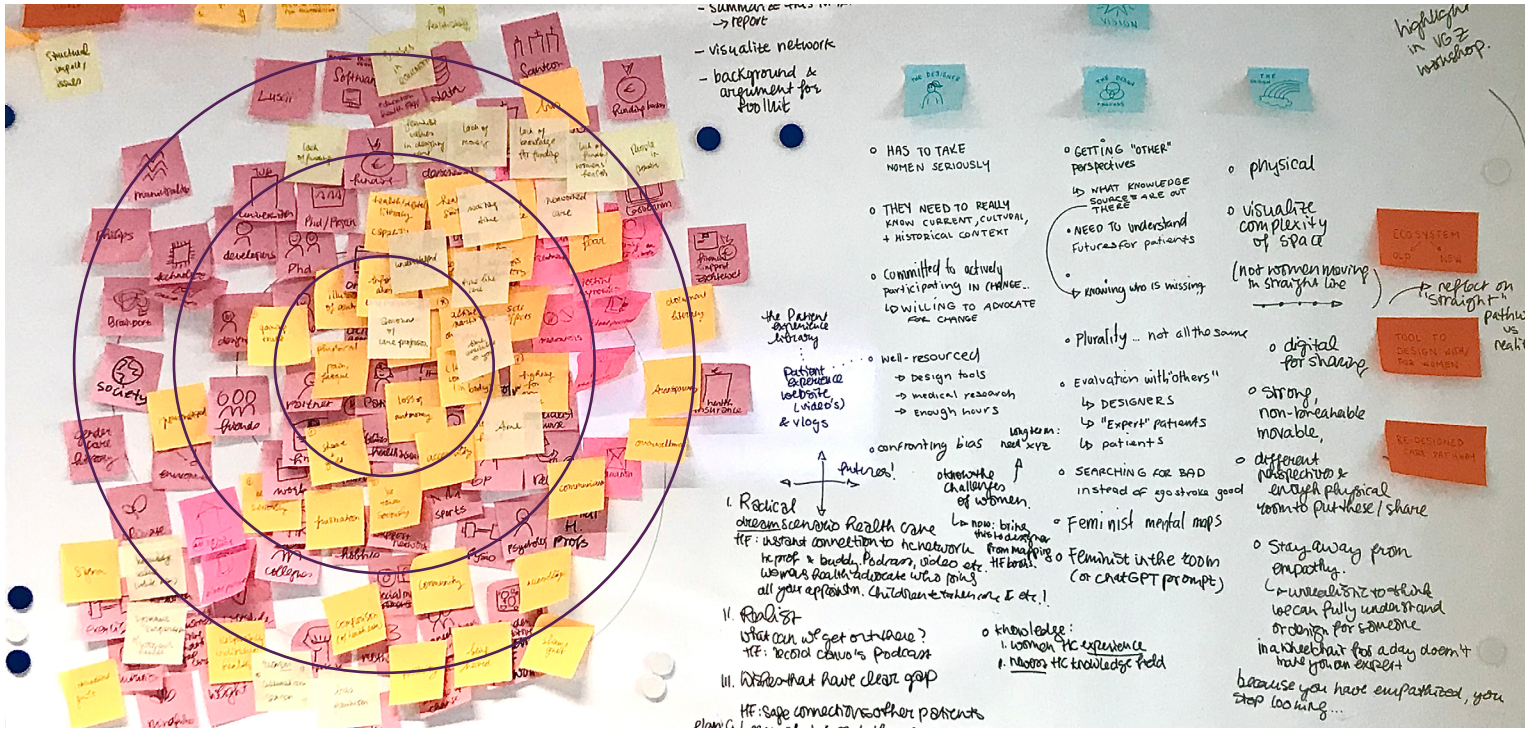


Figure 6 **Ecosystem Mapping and Critical Reflection**

The Designer

* Takes women seriously
* Really knows current, cultural and historical context
* Committed to actively participating in change
  Willing to advocate for change
* Well-resourced
  Design tools, medical research, time
* Confronts (personal) biases
* Knows the challenges of women
  Now: HF research from female cardiologist
  Long-term: regularly invest time on women's experiences in healthcare
* Knowledge
  Women healthcare experiences
  Newest healthcare knowledge, design, innovations in the field

The Design Process

* Offers "other" perspectives
  What knowledge is out there?
  Knowing who is missing
* Needs to understand possible futures for patients
* Expresses plurality
  Not all women are the same
* Evaluates with others
  Designers
  "Expert" patients, representatives
  Patients
* Searches for bad
  Instead of confirming good
* Has feminist mental maps
* Embeds a feminist perspective
  Actively advocating for women's healthcare

The Design

* Visualizes complexity of space
  Women do not move in a straight line (in care pathways)
* Offers different perspectives
  Enough physical space to share and discuss perspectives
* Stays away from empathy
  Unrealistic to think we can fully understand or design for someone (example: in a wheelchair for a day doesn't make you an expert. Because 'you have empathized', you stop looking)
* Digital design
  For sharing, creating & maintaining
* Physical design
  For collaborating & presenting
* Strong, visual & inviting

Table 2 **Criteria Designing Equitable Healthcare for Three Dimensions: (1) Designer, (2) Design Process and (3) Design**

Expert interviews

I conducted five semi-structured interviews with eight designers, healthcare professionals, and health insurers to gather diverse perspectives on healthcare transformation and women's health. During the interview with health insurance experts C & D and heart failure- and remote monitoring nurse E & F, I used a care pathway during the discussion to talk about healthcare processes, collaboration and innovation, available in Appendix E, G and H. This research was approved by the Ethical Review Board on October 10th, 2023 (Appendix F). To conclude insights, I performed a thematic analysis based on the anonymized notes that I made and saved on TU/e OneDrive (Braun & Clarke, 2012). The main insights from each interview are summarized in the following sections.

Expert A - Healthcare Designer in Hospital

In practice there is a certain balance between standardization and personalization in care pathways. Exceptions make care pathways more complex and designing for women's health is such an exception. It will be challenging to work towards both personalization and standardization. Current challenges in clinical practice are technology integration and collaboration between different stakeholders. One way of collaborating is sharing care pathways with other hospitals. Now, everyone designs healthcare individually. Yet the focus should be on sharing knowledge and collaborating. Moreover, there is too much pressure on the healthcare system to not work towards better technology integration.

Patients do not move linearly through a care pathway. Why do we expect them to by designing care pathways linear? In the future we should look at how we can integrate pathways with each other and celebrate complexity. By bringing designers into hospitals, we can work on these complex challenges and ensure equity in technological innovations. We need an open, collaborative and creative view on healthcare transformation.

Expert B - Inclusivity & diversity expert

Since the beginning of medical research, men have been centered in healthcare as professionals, as staff, as researchers and as patients. **Inequity has impacted and decided** many aspects of **our healthcare culture, treatment and organization**. As designer you cannot design change. **Responsibility for change has to be distributed**. Share the responsibility with stakeholders. Your design will be used by different people than you might intend for. Which is good, because making impact and **creating change goes through many hands**. Designers are drawn into hospitals to make apps/wireframes more efficient and not challenged to think in change and innovation. **You want to challenge designers to broaden the scope.** The current scope of the assignment for designers is so tiny, yet the workload is extremely big. This decreases creativity and eventually leads to burnouts.

Design criteria:

- Don't fix the women, fix the system
- Distribute responsibility between stakeholders
- Demonstrate outcomes
- Critique dominant practices
- Look from within
- Parameter for success is saving money
- Ask the difficult questions in discussions

Experts C & D- Innovationmanagers Dutch Health Insurance Company 1

The urgency to collaborate is higher now, but the financial structure is not there yet. So even though collaboration is mentioned in every agreement, it is not adhered to because it is not financially beneficial. The fact that collaboration is costly in healthcare is astounding. As healthcare insurance we can turn this around by promoting collaboration. Making multidisciplinary collaborations financially possible is a challenge and the future. It is time to be transparent, outline the costs, and financially facilitate regional collaboration.

Insights

- Health Insurance should financially enable collaboration
- Financial flows are essential to care pathway innovation and regional collaboration.
- Hospitals should focus on prevention
- Healthcare transformation requires people who are pro-active, collaborative, open-minded and creative
- Knowledge should inspire people and create space for building upon it

Experts E & F - Heart Failure Nurse Specialist & Remote Monitorings Nurse

Patients' attitude shifted to 'we pay for healthcare, so fix me', but good health is a privilege and requires effort. Women take more charge of their health but are more asymptotic, making diagnosis challenging. Practical insights into heart failure guide us, yet health education lacks focus on women's health.

Insights

- Improve education on nonspecific symptoms
- General practitioner should conduct more ECGs for women with symptoms.
- Emphasize self-regulation for patients during home monitoring
- Encourage a shift towards taking more responsibility for one's health, considering the consequences of not being healthy and taking accountability as a patient
- Health care delivery for women's heart failure is learned from professional experience in practice
- Visualizations add an extra layer for those who have not previously encountered the medical condition

Experts G & H - Designer & Innovation Analayst at Dutch Health Insurance Company 2

The feminist design lens is a practical design tool that offers inspiration and aids creating inclusive practices. Reaching deeper layers in design thinking is difficult and as a designer limited by bias. We lack tangible critical thinking tools that are integrated with our design practice. This framework offers new perspectives within the short timeframe we often have in practice. The framework + lens guide idea generation but also enhance implementation. This resonates with our ambition in practice: practical, challenging and impactful.

Evaluation Framework and Feminist Design Lens

• Feminist Design Lens is an inspirational practice • We need designers to guide healthcare collaboration • The framework is a practical tool that supports healthcare designers to design for complex care pathways and integrate solutions •

CARE PATHWAY DESIGN

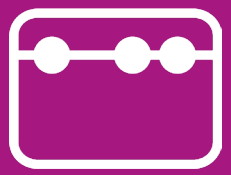
Methodology

Design Activities

To design a care pathway for women with heart failure, I made three care pathways for heart failure (HF), cardiovascular diseases (CVD) and cardiovascular risk management (CVRM) that were used in practice at CZE. Next, I explored and evaluated different ways of care pathway visualization using patient journey mapping, Playmobil, AI in storytelling and sketching (see Figure 8, 9). Furthermore, I facilitated three co-creation workshops for nine healthcare professionals for CVRM to evaluate how design thinking with visual care pathways can lead to new implementations in healthcare practice.

Catharina Ziekenhuis Eindhoven

To design care pathways at Catharina Ziekenhuis Eindhoven (CZE), I employed Metro Mapping (MM) to enhance collaborations with healthcare professionals (Griffioen et al., 2022). With a colleague, I created care pathway templates for Miro based on MM, simplifying the pathway by reducing information layers to promote collaborative use. This reduced complexity and time spent on a single Metro Map. According to feminist values complexity should be celebrated. However, in practice, complexity limits progress at first. Therefore, care pathways should become more detailed as collaboration progresses, because the level of detail is important to voice marginalized knowledge and capture the sensitivities of women's healthcare experiences.



Women with HF

See result on next page (Figure 7)

The care pathway for women with HF illustrates the result of including the knowledge of overlooked voices. Influences that drive change in women's healthcare delivery are patient information, technology and 'alternative' knowledge. Differences in the care pathway are using visualizations to communicate knowledge to prevent health literacy. Furthermore, the care pathway has gender-sensitive technologies that focus on accurate diagnosis for women with heart failure. As a result, women's cardiac rehabilitation is based on real-lived experiences and data-driven. By gathering all these insights from remote monitoring and patient feedback, online self-management education is based on reality and sets honest expectations of women in cardiac rehabilitation. Women with HF can continuously contribute to improving women's healthcare through data-driven care pathways, but only when it comes from an ethical, equitable and societal value-driven business model.

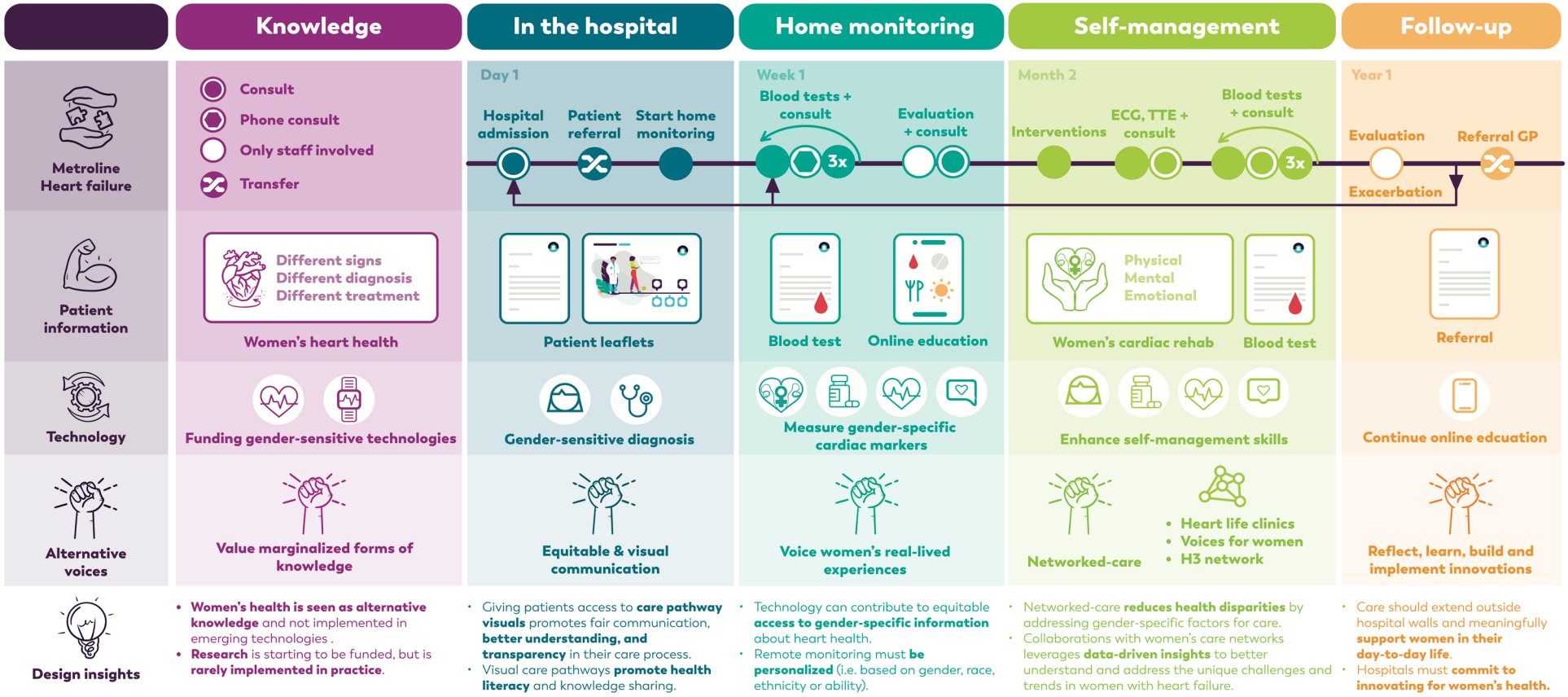


Figure 7 **Envisioned Care Pathway of Women with Heart Failure at CZE**

As illustrated in Figure 7, differences in HF care pathway for women are in the areas of knowledge, rehabilitation, empowerment and networked care. Women's cardiovascular health impacts sleep, stress, hormones and mental well-being. This requires a multidisciplinary network of healthcare professionals specialized in women's health. Furthermore, knowledge should be shared visually to enhance health literacy amongst women. Making informed decisions starts with understanding HF amongst women. Giving women better access to care pathway information promotes fair communication, better understanding, and transparency in their care process.

Explore Care Pathways

First, I created care pathways for heart failure (HF), cardiovascular events (CVA) and cardiovascular risk management (CVRM) aimed to capture current practices with remote monitoring at CZE (Appendix G). These care pathways were evaluated with project leaders and discussed during various meetings with cardiovascular healthcare professionals. Based on the feedback, I concluded that a visual care pathway supported healthcare innovation and brought collaboration between healthcare professionals to a next level. Another important insight was the relationship between the care pathway and the service blueprint. Whilst a care pathway leads to better collaboration, the insights gained have to find their way into the service blueprint. This is important because the service blueprint is where the actual changes in protocols emerge. The exploration of the HF care pathway can be found in Appendix H.

Role of Designers

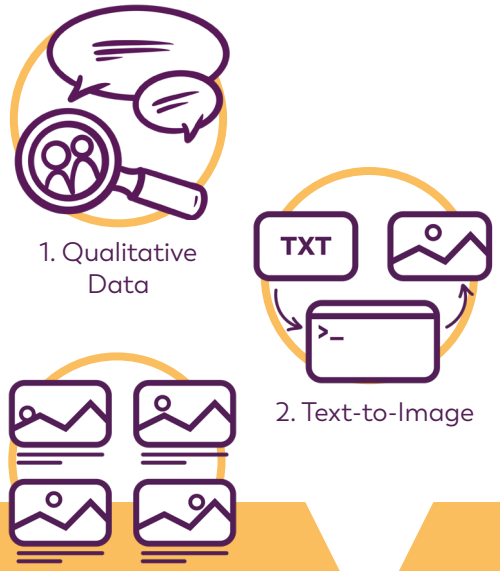
In practice, the role of the designer is to guide the care pathway collaborations and translate insights into practice through the service blueprint. These insights can be communicated to executive parties such as architecture or IT and efforts can be combined to design implementations for practice. As designers, we excel in stakeholder management through skills in collaborating, ideating, prototyping and realization.

Designers in Healthcare Practice

In hospital practice, reality is always catching up with you. Bridging new knowledge into protocol and implementation takes time. Therefore, novelty is overrated in healthcare practice since it almost never reaches implementation. We need designers who design in the now and envision the future of value-based healthcare practices. Designers require practical tools and understanding of healthcare processes. One of my FMP goals is to demonstrate to healthcare designers how to bridge this gap in practice.

Figure 8 **Exploration Care Pathway Visualization with Playmobil**

AI in Storytelling



For me, visualizing has always been a method to translate my ideas to a broader audience. With emerging technologies such as AI, one of my goals was to further develop my visualization skills. Therefore, I followed two workshops given by Professor Daniel Pimentel, co-director of the University of Oregon's Reality Lab and organized by EAISI & Industrial Design. During the workshops I gained hands-on experience with AI/XR and how to strategically understand how and when to use these tools in larger-public framing programs for social good, in my case: healthcare transformation and women's cardiovascular health. Benefits of using AI in storytelling are creating narrative structures, visualizing qualitative data and advance storytelling. As a result, I applied my gained skills to creating a storyboard of healthcare professionals using digital care pathways (Appendix I). The visualization to the left shows the process and provides an example of one of my storyboards for this workshop. By using AI as storytelling methodology, I remained conscious of the connection between terminology and discourse to ensure equitable representation of the collected qualitative data. Figure 9 illustrates an example of the impact of terminology on gender as a default for particular narratives in healthcare using Artificial Intelligence.

Figure 9 **Images Generated with Midjourney AI using Different Terminology in Prompts**

"Show three **doctors** in a room chatting with each

"Show three **healthcare professionals** in a room chatting with each other."

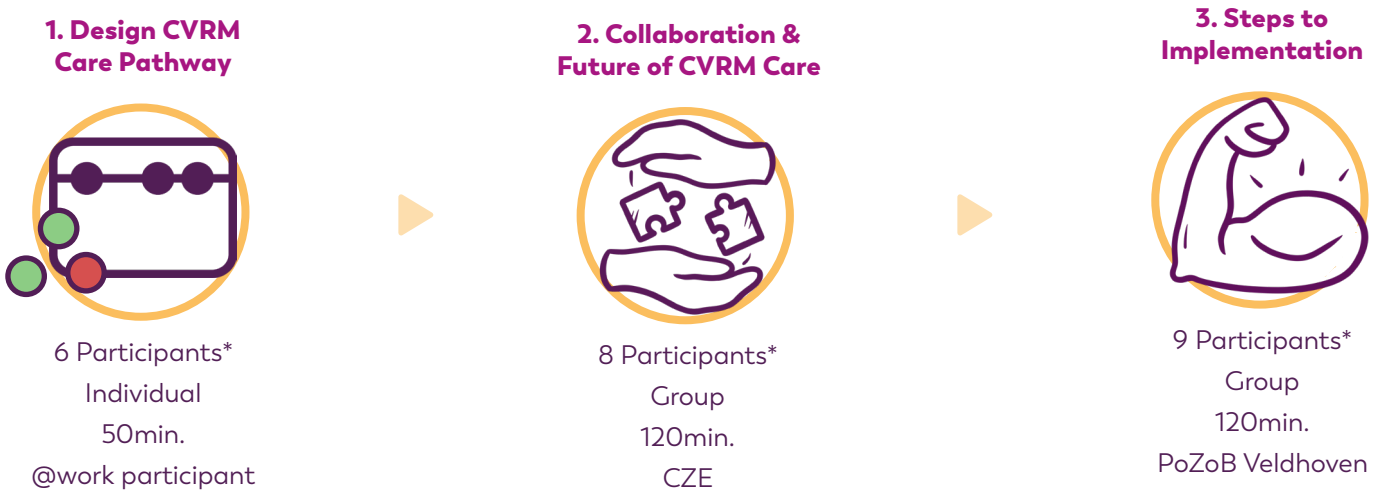
"Show three **nurses** in a room chatting with each

"Show three **diverse nurses** in a room chatting with each other."

Collaboration

Organizing Co-Creation Workshops for Healthcare Professionals

Together with a fellow CZE-intern, I organized three co-creation workshops for the cardiovascular risk management (CVRM) in Eindhoven region, to integrate design methods into healthcare, aiming to rethink the use of care pathways in collaborative settings. The workshop set-up is illustrated in Figure 10. Cardiovascular Risk Management (CVRM) is a transmural healthcare program targeting individuals with personalized care plans involving lifestyle changes. Professionals from hospitals and general practices collaborate on addressing cardiovascular risks. Thematic analysis of qualitative data resulted in valuable insights on the care pathway as supportive and creative collaborative tool for healthcare professionals (Braun & Clarke, 2012). Moreover, valuable insights were gained on the contents of the CVRM care pathway, which were presented to the CVRM transmural workgroup. I will not go into detail of the CVRM-substantive results but focus on the results of the care pathway and design method. All co-creations were evaluated and approved by Eva Deckers (CZE) and 2 CVRM project team leaders.



*All participants work with CVRM patients at various healthcare institutions in region Eindhoven (e.g. healthcare professionals from hospitals, general practitices)

Figure 10 **Set-up of Three Co-Creation Workshops for CVRM**

Co-Creation #1.

Design CVRM
Care Pathway

First, I designed a CVRM care pathway and three CVRM personas (Appendix J, K). The care pathway was based on research of current protocols of CVRM care in region Eindhoven and the personas were based on video/written interviews of people with cardiovascular risks in the region of Eindhoven. Based on the AI Storytelling workshops I followed, I created Midjourney AI-generated images for the personas. During the individual co-creation workshops participant evaluated the care pathway based on their professional experience, using green and red stickers to denote strengths and improvements (see Figure 11). The care pathway was also evaluated with financial experts at an insurance company (Appendix L). Participants received personas, empathizing with their journey through the pathway. The result was six redefined CVRM care pathways and feedback on the care pathway methodology. For healthcare professionals, the main benefit of a visual care pathway was uniformity of healthcare. Especially in transmural healthcare, it is invaluable to have everybody on the same page. Furthermore, a care pathway visualization helps to start the conversation on healthcare professionals' needs and ideas. It was difficult to financially map a care pathway due to the complexity and lack of data in this area.

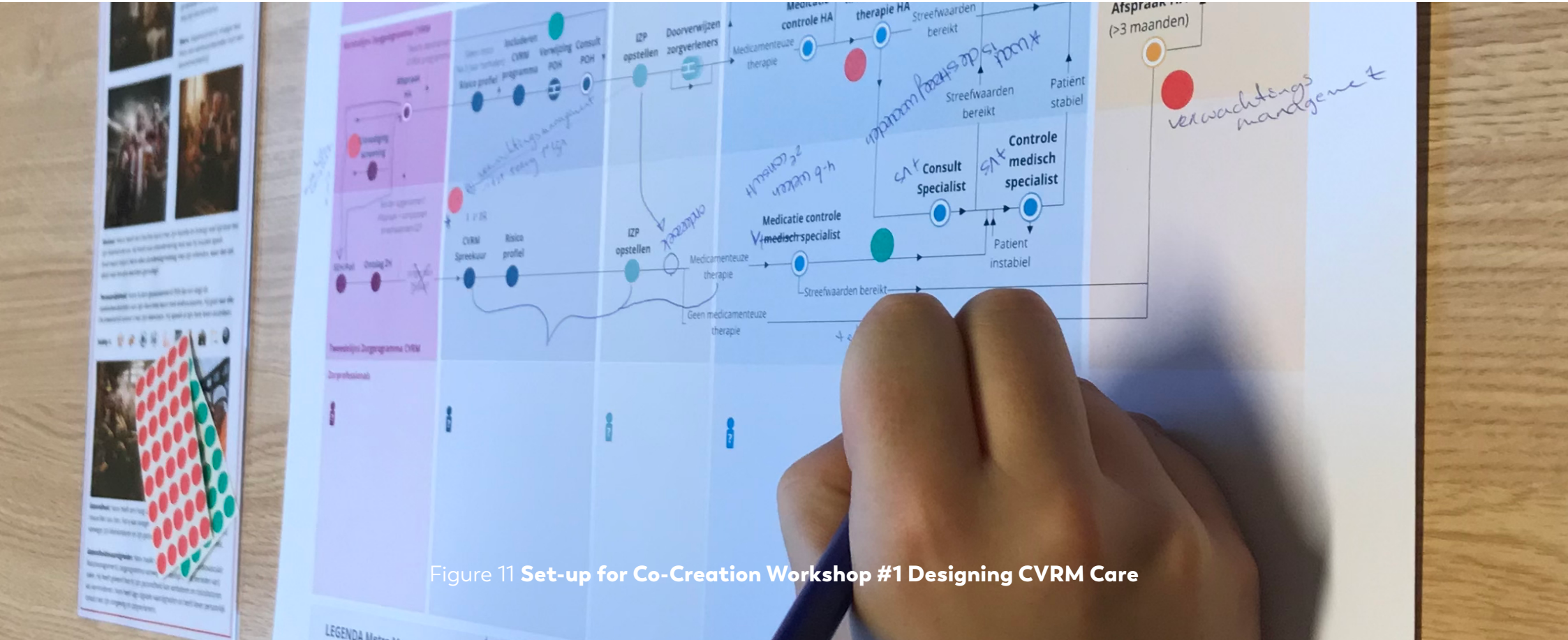


Figure 11 **Set-up for Co-Creation Workshop #1 Designing CVRM Care**

Co-Creation #2.

Collaboration & Future of CVRM Care

The second co-creation was the first time all participants met each other in person. To facilitate discussion and guide the co-creation process, I designed a 4x1 meter CVRM care pathway worksheet, featuring 5 phases: parking, prevention, entrance & referral, CVRM care and evaluation (Appendix M). Discussions extending beyond co-creation were noted on car-stickers and 'parked' on the left. The worksheet included three exercises: stakeholder mapping, defining regional collaboration and creating uniform CVRM pathway. The evaluation collected feedback on participants' co-creation experience with a visual care pathway. During the second co-creation, we facilitated the workshop through every phase. As a result, the entire worksheet was covered with post-its and valuable insights for regional CVRM care were obtained (see Figure 12). One participant mentioned that this was the first time they actually had a real conversation about the future and ambition for CVRM care in the region. Often these meetings are extremely clinical and protocol-oriented, but this co-creation and especially the visual, supported more open-minded discussion and illustrated impact of the conversation. The phases and exercises ensured coverage of a variety of topics, rather than being stuck on details. Other participants mentioned something similar; they had never seen a meeting where ambition and motivation was shared at this collaborative level. The choice of methodology was powerful. The informal atmosphere led people to think differently and engage with each other in conversation. They asked more questions instead of passing judgment.

Figure 12 **Result of CVRM Co-Creation Workshop #2**

Co-Creation #3.

Steps to Implementation

Five insights emerged from the thematic analysis of co-creation #1 and #2, each with corresponding FROM-TO-action points (Appendix N). The third co-creation went beyond design, involving collective planning for future CVRM meetings. As the CVRM-project extends beyond my FMP, it was crucial to conclude the co-creations constructively, leaving the group with tangible next steps. Participants and the project team praised the outcomes, with one expressing that the group's innovative energy was the reason they cherished their job, making the workshops a reminder of their collaborative ambitions.

1. Tangible collaboration principles are the foundation of transmural care pathways.
2. Regional responsibility for CVRM prevention leads to ambiguity.
3. Uniformity is an effective approach to address challenges, as long the appraoch is feasible.
4. Implementing (digital) integration requires systemic solutions.
5. Financial flows and reimbursements should be inherent to healthcare collaborations.

Conclusion

In conclusion, design thinking and co-creation are invaluable for healthcare collaborations. Design practices open up discussion, supports ambition, envisions alternative futures, leads to constructive next steps and roads to implementation. Moreover, a visual care pathway serves as a tangible and contextually relevant mapping tool in co-creation and collaborative healthcare settings in support of healthcare professionals to engage with, get inspired by and get on board with the development of new care pathways.

An illustration I made for the workshops.

Feminism in Design Critique

The Feminist Design Lens refers to a feminist perspective through which designers can view and challenge problems, approaches, or opportunities. By framing a feminist design process based on feminist principles, values, or considerations designers are provided with a tangible tool to design equitable healthcare. Essentially, the feminist design lens guides decision-making, problem-solving and implementation within the context of Framework of Designing Equitable Healthcare.

SERVICE BLUEPRINT

Methodology

Design Activities

To design a service blueprint for heart failure (HF), I read through hospital protocols and attended CZE meetings with cardiovascular healthcare professionals. Next, I outlined the service blueprint similar to the HF care pathway phases. As methodology I used short design-thinking iterations of creating, validating and adapting healthcare processes. After I finalized the service blueprint, making use of existing service blueprint practices, I used the Feminist Design Lens to create design recommendations in a design sprint to quickly generate and validate ideas early in the design process.

Catharina Ziekenhuis Eindhoven

At CZE, the service blueprint was introduced as a design approach on Miro in April 2023. Together with a colleague, I designed the service blueprint for HF. Actual changes in how healthcare is delivered takes place in the service blueprint. Therefore, I changed how knowledge of remote monitoring is visualized for patients. By revisiting my M2.1 project 'visualizing care pathways for patients', I visualized care pathways for cardiovascular patients at CZE to bring knowledge of the care pathway in hands of cardiovascular patients. The CVA visualization is online on the CZE website and utilized by the monitoring center. Visuals for gestational diabetes and heart failure are currently evaluated and improved by Communications at CZE (Appendix R). Although making a service blueprint is time-consuming, it is worthwhile because it assists IT and architecture with technological implications and decision-making in new care pathways. Colleagues appreciated using service blueprints on Miro for concrete visualizations, facilitating collaboration on digital innovations. To conclude my time at CZE, I crafted a detailed workflow for designers, evaluated it with project leads, and used it to explain design approaches to a new project leader.

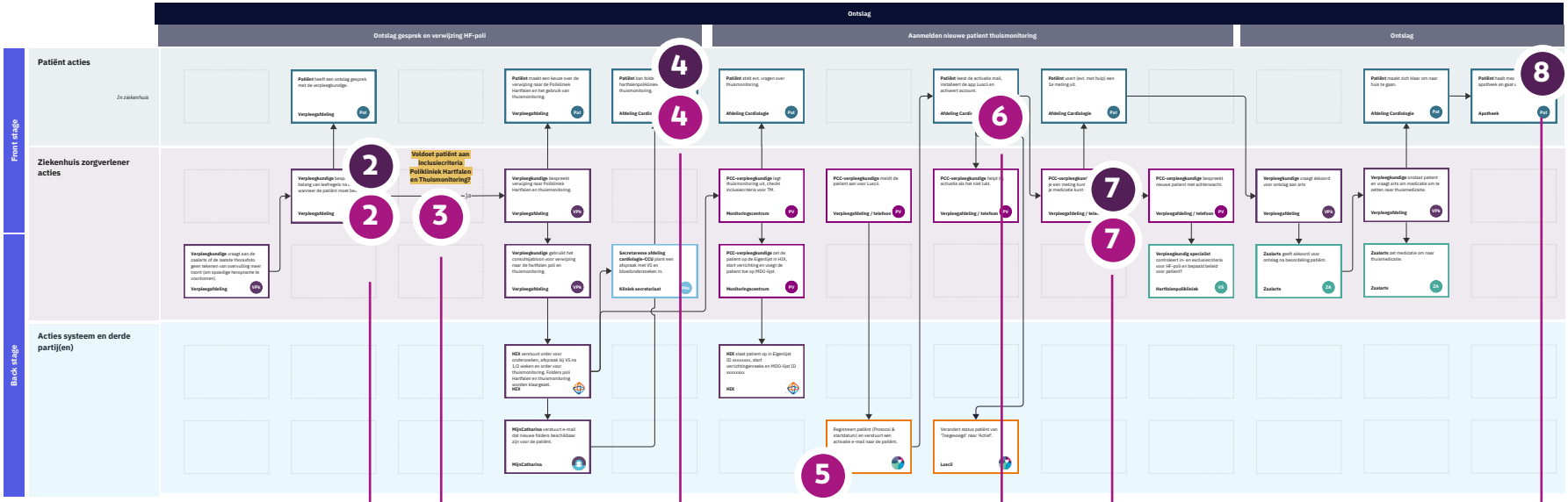
Women with HF

See result on next page (Figure 13)

For the final HF Service Blueprint, I focused on service evaluation with the Feminist Design Lens for the value knowledge. Based on my goals in the area of Technology & Realization I decided to not make a service blueprint specifically for women but aim for implementation of recommendations in practice.

Evaluation Service Blueprint with Feminist Design Lens

Through evaluation, I discovered opportunities in the HF service blueprint to improve health literacy amongst women. The most promising area of change was visualizing care pathways to give women better access to healthcare information and increase understanding, manage expextations and support better decision making. Figure 13 illustrates 12 **challenges** and **opportunities**. The full service blueprint can be found in Appendix Q.



Women have negative previous healthcare experiences when not taken seriously

Target prevention specifically for women

Inclusion criteria for women

Lifestyle advice is full of bias and prejudice

Empower positive mindset for lifestyle changes

Protocol can be updated with knowledge relevant to women's health

Patient information says nothing about women with HF

Advocate for differences in women's cardiovascular health

Protocol doesn't include women's symptoms or measurements

Visualize patient information to enhance health literacy

Send email before cold-calling to build trust and edcute in phases

Medication is based on male bodies, women do not always receive the right treatment

Knowledge - Challenge

Knowledge - Opportunity

Figure 13 **Evaluation Service Blueprint with Feminist Design Lens for Heart Failure Patients at CZE**

Recommendations

#1. Treat women's cardiovascular diseases through holistic approaches & regional collaborations

a. Collaborate in Multidisciplinary Teams & Organizations

1

b. Update Protocols with Relevant Research

3 6

c. Advocate for Women's Health

4

#2. Change how we address women's health & provide information for female patients

d. Gender-sensitive patient information in remote monitoring apps

5

e. Enhance health literacy by changing terminology

2

f. Visualize care pathway to empower patients.

7

Figure 14 **Design Recommendations based on the Service Blueprint and Care Pathway of Women with HF**

Implementation A

Figure 15a **CZE Monitoringscenter with Visual Care Pathway**

Healthcare changes come down to implementations in hospital protocol. To improbe patient information, I wanted to use care pathway visualizations. From a personal development perspective, this has been one of my biggest strengths and growing ambition to contribute to women's health. Giving women access to visual communication of care pathways promotes health literacy, better understanding, knowledge sharing and transparency about healthcare processes. Ensuring women have access to the same opportunities, resources and privileges, regardless of their background, characteristics or circumstances, is essential to equitable healthcare. Proper patient education and visualization of information is the first step. As a result, I reviewed the visualization for CVD patients with communications at CZE and they approved (Figure 15b). The CVD care pathway visualization is live on the CZE website, used in the Monitoringscenter and sent to patients (see Figure 15a). A visual for HF patients is awaiting approval (Appendix P).

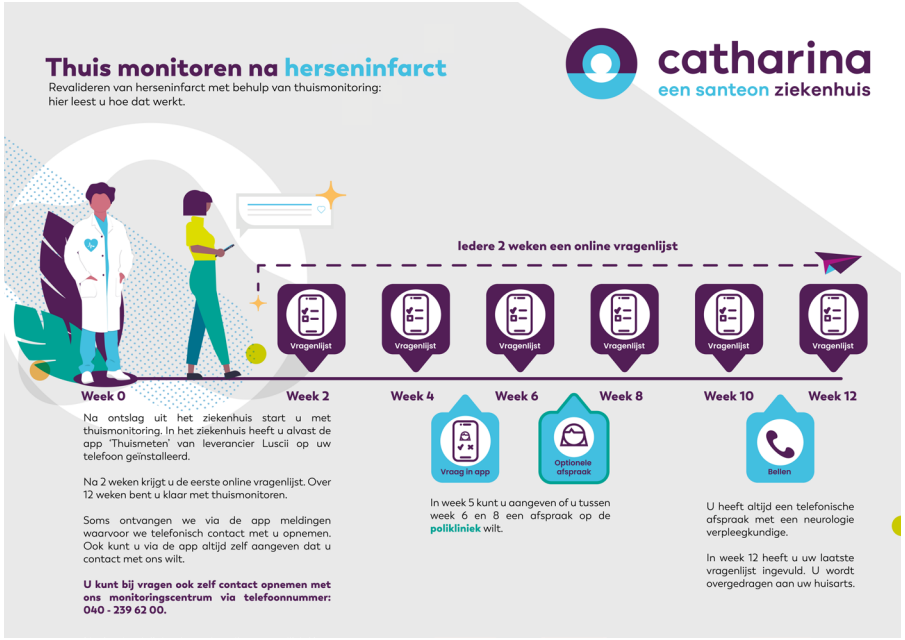


Figure 15b **CVA Visualization in Hopsital Practice**

Implementation B

Gestational Diabetes Implementations

Another honorable mention is related to my M2.1 project of 'Visualizing care pathways for gestational diabetes patients'. In June 2023, I made recommendations for remote monitoring to the Gynecology department, which were received positively and will be implemented in the future (Appendix R). Following, I presented the recommendations to a project leader at Santeon, an umbrella company of seven hospitals in the Netherlands and to gynecologists at CZE. Both parties were enthusiastic and will implement the recommendations in the remote monitoring application used in all seven hospitals.

One example of improving patient information for gestational diabetes patients is illustrated in Figure 16. The purple box says: "In your hospital, the following glucose target apply". Women often asked healthcare professionals why they couldn't apply the glucose targets they found online. This sentence is added to prevent misinformation. Future evaluation will determine the impact of this sentence on misinformation.

Figure 16 **Screenshot Gestational Diabetes Glucose Levels (Remote Monitoring Application)**

Implementation C

Design Templates & Workflow

As a third implementation, I created a Miro board with all the templates for the ecosystem, care pathway and service blueprint (Appendix S). Past November, Miro was officially integrated in the workprocess at CZE to further adapt design practices in healthcare. Moreover, I created a design workflow based on practice, which was reviewed with two project leaders at CZE (see Figure 17). This enables CZE to continue the design practices after my graduation.

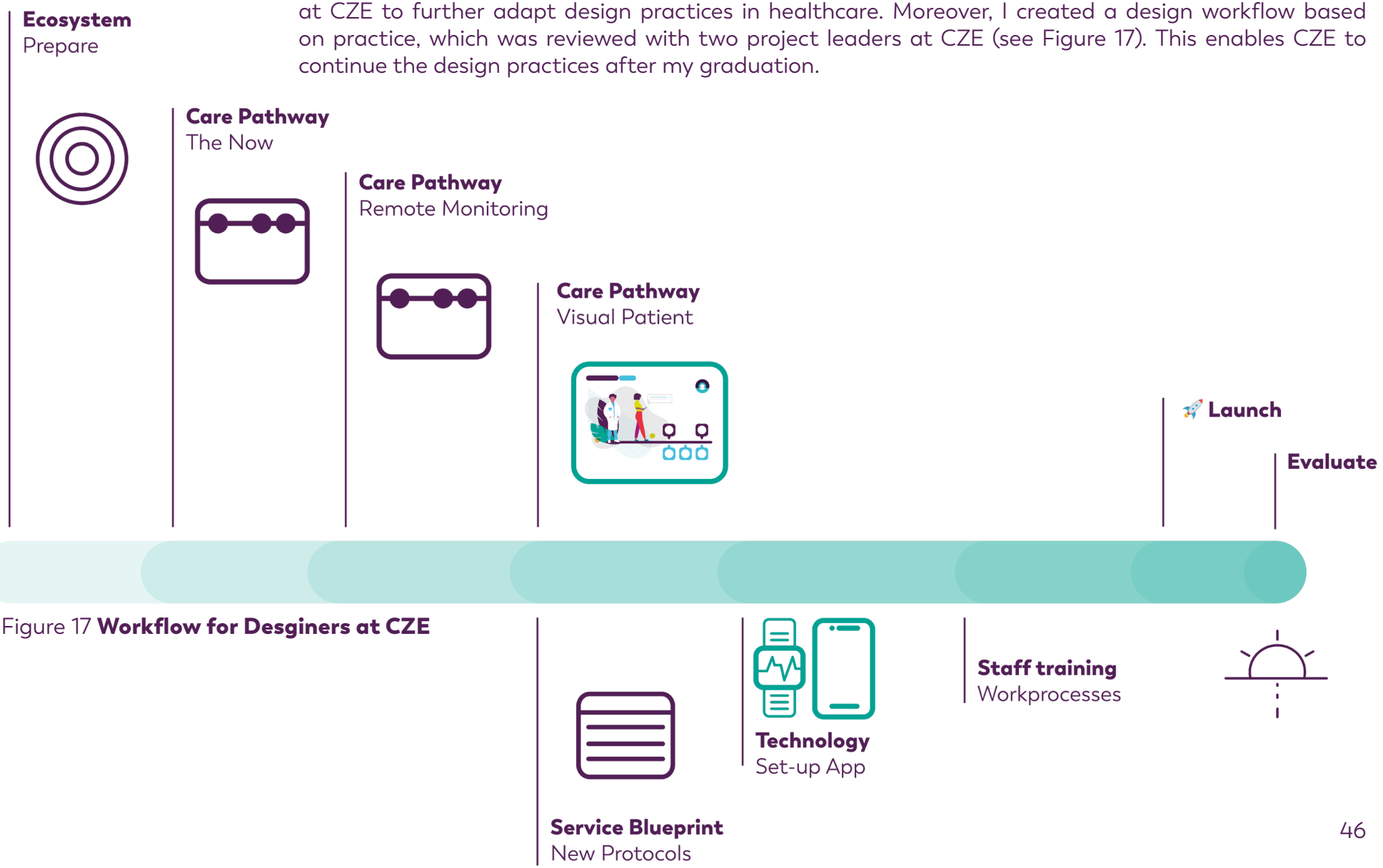


Figure 17 **Workflow for Desginers at CZE**

Company Feedback

“I have experienced our collaboration as very pleasant and inspiring. This was the first time for me working on a project with a designer, and I’ve learned a lot from you (e.g. Metro Mapping).

It was remarkable to see how quickly you can visually map processes and how this, in the case of stroke patients, provides a better understanding of what the first weeks after discharge will look like for them.

Additionally, you provided valuable insights regarding the care pathway for gestational diabetes. The internists and gynecologists are enthusiastic about your ideas, and these will be further developed within the Santeon collaboration to hopefully achieve an even better app for patients with gestational diabetes.

Thank you for your dedication and inspiration!”

Appreciation from CZE

“The choice for a co-creation workshop was very powerful. You facilitated an informal atmosphere, encouraged people to think differently and engage with each other in conversation. They asked more questions instead of passing judgment. Your guidance and visualizations are the foundation for our enthusiasm which will be visible throughout our collaboration.”

Compliment from the co-creation workshops

“In your Final Master Project you have succesfully evaluated design approaches in hospital practice, You made what we know as designers work for our hospital context. We have enjoyed your visual approach and with team-effort you have made it possible for patients to acces to care pathway visualizations. Realizing your ambitions is a strong conclusion of your time here.”

Feedback from CZE

Future Development

Envisioning Speculative Futures of Women's Health in Hospital Practice

To envision speculative futures of women's health in hospital practice, I used the future cones as illustrated in Figure 18 (Gall et al., 2022). Envisioning futures is about foresight and not prediction. In the present, design approaches in hospital practice is a probable trend. Data-driven healthcare is plausible when system integration becomes possible within and between healthcare institutions and systems. Furthermore, I forsee that equitable healthcare is possible, but designers are needed to bring equity and feminist perspectives into healthcare practices.

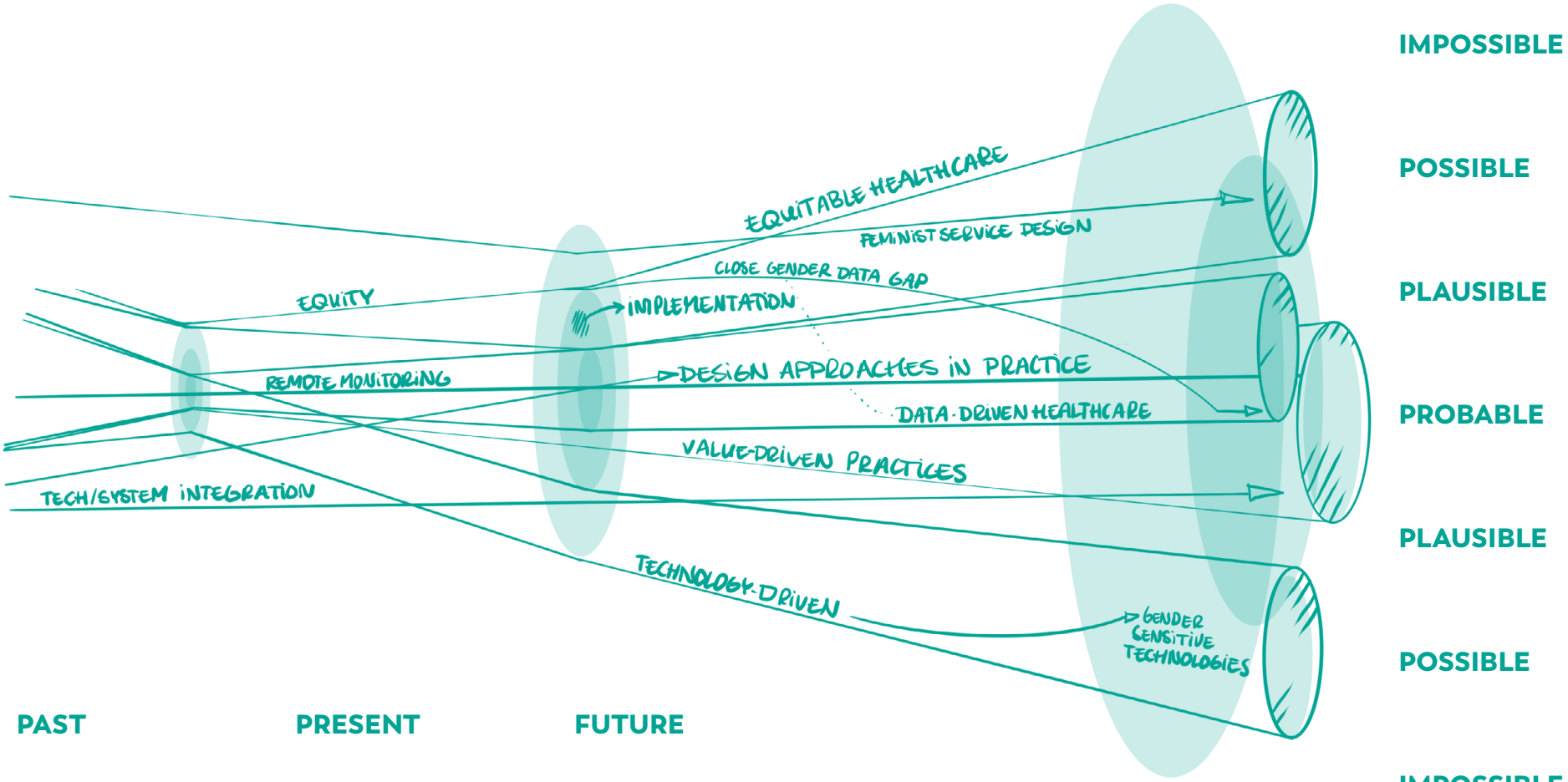


Figure 18 **Envisioning Speculative Futures of Women's Health in Hospital Practice**

Discussion

This project serves as a practical guide for healthcare designers aiming to enhance the adoption of equitable practices in clinical settings within hospitals. The outcome is a framework for bringing design practices into hospitals and demonstrating how equitable healthcare innovations can be implemented in practice using a Feminist Design Lens. The expert interviews and co-creations with healthcare professionals highlight the challenges in healthcare implementations and how inequity is embedded in our healthcare culture, treatment and organization.

The proposed framework demonstrated three design approaches for designing equitable healthcare: (1) ecosystem mapping, (2) care pathway design and (3) service blueprints. These design approaches were put into practice for women with heart failure at Catharina Ziekenhuis Eindhoven. The ecosystem of women with HF illustrates that knowledge of women's health is not part of mainstream practice and how re-distribution of knowledge can contribute to more equity in health care delivery. The care pathway for women with HF highlights inequities across channels of information, technologies and knowledge. The re-designed care pathway proposes new perspectives on gender-sensitive technologies for cardiovascular diagnosis amongst women. By introducing practical perspectives, the Design Framework with Feminist Design Lens address the need for equitable healthcare for women and demonstrate opportunities for designers to critically reflect on dominant healthcare practices and share responsibility amongst stakeholders to include marginalized voices in their design. These insights support the findings of Gericke et al. (2020) and Place (2023) who voiced the opportunity to critique, improve and adapt design approaches rather than developing new methodologies.

For designers, this project demonstrates how they can operate and design within the ecosystem of a hospital. For design approaches in hospital practice, designers need to become an integral part of healthcare settings, particularly within hospitals. By immersing themselves in these environments, designers are allowed to shape solutions from within, utilizing their competences such as understanding diverse needs, aligning values of patient, staff and society, visualizing concepts, prototyping, testing and implementation. The true power of this project lies in the tangible transformation of ideas to hospital practices, echoing a commitment to implementation and enduring impact. It is important to note that change does not happen overnight. Designers have to invest time and effort in stakeholder relationships,

understand hospital politics, practices and policies, navigate emerging technologies, challenge personal biases and take responsibility in questioning design approaches to work towards equitable healthcare. Furthermore, touching and changing hierarchal hospital structures requires sensitivity, collaboration and a creative and strong mindset. The results of the CVRM co-design workshop, that facilitated collaboration and regional strategy for nine healthcare professionals, support earlier findings of Melles et al. (2021) who said designers have essential skills for multidisciplinary collaborations, align values and expectations and capturing sensitivities of people's needs.

The proposed Feminist Design Lens challenges design methodologies to take steps beyond idea generation and ensure sustained implementation in long-term practices. Abstracting and executing ideas from design approaches is a critical aspect of healthcare transformation and often overlooked. Mere ideation or design consultation without implementation does not address the pressing needs for technological integration, patient-centered care and the alleviation of health inequalities. To effectively and sustainably bridge this gap, designers must advocate for the active implementation of equitable solutions in real-world settings.

Resources such as time, money and tangible approaches are limited in hospital practice. Therefore, designing specifically for women is not always possible. An opportunity for designers is to work in positions of power where they can advocate for marginalized groups and embed feminist values as common practice and not as an afterthought. Furthermore, there is an opportunity to share the Framework for Designing Equitable Healthcare and the Feminist Design Lens with other hospitals. "We need to collaborate" should become "we collaborate" and actually do the work. This project opens up healthcare collaboration by introducing design practices such as co-creation, design-thinking, ecosystem mapping and care pathways into hospital practice, demonstrating its relevance because real-world examples of design approaches are limited and should thus be further demonstrated in future practice.

Conclusion

This project aimed to integrate design approaches into hospital practice. By working as a designer at Catharina Ziekenhuis Eindhoven, the result of real-world examples have demonstrated how to design towards implementation in hospital practice. It is evident that value-based healthcare, multi-stakeholder collaborations and care pathway visualizations contribute to implementation of healthcare delivery and healthcare transformation.

In practice, designing equitable women's health is not part of dominant design practices. To bridge the gap, this project offers designers a tangible Feminist Design Lens, created by valuing marginalized voices and offering alternative perspectives on how to achieve equitable healthcare in hospital practice through a Design Framework. Through critical reflection of ecosystem mapping, care pathway design and service blueprints, dominant practices can be challenged, improved and adapted to design for women's health.

This project enhances the importance of designers in hospital practice. Their practical skills, creativity and collaborative competences are invaluable to transforming healthcare. This includes challenges such as organizing technology between digital worlds that consider women's health and visualizing patient information to enhance health literacy amongst women. Ultimately this design project employs resources to address real-world challenges in healthcare practice and demonstrates how to realize ambitions for healthcare transformation.

Author
Noa Smolenaars

Mentor
dr. Tilde Bekker

Second Assessor
dr. Yaliang Chuang

Third Assessor
dr. Panos Markopoulos

External Mentors
dr. Eva Deckers
Daisy O'Neill

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Eindhoven University of Technology
Department of Industrial Design
Design Leadership & Entrepreneurship (DLE)

I want to express my appreciation to those around me

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