

Enhancing Patient and Healthcare Worker Experience in the Breast Cancer Surgical Pathway through design

Master thesis

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Acknowledgement

Dear reader,

Thank you for your interest in my graduation thesis. This project has been the most extensive and meaningful project of my academic journey. When I started, I could not have predicted where it would lead me or what I would discover along the way. Now, at the end of this process, I am grateful for the things I have learned in relation to design, healthcare, and myself.

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This thesis marks the end of my time as a student. I hope that the results of this work will contribute to improving care at the RdGG and supporting both patients and professionals in their journey.

While writing this thesis, AI tools were used as a tool to refine the language, improve readability and discuss feedback. The research, analysis and ideas are entirely of my own.

Kind regards,

Teije Nolen

Executive summary

This thesis explores how human-centered design can improve both patient and healthcare-worker experiences within the breast cancer surgical pathway at the Reinier de Graaf Gasthuis. Breast cancer care is multidisciplinary, complex and emotionally demanding process. Patients navigate a pathway of consultations, receive treatments and make important decisions, while professionals work within tight schedules, interdependent processes and a high workload. Through literature review, observations, walk-along sessions, semi-structured interviews, thematic analysis (using NVivo) and patient journey mapping, the project uncovers key challenges in communication, emotional support and organizational coordination.

Patients describe the RdGG as empathetic, accessible and medically highly skilled. They consistently feel seen, heard and genuinely supported by the hospital staff. At the same time, several areas for improvement emerged, including clearer preoperative information and the avoidance of emotionally charged language. Patients also expressed that there is potential for further digitalization of the care process, like an easy accessible app. A recurring theme was the desire for opportunities to connect with former patients (“buddies”) who understand the emotional impact of a breast cancer diagnosis and treatment. However, both the ‘patient satisfaction survey’ and the interviews confirm a more than positive experience, with RdGG scoring a 9/10 and patients expressing strong satisfaction with their care.

Healthcare professionals highlight a very different set of challenges. The scheduling of combined oncological and reconstructive surgeries (IBR) appears as the most significant bottleneck. Variations in surgeon availability, unpredictable procedure durations, sudden changes in schedules because of treatment changes and limited digital integration make planning frustrating and time-consuming. Despite high performance metrics (patient satisfaction survey), caretakers indicate that current systems require substantial manual coordination “behind the scenes” to maintain quality and availability.

The design brief arising from these insights focuses on improving communication, strengthening coordination and making the surgical planning process more predictable and transparent. This thesis presents potential interventions, including predictive scheduling methods, data-driven forecasting of IBR demand, an online planning tool, a patient opt-in system for flexible scheduling and clearer distribution of planning responsibilities among departments. A strategic roadmap outlines how these interventions can be implemented between 2026 and 2030, ultimately enabling a more integrated and efficient planning ecosystem.

Overall, this project shows that design can play an important role in connecting organizational needs with human experiences. By enhancing communication, supporting emotional needs and improving logistical workflows, the RdGG can offer breast cancer patients a consistent and comforting care journey, while reducing workload and increasing efficiency for its healthcare professionals.

Glossary

DCIS:	Ductal Carcinoma in Situ, non-invasive form of breast cancer, sometimes called stage 0. Because DCIS can develop into invasive breast cancer, it is often described as a precancerous stage and is usually treated
DIEP:	DIEP surgery, or Deep Inferior Epigastric Artery Perforator flap surgery, is a type of breast reconstruction that uses your own skin, fat and blood vessels from your lower abdomen (or other suitable parts) to create a new breast
GP:	General Practitioner
HiX:	Electronic patient file software used in the Reinier de Graaf Gasthuis
IBR:	Immediate Breast Reconstruction
Mammary carcinoma:	Medical term for breast cancer
Mamma department:	Breast cancer department
MDO:	Multidisciplinary Consultation: consultation between doctors with different specialisms
NL:	The Netherlands
OR:	Operating Room
RdGG:	Reinier de Graaf Gasthuis
TU Delft:	Technical University of Delft
VWS:	Ministry of Health

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01

Introduction

This chapter explains the assignment in detail. It describes the context, scope and focus of the project. Additionally, the stakeholders and actors are being introduced. Finally, it explains how the project will be carried out and which methods will be used.

Introduction

1.1 Project assignment

1.1.1 Context

This graduation project takes place at the breast cancer (mammopoli) and plastic surgery section of the Reinier de Graaf Gasthuis (RdGG), a hospital located in Delft which is embracing innovation within the healthcare delivery. Breast cancer affects a significant share of the population. One out of seven women in the Netherlands will receive the diagnosis of breast cancer during their lifetime (RIVM, 2023), with over 18,100 new cases reported nationally (Kankerbestrijding, 2025) and 377 diagnosed at RdGG in 2024 alone (Oncological surgeon RdGG, personal communication, June 2025).

According to Berry (2019), "Cancer" may be the scariest word in all of the healthcare not surprisingly, then, cancer care has all of the characteristics of a "high-emotion service". Since the frequency of this disease and its emotional impact, it is crucial that the treatment process is both efficient and empathetic. The pathway is complex and demanding with patients facing uncertainty and vulnerability, while healthcare providers operate under high pressure. Each stakeholder, from patients to surgeons and planners, brings unique needs and communication styles, which, while valuable, can lead to misalignment and inefficiency. Fallowfield (2008) highlights that "Burnout is highest among doctors who feel they

have not received adequate training in communication and management skills", further underlining the need for human-centered approaches in this care process.

The breast cancer pathway (see chapter 4.6) includes interactions, planning moments and decision points, many of which could be stressful or disconnect patients from care workers (Rivers & Sanford, 2021). These issues can undermine the quality of care and the well-being of both patients and care providers.

The goal of this project is to make the breast cancer care process more human-centered by identifying and improving challenges in the current process for both the caregivers and patients.



1.1.2 Scope and focus

The primary goal of this graduation project is to improve the experience of both patients and healthcare professionals by focusing on communication and logistical coordination within the breast cancer surgical process at the RdGG. The project aims to identify emotional and organizational challenges from both perspectives in order to achieve improvements.

Since male breast cancer is very rare, making up less than 1% of all breast cancer cases. As mentioned earlier, in 2024 a total of 18,100 new cases were reported nationally (Kankerbestrijding, 2025). Of these, about 200 cases occurred in men. This is consistent with data from the Reinier de Graaf Gasthuis (RdGG), where yearly 3-8 male breast cancer patients are treated (Oncological surgeon RdGG, personal communication, August, 2025). For this reason, the research focuses on women with breast cancer.

This project was initiated at the request of the oncological surgeon and the plastic surgeon at the RdGG, both of whom perform surgeries on breast cancer patients. As key stakeholders in the care pathway, they identified challenges in communication and logistical coordination that affect both patients and healthcare professionals. Their involvement underlines the urgency of addressing these issues, as leaving them unresolved may result in continued patient stress, inefficiencies in planning and increases pressure on caregivers.

The scope includes the phases of diagnosis, treatment and aftercare in the breast cancer care trajectory, emphasizing the moments where communication, planning and information exchange are crucial. This includes patient consultations, multidisciplinary meetings, surgical preparation and follow-up appointments. The study is limited to the context of the RdGG and does not extend to care provided outside the hospital or in other institutions.

By using a human-centered, design-driven mixed methods approach, the project aims to visualize the current journey through interviews, observations and mapping tools such as patient journey maps and system maps. The research focuses on understanding the needs, expectations and experiences of both patients and care professionals. Based on these insights, the project seeks to deliver a design intervention that facilitates better communication, emotional support and coordination within the surgical care process. This could be a tool, service, or system-level solution, developed through co-creation and iterative prototyping with key stakeholders.

"Design an intervention that improves the surgical pathway for patients and healthcare professionals within the breast cancer care pathway at the RdGG, by addressing both logistical and emotional challenges in order to enhance quality and efficiency of care."

1.1.3 Stakeholder mapping

The breast cancer surgical pathway at the RdGG involves a complicated and layered network of stakeholders who each contribute to shaping the patient experience. Each stakeholder is involved with the patient in a different way, either direct or indirectly. The stakeholder map (Figure 1) shows these relationships in circles, with the patient in the middle.

In the middle of the care process is the breast cancer patient, whose physical and emotional well-being forms the primary focus of care. Directly surrounding the patient are the formal and informal caregivers, such as family members, GP, RdGG caretakers and providers of mental healthcare services. The involvement of these parties are essential to the patient's quality of life and treatment experience. The RdGG caretakers within this layer is a representation of multiple caretakers within the RdGG. This group includes oncologists, plastic surgeons, chemotherapists, radiotherapists, pathologists, nurses, Doctor's assistants and other clinical professionals. These professionals are directly in contact with the patient but also with each other.

Supporting this group are the operational and organisational departments within the hospital, such as OR planners, ICT staff, administrative personnel and hospital management. These roles contribute to the logistical and structural backbone of the care pathway. They are responsible for tasks like managing schedules, coordinating resources and maintaining systems that allow care teams to function effectively.

Further outward, the map includes broader external stakeholders, such as rehabilitation specialists, healthcare associations, quality and safety teams, researchers and insurance companies. These actors influence the broader system in which care is delivered by contributing to innovation, policy development and assurance. Institutions such as the VWS set national guidelines and priorities that shape breast cancer care across hospitals and ensure consistency and quality throughout the healthcare system.

This stakeholder map underscores the complexity of breast cancer care and highlights the importance of integrated communication between all involved. While some stakeholders are in direct contact with the patient, others operate in the background. However, all contribute to the overall experience of the patient.

By mapping this network, it becomes clear that improving breast cancer care is not only depending on medical developments, but also on collaboration between non-medical parties. This study takes a human-centered perspective, taking into account the needs and experiences of patients, caregivers and other relevant stakeholders.

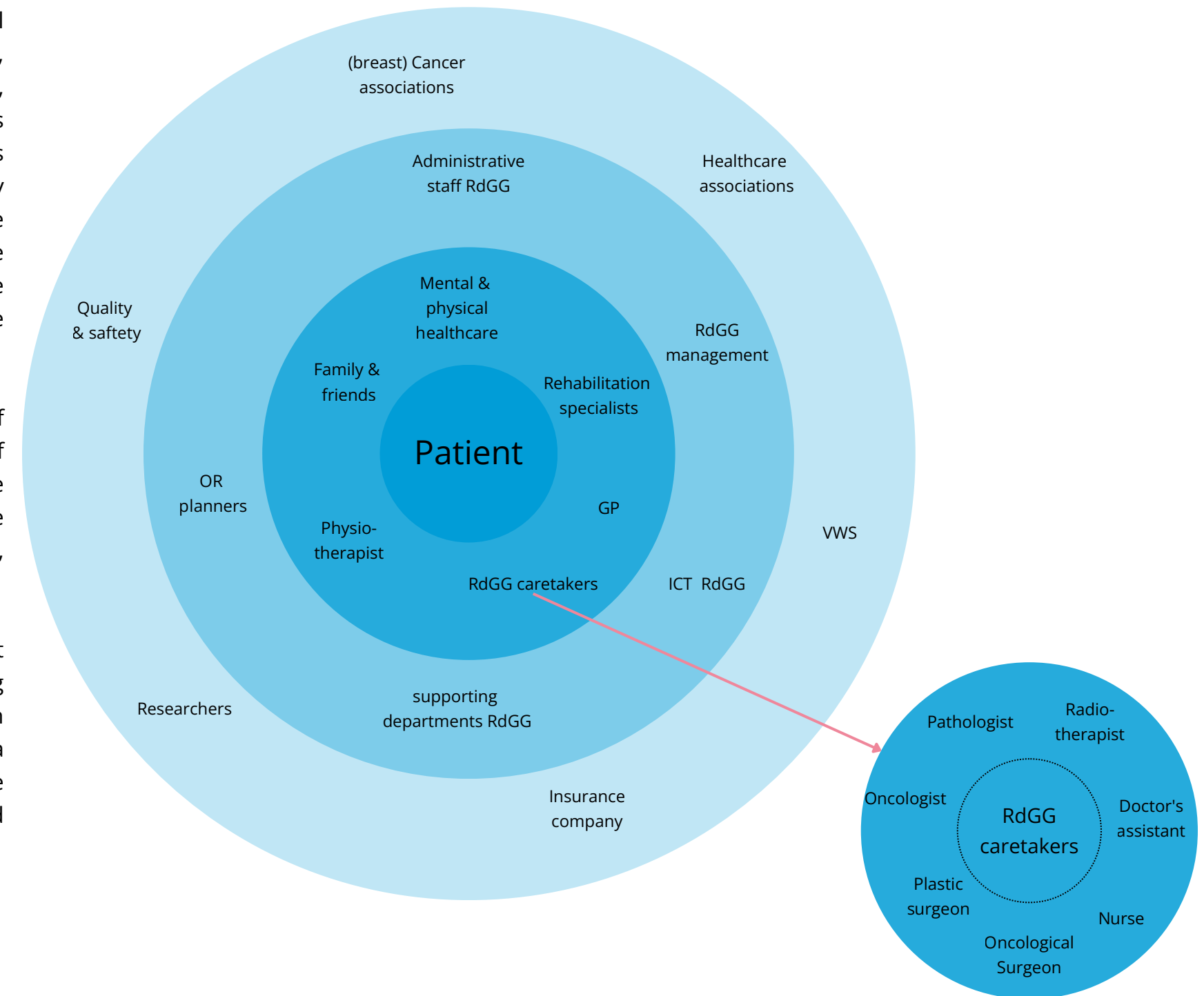


Figure 1. Stakeholder map - Breast cancer patient experience

1.2.1 Double Diamond Model

The Double Diamond framework guides the project through the four stages of Discover, Define, Develop and Deliver (see Figure 2). This methodology offers a structured and iterative approach to problem-solving by emphasizing divergent and convergent thinking in each phase (The Design Council, 2025).

In the Discover phase, the project starts with a literature review, expert and stakeholder interviews, analysis of supporting tools and trends scouting. These activities help identify a broad set of insights and challenges within the breast cancer surgical pathway.

In the Define phase, the gathered insights are analysed through journey & actor mapping and problem framing to clearly translate the core challenges faced by patients and staff. This phase ends with the formulation of a future vision.

The Develop phase focuses on transforming the problem definition and vision into idea generation. A design goal is articulated, followed by co-creative ideation sessions and early validation through stakeholder feedback.

In the Deliver phase, concept development is refined further through trend research, roadmapping, evaluation of a future journey map. The process results in concrete recommendations for implementation.

Using the Double Diamond ensures that the final concept fits to the practical needs of the stakeholders

through continuous involvement and in-depth research. It provides a clear understanding of the complex hospital context, making it easier to propose solutions that are both human-centered and practically feasible.

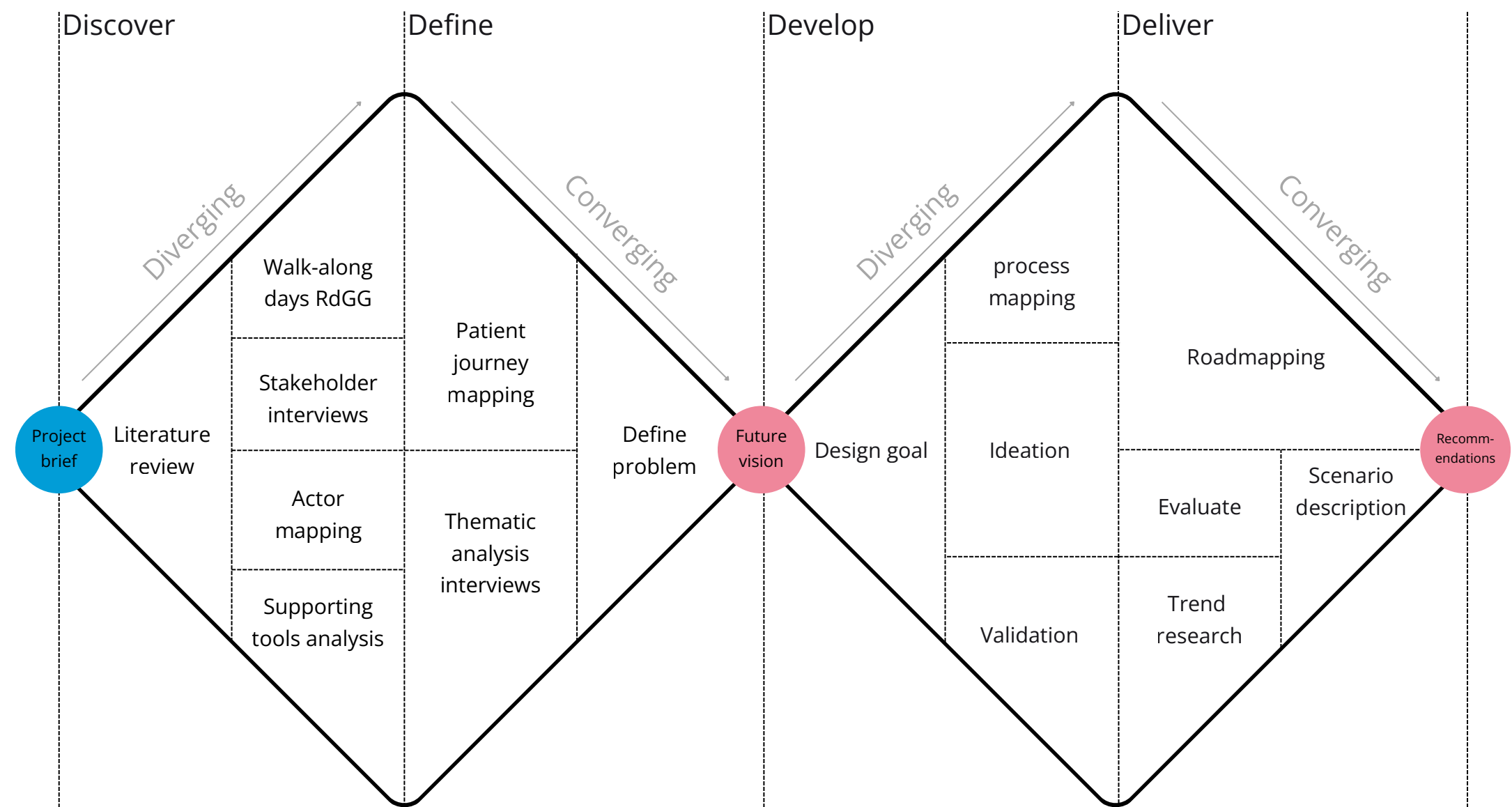


Figure 2. Double diamond method

1.2.2 Patient journey mapping

To gain a better understanding of the breast cancer care pathway, this study will combine observations, interviews and patient journey mapping. These methods help identify challenges, inefficiencies and moments of tension or stress for both patients and healthcare providers. The insights gained from this will be used to describe a clear design objective, which will be used as a guideline for the design process and the development of a final concept.

Patient journey mapping is an increasingly popular method for evaluating individuals' experiences within complex, dynamic healthcare systems (Sijm-Eeken et al., 2020). This approach illustrates how different stakeholders interact with each other during each phase of the journey.

Two journey maps will be developed during this project: one reflecting the patient's journey and one reflecting the caregivers' journey. Each map highlights challenges, communication issues and opportunities for improvement from its perspective. These two maps will then be merged into a single visual to provide a comprehensive overview of the current care process and identify where interventions can have the most impact.

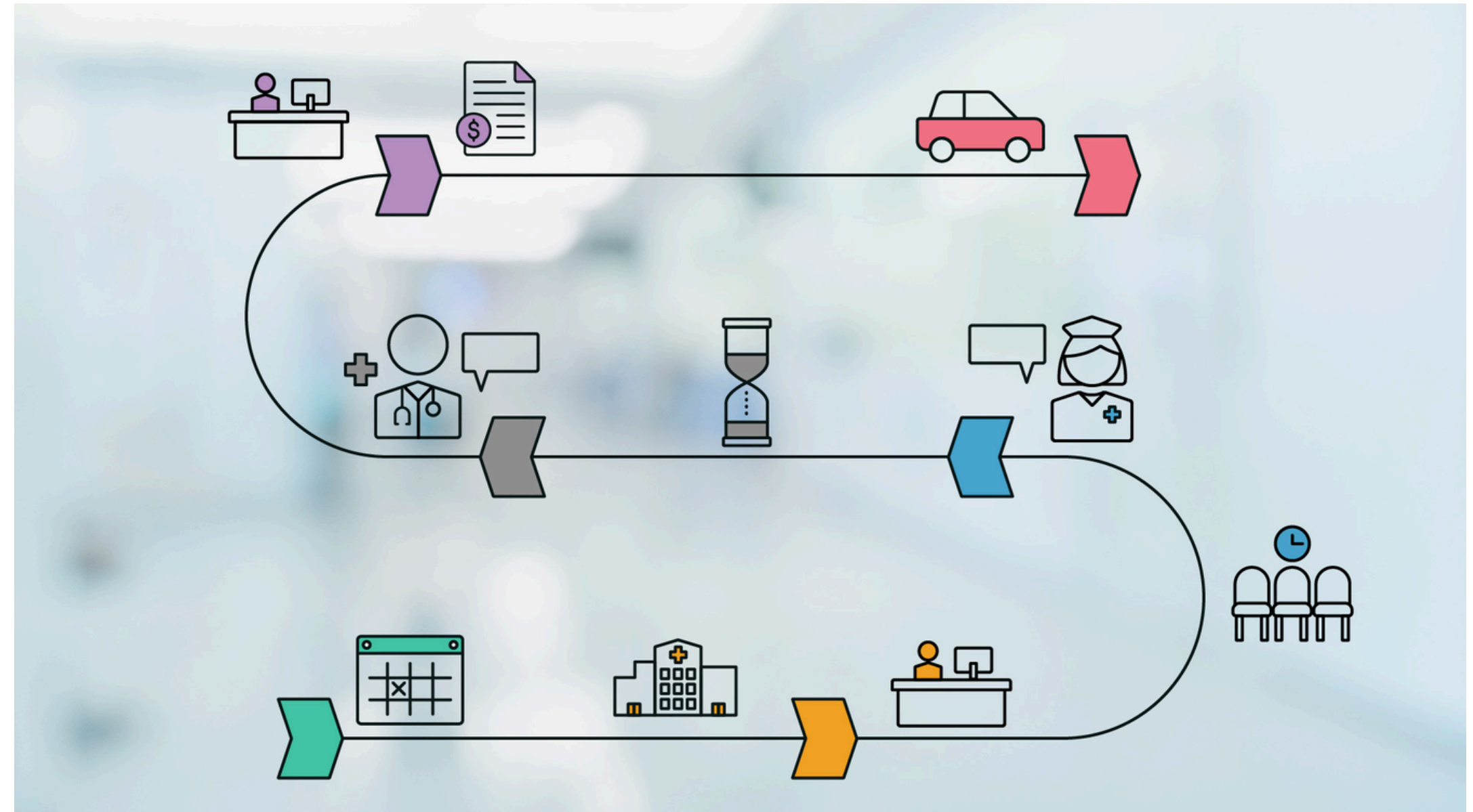


Figure 3. Schematic patient journey

02

Breast Cancer Care Pathway

This chapter explores the literature to give a clear explanation of breast cancer. To understand the treatment process in the RdGG, it is first important to look at what breast cancer is, the different types that can occur and the treatment options that are available. Having this basic knowledge provides the foundation for understanding how treatment decisions are made and why these can differ from one patient to another.

Breast Cancer Care Pathway

2.1 Introduction

The treatment of breast cancer is complex and involves a multidisciplinary approach. Patients actually go through three phases during treatment: diagnosis, treatment and follow-up. Each patient's journey is unique and dynamic. This depends on their individual characteristics in terms of health status, genetics, wishes and environment. That is why it is important that all healthcare providers understand the entire care and treatment process (Metsälä et al., 2022).

2.2 Breast cancer

Breast cancer is a disease that develops when cells in the breast grow and divide uncontrollably, forming a tumor. If this tumor is not treated, it could spread throughout the body and become fatal (World Health Organisation, 2025). Most tumors develop in the milk ducts or lobules (see Figure 4 & 5). When tumor cells are located within the ducts or lobules, the condition is called ductal carcinoma in situ (DCIS) which is a precancerous stage (Westmead Breast Cancer Institute, 2023). Once tumor cells break through the duct or lobule and invade the surrounding breast tissue, it is called invasive ductal or lobular carcinoma (IDC/ILC). IDC carries a risk of spreading to other parts of the body (Breast Cancer Treatment, 2024).

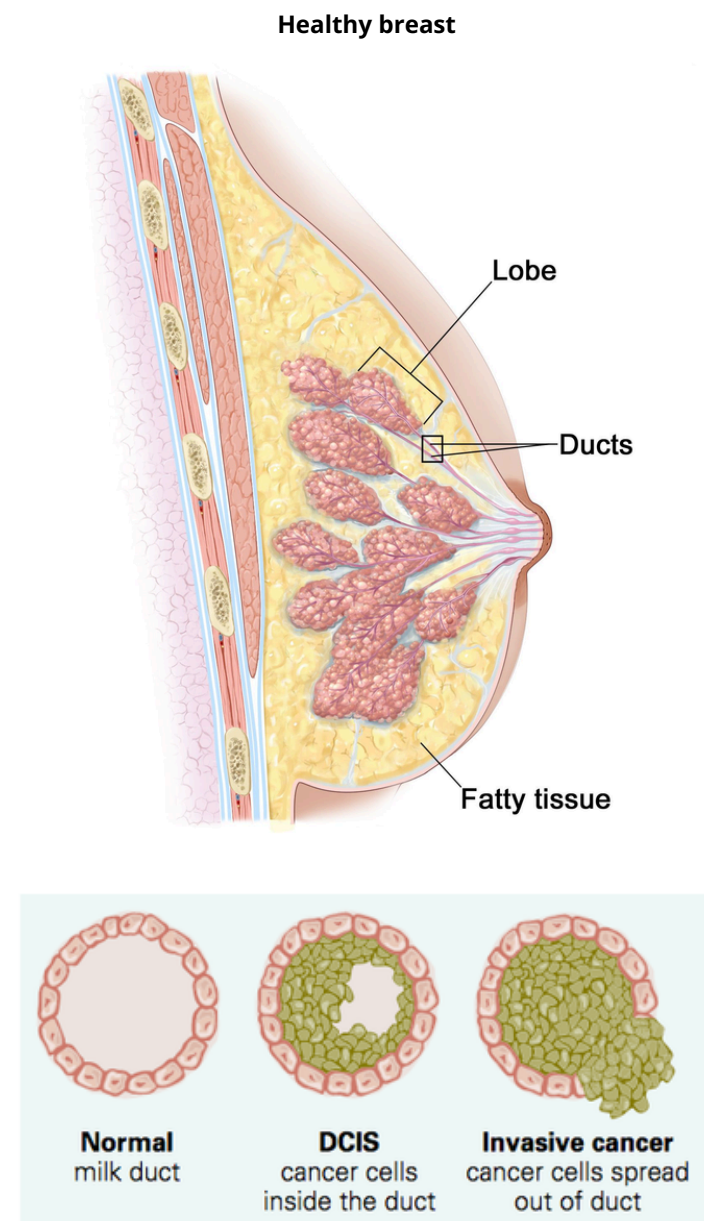


Figure 4. Normal cells lining a milk duct, these can develop into DCIS, which can sometimes progress to invasive cancer (Breast Cancer Treatment, 2024; Westmead Breast Cancer Institute, 2023)

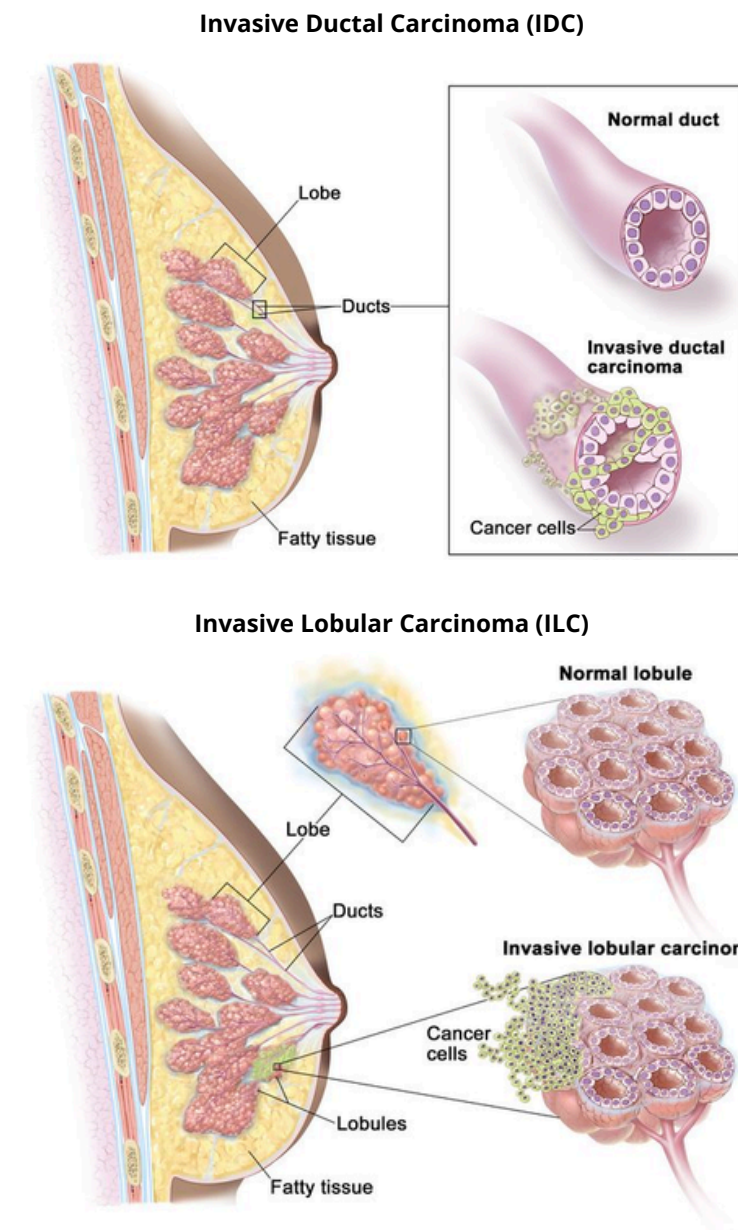


Figure 5. Two types of invasive carcinoma within the breast (Breast Cancer Treatment, 2024)

The 18,100 people who were diagnosed with breast cancer in 2024, included cases of DCIS. This makes breast cancer the most common type of cancer among women, accounting for about 30% of all female cancer cases in the Netherlands. As noted earlier, approximately one out of seven women will develop breast cancer during their lifetime and 1 in 27 women will die from the disease (Integraal Kankercentrum Nederland, 2025).

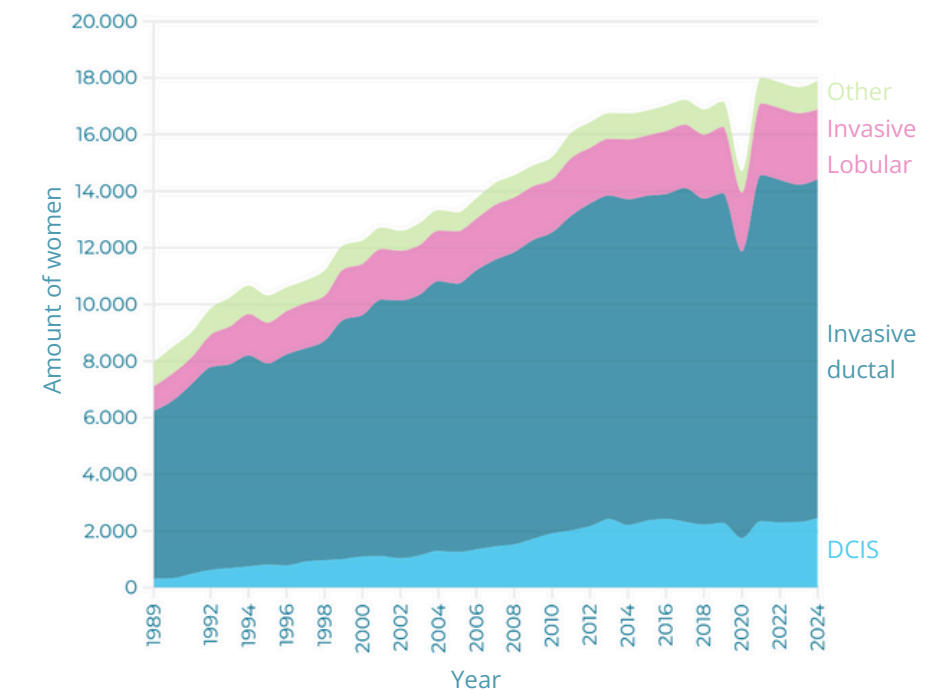


Figure 6. Amount of women diagnosed with breast cancer in NL (Integraal Kankercentrum Nederland, 2025).

In the Netherlands, the number of new breast cancer diagnoses has increased over the past decades. Research shows that this rise is largely explained by the introduction and expansion of the national population screening program, which detects more early-stage cancers such as DCIS (Vondeling et al., 2018). Additionally, the aging population contributes to the growing number of cases, as older women are at higher risk of developing breast cancer.

Lifestyle factors such as overweight, reduced physical activity and alcohol consumption are also on the rise and further increase risk (Van Gemert et al., 2015; Paap et al., 2008). This means that more cases are being diagnosed each year, not only because the disease is becoming more common, but also because the healthcare system is improving, allowing earlier detection. The graph shows a decrease in the number of diagnosed breast cancer patients in 2020. This was mainly due to the COVID-19 virus, which caused a temporary stop to population screening and a decrease in the number of people reporting symptoms to their general practitioner.

2.3 Types of breast cancer

According to the Integral Cancer Center Netherlands (IKNL), the most common types of breast cancer are HR+/HER2+, HR+/HER2-, HR-/HER2+, HR-/HER2-.

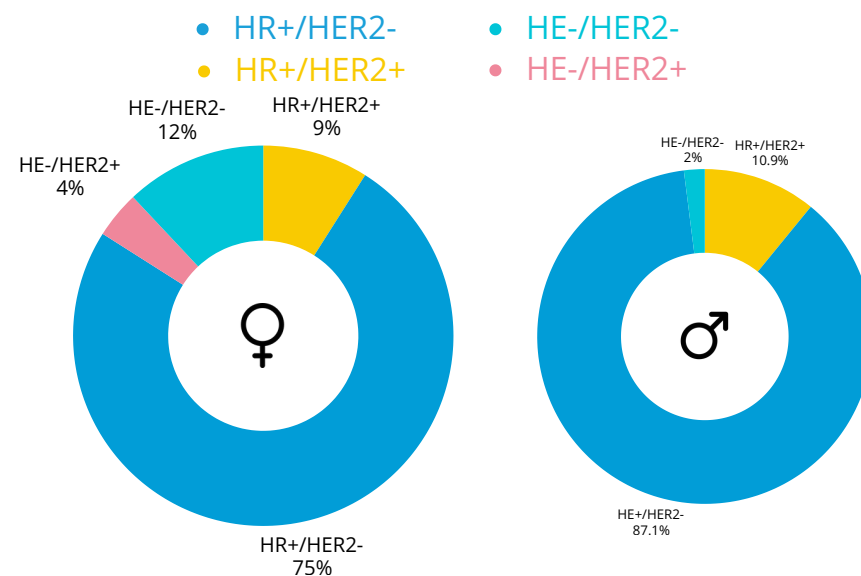


Figure 7. The occurrence of breast cancer subtypes (IKNL, 2025)

HR stands for hormone receptor. If a breast cancer is HR+, it means the tumor cells have receptors for the hormones estrogen or progesterone.

These hormones can stimulate the tumor to grow (National Cancer Institute USA, 2025).

If a breast cancer is HER2+ (Human Epidermal Growth Factor receptor 2+), the tumor cells produce too much of the HER2 protein. This protein can make the cancer grow faster and is often linked to more aggressive forms of breast cancer (National Cancer Institute USA, 2025).

When a tumor is detected, it can be at different stages of development. As shown in Table 1, breast cancer is classified into four main stages, plus DCIS (stage 0). The stage indicates how large the tumor is and how far the cancer has spread in the body. This information is essential for choosing the most suitable treatment plan. In general, higher-stage cancers require faster and more extensive treatment than lower-stage cancers. By determining the stage, doctors can decide whether surgery, medication, radiation, or a combination of treatments is necessary.

In addition to the different stages and the four most common types of breast cancer, rare tumor cells are also discovered sometimes (Jenkins et al., 2021). For some patients, certain treatments cannot be used, for example because of allergies or other medical reasons. This shows why there is no single treatment that works for everyone. Each type of breast cancer may require a different approach, making the treatment a complex process.

Stages of tumor	Description
DCIS (precancerous, stage 0)	<ul style="list-style-type: none"> The abnormal cells are only found in the milk ducts of the breast. The tumor has not yet spread to the surrounding breast tissue and there are no metastases to lymph nodes or other organs.
Stage I	<ul style="list-style-type: none"> The tumor is smaller than 2 centimeters. There may be metastases to the lymph nodes, but there are no metastases to other organs.
Stage II	<ul style="list-style-type: none"> The tumor is between 2 and 5 centimeters. There may be metastases to the lymph nodes, but there are no metastases to other organs.
Stage III	<ul style="list-style-type: none"> The tumor is larger than 5 centimeters. There may be metastases to the lymph nodes. A tumor smaller than 5 centimeters that protrudes through the skin or is attached to the chest wall also falls under this stage. In these cases, there is a high risk of metastases to other parts of the body.
Stage IV	<ul style="list-style-type: none"> A tumor with metastases to other tissues or organs in the body.

Table 1. The different stages of a tumor in the breast (Borstkankervereniging Nederland, 2025)

2.4 Treatment of breast cancer

The treatment of mammary carcinoma depends on many variables like the patients' age, tumor size, stage (Admoun & Mayrovitz, 2021). For some patients, the treatment process may be relatively straightforward, while for others it can be lengthy and physically as well as emotionally demanding. Breast cancer care describes three core stages: diagnosis, treatment (surgery, chemotherapy, radiation) and aftercare (survivorship) (Lee et al., 2024). The 'aftercare phase' represents the period following primary treatment, where the focus shifts to monitoring, supporting recovery and managing long-term health needs (Chan et al., 2023).

Adjuvant Therapy

Adjuvant systemic therapy is treatment given after surgery. It can include chemotherapy, hormone therapy, immunotherapy, radiation therapy, or a combination of these. The goal is to reduce the risk of recurrence (Ronsini et al., 2024).

Neoadjuvant Therapy

Neoadjuvant systemic therapy is treatment given before surgery. Doctors recommend this when it is clear that additional treatment will be needed. One reason is to shrink the tumor, which could make breast-conserving surgery possible or make a larger tumor easier to remove (Chen et al., 2023). Another reason is to test how well the cancer responds to the treatment. If the tumor shrinks, it shows that the therapy is effective. If it does not, doctors can switch to a different medication that may work better (BOOG Study Center, 2024)

Surgical Options

Surgery is often the most important step in the treatment of breast cancer. The aim is to remove the tumor while preserving as much healthy tissue as possible, minimizing the impact on the patient's body. Depending on the type, size and stage of the tumor, as well as the patient's personal wishes, there are several surgical approaches:

Lumpectomy (Breast conserving surgery)

When a breast-conserving surgery is done, the tumor and a margin of surrounding tissue are removed, but most of the breast is preserved (see Figure 8). This is usually followed by radiotherapy (adjuvant therapy) to reduce the risk of recurrence (Chua, 2024).

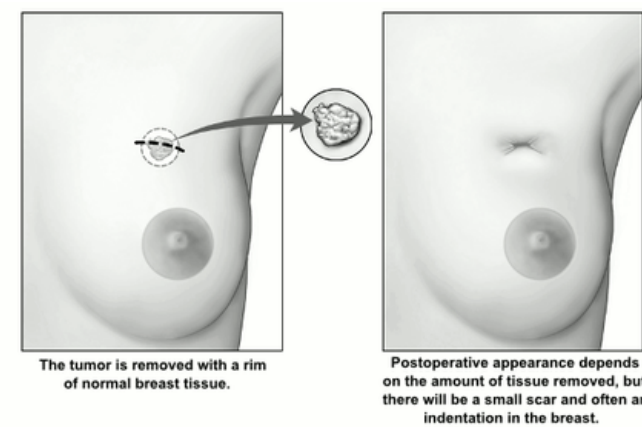


Figure 8. Breast conserving surgery (American Cancer Society, n.d.)

Mastectomy

During mastectomy the entire breast is removed. Variations include skin-sparing mastectomy, where most of the breast skin is preserved and nipple-sparing mastectomy, where both the skin and the nipple are kept intact. These approaches can make later reconstruction easier and improve cosmetic outcomes (Admoun & Mayrovitz, 2021). In both situations often a lymph node removal is done. During surgery, one or more lymph nodes from the

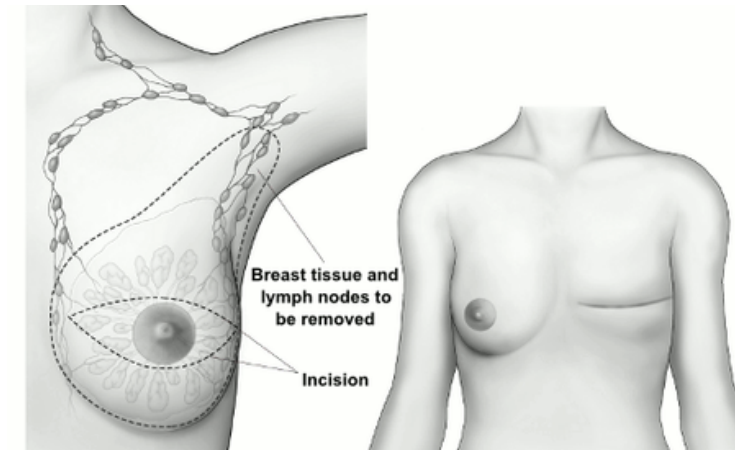


Figure 9. Mastectomy (American Cancer Society, n.d.)

axilla are often removed to check whether the cancer has spread to the rest of the body. This may involve a sentinel lymph node biopsy (removing only the first few nodes where cancer cells are most likely to spread) or an axillary lymph node dissection (removing more nodes if needed) (Giammarile et al., 2022).

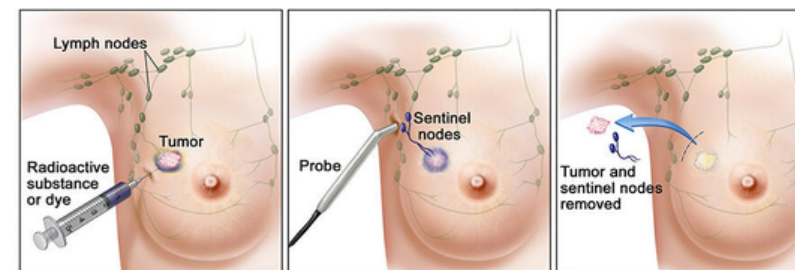


Figure 10. Lymph node removal (National Cancer Institute USA, 2017)

The removed tissue is examined by a pathologist after surgery to ensure that the cancer has been completely removed from the patient (Kopicky et al., 2024). It may turn out afterwards that not enough tissue has been removed and that another surgery is necessary. For many patients, breast reconstruction is an important part of recovery. This procedure can be performed either combined with the oncological surgeon, also known as IBR (Immediate Breast

Reconstruction) or at a later stage (months/years after the surgery). Nowadays, more and more Dutch patients are choosing to undergo IBR, as it means that the patient does not have to undergo a second surgery (Heeling et al., 2024). Not only does this shorten the patient's recovery time, but it also decreases the hospital's occupancy rate, as the patient does not need to be readmitted for in the hospital (if the hospital is able to provide the reconstruction). IBR does require careful planning, as the plastic surgeon must be ready to operate as soon as the oncological surgeon has completed their part. Currently, several techniques are available to reconstruct the breast and the choice depends on medical factors as well as the patient's preferences. In the RdGG, the term "combi-patient" is also used to refer to a patient undergoing IBR surgery.

Implant-based reconstruction

In this approach, a silicone or saline implant is placed beneath the breast skin or muscle to recreate the shape of the breast (Malekpour et al., 2023). It is generally a shorter surgery with a faster recovery compared to tissue-based methods, but implants may need to be replaced over time (Kidd et al., 2024).

Fat Grafting

This technique uses fat taken from another part of the patient's body (such as the thighs or abdomen) through liposuction. The fat is then injected into the breast area to restore shape or improve symmetry. Fat grafting can be performed on its own in selected cases, but is often used to refine the results of other reconstruction techniques (Turner et al., 2020).

Autologous reconstruction

This method uses the patient's own tissue to create a new breast, also known as a DIEP surgery. Tissue is taken from another part of the body, which can vary depending on preference and body type. Because the reconstructed breast is made from natural tissue, it often looks and feels more natural. However, the surgery is more complex, requires a longer recovery period and involves scars at both the breast and donor site (Scaglioni et al., 2025). When the amputation takes place at the same time, it is called a direct DIEP (the procedures can also take place in a later stage). A direct DIEP requires two Plastic Surgeons and one Oncological surgeon.

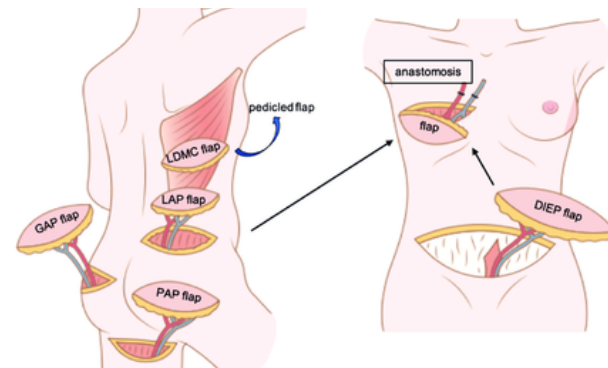


Figure 11. Autologous reconstruction options (Katsuragi et al., 2024)

Nipple-areola reconstruction (NAC)

Reconstruction of the nipple-areola (nipple + small circular area surrounding the nipple) is for some the final step in breast reconstruction. This procedure aims to restore the natural appearance of the breast by recreating the nipple and areola. Beyond the cosmetic result, nipple reconstruction can contribute to improved body image, greater satisfaction with the reconstructed breast and increased sexual well-being

(Egan et al., 2021). A nipple can be reconstructed surgically by reshaping and stitching skin and/or the nipple-areola can be recreated through tattooing (See Figure 13). While it is generally a smaller procedure compared to full breast reconstruction, it is an important step for many patients in completing the reconstruction process. Plastic surgery is not only focused on reconstruction. Some patients opt for breast augmentation/reduction or procedures to improve symmetry after treatment. The choice of technique depends on medical factors, recovery period and the patient's personal preferences.

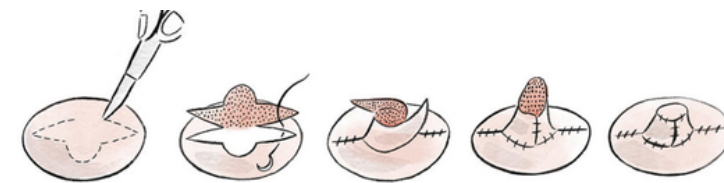


Figure 12. Reshaping the nipple (Hobson, 2017)



Figure 13. Nipple-areola through tattooing (Tsedeq naturalbeauty andskincare, 2025)

2.5 Summary

Breast cancer is the most common form of cancer in women and can occur in various forms and stages, each requiring its own treatment approach. The care pathway consists of diagnosis, treatment and follow-up/aftercare and may include therapies such as chemotherapy or hormone therapy, surgical procedures and reconstructive procedures. Within surgical treatment, there are also various procedures such as breast-conserving surgery and mastectomy, sometimes in combination with the removal of lymph nodes. For many patients, reconstruction plays an important role in physical and emotional recovery, with options ranging from implants and fat grafting to autologous tissue reconstruction and nipple-areola reconstruction. Because each patient's situation is unique, treatment plans can vary greatly, with the goal of not only removing the cancer but also restoring quality of life.

03

Context Exploration

This chapter takes a closer look at patients and caregivers within the RdGG. By creating an actor map that visualizes how patients interact with their environment, analyzing available online tools for patient support and by accompanying RdGG professionals during their work, a deeper understanding of the breast cancer treatment process at the RdGG and the experiences of its patients is gained.

Context Exploration

3.1 Actor map

Mapping the relationships and dependencies between actors in the breast cancer care pathway helps identify where communication or logistical breakdowns may occur. This process provides insight into both patient and healthcare professional experiences and highlights the complexity of coordination required to deliver care at the RdGG (see Actor map on the next page).

To support this analysis, an actor map was developed that visualizes the stakeholders involved in breast cancer care. The map was created through exploratory interviews at the RdGG, literature research on breast cancer care and desk research into relevant organizations and services. Actors were grouped into categories such as caregivers, public institutions, private organizations, daily life factors and external influences. The mapping exercise offers an overview of the wide network of individuals and institutions that influence the patient journey.

The actor map reveals important elements that are related to the breast cancer care process:

Multidisciplinary and long-term care

Treatment requires collaboration between many specialists (oncological surgeons, plastic surgeons, oncological nurses, radiotherapists, pathologists, etc.). Some are less involved, whereas others remain throughout the entire process. MDO's play a central role in ensuring treatment coherence.

In the case of breast cancer, oncological and plastic surgeons regularly work closely together to perform IBR surgeries, in which breast reconstruction takes place immediately after tumour removal. This approach not only improves medical outcomes but also helps make the experience as positive and restorative as possible for the patient. Such direct collaboration requires precise coordination between multiple departments within the hospital to align schedules, resources and expertise efficiently.

Frequent hospital visits

Patients have to frequently visit the hospital for chemotherapy, radiotherapy, consultations, follow-up checks and preparatory appointments for surgery. These visits can have a big impact on their daily life and require careful coordination between different departments within the hospital.

Care beyond the hospital

Some patients could also need psychological support, physiotherapy, or rehabilitation support. Others require help with daily tasks such as household work or childcare. This combination of medical, psychological and social services makes the pathway broader and more complex than many other treatment processes.

Social and personal consequences

Treatment can affect patients' work, financial security and family responsibilities. Patients must arrange sick leave, deal with uncertainty about their income and reorganize family roles. These social aspects place an additional burden on top of medical care.

Influence of external organizations

External actors influence the pathway. For example, the Dutch Breast Cancer Association (BVN) provides advocacy and peer support, RIVM organizes national breast cancer screening and insurers determine reimbursement. Awareness campaigns, such as Pink Ribbon and research funders like BOOG (breast cancer research group) also have a major role in shaping care and groundbreaking discoveries.

Aesthetic and emotional dimensions

Cancer treatment is not only associated with illness, but also affects patients' identity and body image. Reconstructive surgery, wigs, specialized lingerie, or tattooing after mastectomy all form part of the journey. These aspects emphasize the emotional and psychological recovery that accompanies the medical treatment.

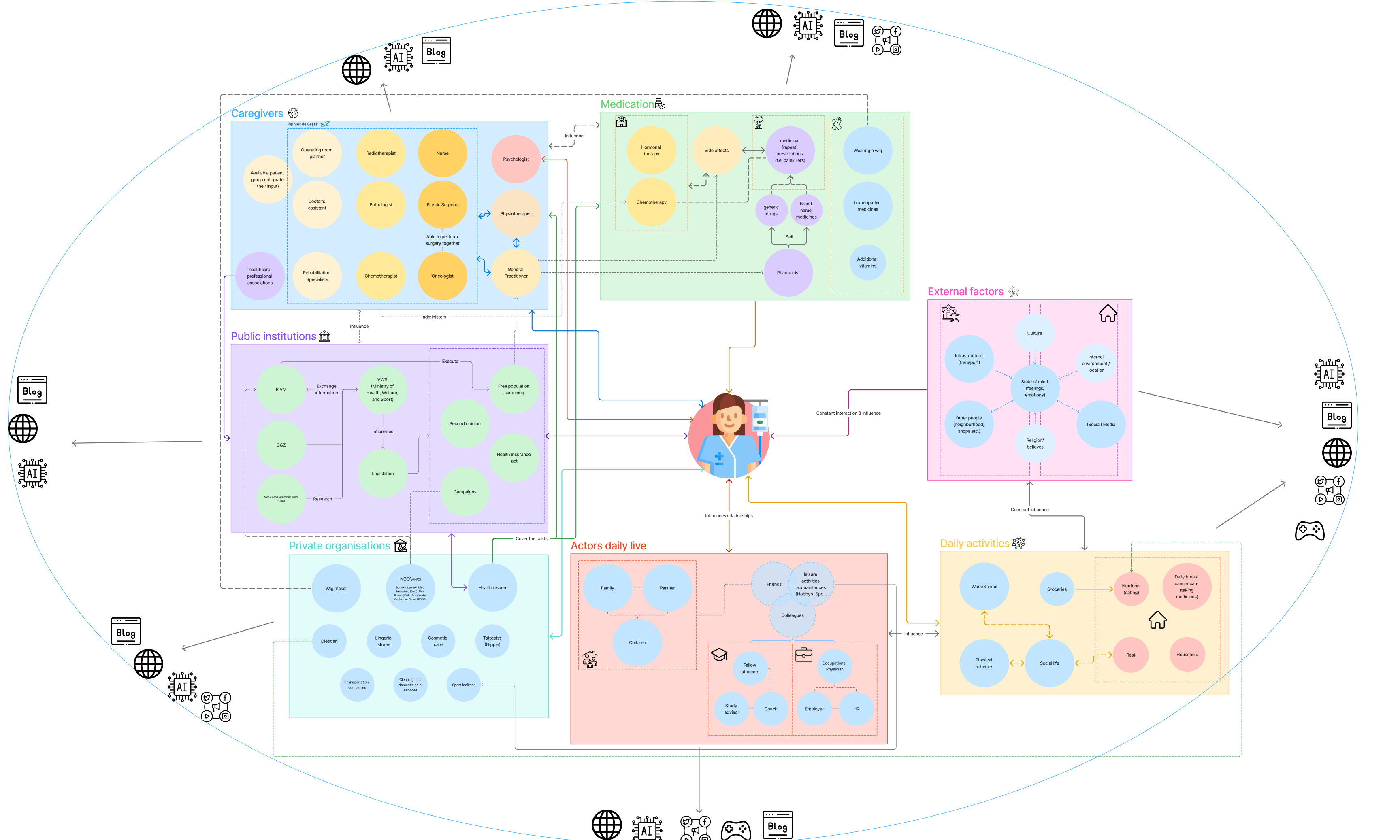
The digital environment

The blue circle in the actor map highlights the growing role of digital tools. Patients increasingly use online platforms for contact, practical advice and emotional support. Healthcare providers also rely on digital

solutions, from patient portals to communication with colleagues. This online environment extends the actor landscape, shaping how both patients and professionals interact with care.

In addition, patients' experiences differ depending on their type of breast cancer and treatment. Some continue working and exercising during treatment, while others experience physical and mental symptoms and become dependent due to the intensive therapy. These differences show how the same disease can affect daily life in very different ways.

It is distinguished by its multidisciplinary structure, frequent hospital visits, the involvement of external organizations and the integration of physical and emotional needs into treatment. Also, the presence of digital actors further broadens the landscape. For patients, this means a (transformational) process that affects almost every aspect of their daily lives. For healthcare providers at RdGG, it emphasizes the importance of coordination, flexibility and holistic support in guiding patients through this complex care pathway.



3.2 Online Patient Supporting Tools Analysis

This chapter explores the online tools available to support breast cancer patients throughout their care process. The aim of this analysis is to understand how digital tools can complement hospital care by identifying which online platforms patients already use, what gaps exist and whether additional support tools could improve their overall treatment experience.

To address this question, a desktop analysis was conducted, reviewing publicly available tools and digital platforms related to breast cancer care. As discussed earlier, the entire process is divided into diagnosis, treatment and aftercare. The purpose of this overview is to determine whether patients are aware of these existing digital resources and whether new or improved tools could provide added value.

To provide a clear overview, a selection of tools was made based on two criteria:

- Relevance to (breast) cancer care – tools that explicitly support patients during at least one phase of the breast cancer treatment process.
- Related to healthcare – tools under the theme 'health & fitness'/'medical' or those mentioned or recommended by healthcare providers at the RdGG.

Tools that did not meet these criteria were excluded. The aim is not to provide a complete overview of all available tools, but to demonstrate that there are tools available that can support patients during their treatment.

The analysis shows that tools exist for all three phases of the breast cancer treatment process. Some tools focus on the diagnosis phase and provide information and support in monitoring your own breasts for abnormalities. Others support the treatment phase, for example by providing medication reminders or tracking exercise and nutrition. There are tools that focus on both information and emotion, for example by providing access to medical data or offering mindfulness exercises. Lastly, there are various tools that focus on the aftercare phase, such as online platforms that focus on mental well-being and reintegration. There are also tools that cover multiple phases and support patients throughout their entire journey.

The RdGG has an online environment accessible on their website: "The patient portal is Reinier de Graaf's secure online environment. Patients can view their medical records and arrange matters themselves such as scheduling appointments online. You can also read important brochures, fill out questionnaires and view results and letters." (Reinier De Graaf, n.d.). What stands out is that, unlike many other hospitals, the RdGG does not have any apps available for its patients (ChipSoft, 2025). These apps are often similar to the patient portal but much more accessible to use. In this study, it will be explored whether the RdGG is aware of the existence of such apps and the reasons they are not (yet) applied in practice.

Another point is that digital tools vary greatly in focus and quality. Some focus on practical support, while others emphasize emotional support. This diversity raises the question of whether patients would benefit more from a single integrated tool or from multiple specialized tools.

By interviewing patients, it can be determined whether there is a need for online tools to support them, which ones they already use and whether there are any gaps that can be filled. It may also be the case that patients are unaware of certain tools that could meet their needs.

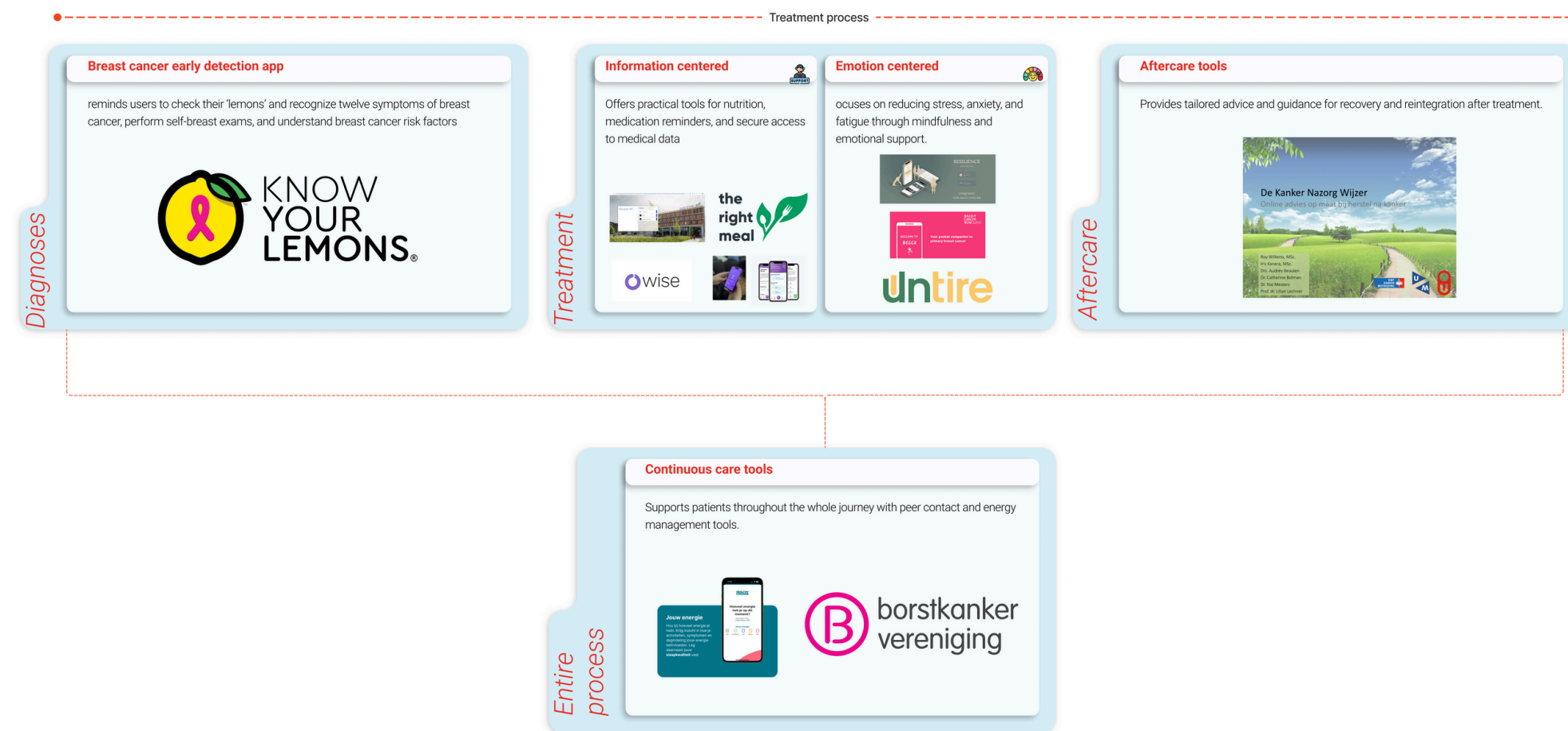


Figure 14. Patient online supporting tools analysis

3.3 Walk-along Days & Informal Interviews with Caretakers

To gain a better understanding of the daily work of the caregivers at the RdGG, shadowing days were planned to observe their behavior and activities. The aim of this step was to identify the responsibilities, challenges and collaboration between different professional groups involved in oncological care.

The walk-along method was applied by spending several half-days with different caretakers, including oncological surgeons, oncological nurses, plastic surgeons and day coordinators. Informal interviews were conducted during these walk-alongs, where questions were asked about their roles, responsibilities and difficulties they encounter. Observations were noted and sorted by role.

Oncological Surgeon

The most important conclusion from these days is that an oncological surgeon has many tasks and must help each patient as best as possible by taking all the time needed for them to answer all their questions. Their weekly tasks can be divided into three main areas: outpatient clinic, surgery and MDOs (multidisciplinary meetings) including supervision of doctors in training. During the outpatient clinic, the surgeon meets patients to discuss planned surgeries and to share the results of examinations or interventions. In MDOs, the surgeon collaborates with a multidisciplinary team (including pathologists, radiotherapists and nurses) to agree on a treatment plan for each single patient. A large part of the surgeon's work is also performing surgery, where the treatment plan, that has been discussed with colleagues and the patient, is carried out.

An oncologist and an oncological surgeon have different roles in the treatment process. The oncological surgeon is responsible for planning and performing the surgery, while the oncologist is responsible for chemotherapy and hormone therapy, which may be given before or after surgery (Oncological surgeon RdGG, personal communication, August, 2025). Patients therefore meet the surgeon for their operation and the oncologist for systemic treatments. In many hospitals, patients may go under surgery by a different surgeon than the one with whom they discussed the plan during the outpatient clinic. At the RdGG, they believe it is important for patients to feel at ease and try to involve the same doctors in the treatment throughout the entire process. This can sometimes be a logistical challenge, as each surgeon can only operate on their own patients.

Oncological Nurse

The duties of an oncological nurse are mostly the same as those of an oncological surgeon, except that they are not allowed to perform surgery. Throughout the entire treatment process, they hold outpatient consultations with patients to discuss test results, explain what the treatment will involve and answer any questions. They are also part of the MDOs, where they help decide on the procedures that will be performed on patients.

Plastic Surgeon

The tasks of a plastic surgeon include restoring the form and function of body parts through reconstructive surgery. This involves conducting

outpatient clinics and setting up treatment plans which can include complex or simple surgeries. Plastic surgeons can play an important role in the well-being of patients. Since patients are going through a difficult period and are often afraid of losing their original breast(s), plastic surgeons offer them an alternative. Plastic surgeons are obviously also part of the IBR surgery. The number of IBRs in the RdGG is on average significantly higher than in the rest of the Netherlands (see Table 2).

Immediate breast reconstruction after surgery	RdGG	National average
Patients with IDC/ILC	41.1%	29.9%
Patients with DCIS	57.1%	38.5%

Table 2. Above-average IBR scores RdGG (Ziekenhuischeck, 2024)

Day Coordinators

The day coordinators are responsible for the planning of the operating rooms. Because many surgeries take place each day, multiple professionals are involved in every procedure and it is difficult to predict in advance how long operations will take, surgery scheduling can be quite complex. In addition, when technical issues arise in the operating rooms, such as a malfunctioning lamp, they are contacted to resolve the problem. During the walk-along it became clear how busy their role is, as their phones rang constantly. They are also responsible for ensuring that combi-patient procedures, such as tumor removal combined with immediate breast reconstruction (IBR),

run smoothly. Since the plastic surgeon and the oncological surgeon need to switch rooms during surgery, the procedures can become a logistical challenge (further explanation in Chapter 6.3).



Figure 15. Walk-along with Day Coordinators

The observations indicate that oncological care at RdGG is characterized by close collaboration between multiple disciplines. However, this interdependence also introduces logistical challenges. For example, limited integration between departments and reactive scheduling can reduce overall efficiency. These findings suggest that the quality of care depends not only on clinical expertise but also on organizational alignment and communication structures.

The walk-along days provided valuable insights into how oncological and reconstructive care are organized at RdGG. Each professional group has clearly defined roles, yet their collaboration is essential to deliver high-quality, patient-centered care. Despite logistical challenges, the multidisciplinary coordination contributes to strong treatment outcomes. These factors likely explain why RdGG achieves higher-than-average rates of IBR surgeries compared to the national average.



Figure 16. Walk-along day: IBR surgery & multi-disciplinary meetings

3.4 Key Takeaways

The contextual research provided an in-depth understanding of how oncological and reconstructive breast care are organised at the RdGG and how both professionals and patients navigate through this environment. This chapter explains what is most relevant to carry forward into the design phase. The focus now shifts from describing the current situation to identifying how these insights can inform future design decisions.

A key insight from the research is that the breast cancer care process is inherently complex. It involves many actors, systems and overlapping responsibilities. The design will therefore not aim to simplify the medical process itself, but to make this complexity more transparent and manageable. Creating clarity and overview for those who work within and experience the system will be a central goal. The design must help users understand what happens when, who is involved and what is expected of them.

The dynamic nature of care at the RdGG also highlights the need for flexibility. Schedules can change and professionals are required to adapt quickly to shifting circumstances. Tools or interventions that are too rigid will not fit this reality. The design should therefore accommodate changes easily and support staff in staying aligned when plans evolve.

Another important consideration is that the design should strengthen existing collaboration rather than introduce additional layers of work. Professionals already dedicate much effort to coordination and communication. Any future intervention must build upon these existing practices and contribute to smoother collaboration without increasing administrative pressure.

The research also showed that care is not only a clinical process but equally an emotional and social one. Both patients and professionals balance medical, logistical and personal challenges throughout the treatment journey. Future design work should therefore consider the human side of care and explore how digital or physical solutions can connect these different dimensions in a meaningful way.

Finally, the hospital and patients already make use of several digital systems, yet these tools are not always well connected or user-friendly. Rather than replacing existing infrastructures, the design process will focus on how to enhance and extend what is already in place. This means identifying opportunities for better integration, improved usability and more cohesive experiences across different touchpoints.

In a later stage, there will be build on these considerations by translating them into concrete design principles and concepts. The aim is to develop solutions that create clarity in a complex system, support flexible coordination between disciplines and foster a more continuous and empathetic experience for both patients and healthcare professionals. This marks the transition from understanding the current context to shaping new possibilities for improvement within it.

04

Qualitative data analysis - Interviews with Patients and RdGG Caretakers

In this chapter a qualitative data analysis is done known as the Seven Steps to Conducting, Analyzing and Reporting Semi-Structured Interview Data (7S CARS-SID). Interviews with patients and healthcare providers at the RdGG are systematically analyzed. In addition, a patient journey is developed that illustrates the steps and emotions experienced by both patients and caregivers. The insights derived from this analysis help to identify potential challenges within the breast cancer care process.

Qualitative data analysis

4.1 Method

For this study, a semi-structured interview method is chosen because this data collection technique offers both structure and flexibility for in-depth exploration. The main advantage of semi-structured interviews is that the interviewer uses a prepared guide with key questions but remains flexible to follow up on relevant topics that emerge naturally during the conversation (Adeoye-Olatunde & Olenik, 2021). This allows researchers to gain a deep understanding of participants' perspectives and experiences while keeping the main research questions in focus. The insights gathered through these interviews will be translated into a patient journey visual, which maps the patient's experiences, emotions and interactions throughout the breast cancer care process. This journey will serve as a foundation for identifying design opportunities in the following phase.

Adeoye-Olatunde and Olenik (2021) describe a systematic approach for this, called the Seven Steps to Conducting, Analyzing and Reporting Semi-Structured Interview Data (7S CARS-SID). This framework includes the following steps:

1. Assess whether a semi-structured interview is the appropriate method
2. Define a suitable sampling and recruitment strategy (see Appendix A.)
3. Develop an interview guide

4. Conduct the interviews and manage data securely
5. Analyse the data
6. Draw conclusions
7. Report the results according to clear guidelines

Following these methodological steps improves the reliability and transparency of qualitative data analysis. This method is therefore particularly suitable for revealing patients' and caretakers personal experiences, motivations and contextual factors that cannot be captured using quantitative questionnaires alone.

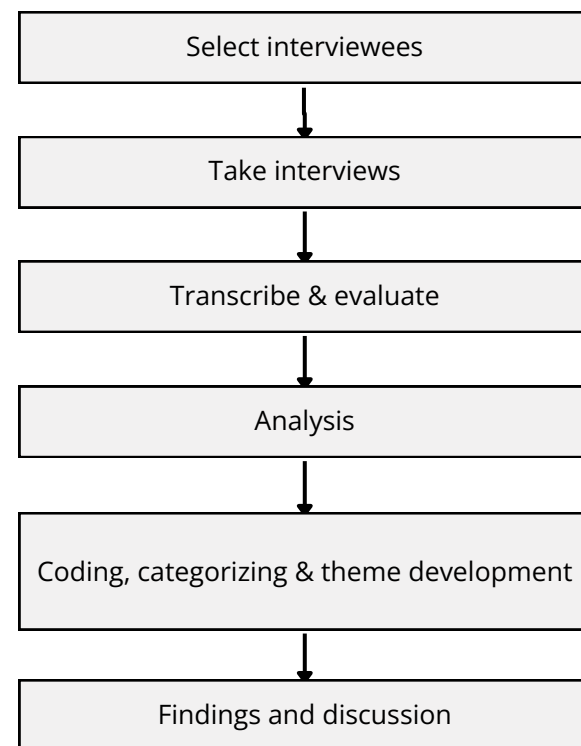


Figure 17. Qualitative data analysis

4.2 Interviews

To gain a deeper understanding of the breast cancer treatment process from different perspectives, a series of semi-structured interviews are conducted with both patients and healthcare professionals. The aim is to explore how the treatment process is experienced, which aspects are valued and where opportunities for improvement may lie.

A total of five women, ranging from 48 until 66 years old during treatment at the RdGG, are interviewed. The focus of these interviews is on their personal experiences throughout the different stages of the care pathway. Patients are asked to reflect on their entire treatment process, how they experienced it and what impact it has on their daily lives and well-being. In addition, attention is paid to the role of communication, the support they receive from healthcare providers, family and friends and whether the logistical organization of appointments and treatments is clear and accessible. Patients are also asked to share which aspects of care they appreciate most and which aspects they believe could be improved (see Appendix B.).

Alongside the patient interviews, several healthcare professionals directly involved in breast cancer care at the RdGG were also interviewed. This group includes an oncological surgeon, a physician assistant and a plastic surgeon. These interviews focus on the professional perspective of the treatment process. Caretakers are asked to describe their role, identify which parts of the process run smoothly and where potential challenges lie.

Particular attention is paid to interdisciplinary collaboration, communication with patients, the balance between medical and emotional support and the various tools used (see Appendix C.).

By combining insights from both patients and caretakers, the interviews provide a broad picture of how the breast cancer care process is experienced at the RdGG. While this section describes the setup and scope of the interviews, the results and themes that emerge from these conversations are presented in the following part of this chapter.



Figure 18. Interviews taken at the RdGG

4.4 Overview analysis

Table 3 provides an overview of all identified codes and themes. It also shows how many citations are linked to each code and which interviewees they came from. The abbreviations in the last column indicate the source of each citation (see next page at the bottom of the table).

Since some interviews delve more deeply into specific topics than others, not every code is represented equally across all participants. The frequency of a code provides some indication of how common an issue is, but this should not be interpreted as its only measure of importance. Even if a theme is mentioned by only a few interviewees, it may still highlight a significant challenge or opportunity that deserves further exploration.

To identify the most relevant opportunities, multiple criteria were considered:

- **Language use** (choice of words, tone, emphasis)
- **Nonverbal behavior** (facial expressions, gestures, emotional responses during the interview)
- **Frequency of themes** (how often an issue was raised), which was taken into account but regarded as less important than the qualitative indicators above.

By combining these criteria, both frequently and infrequently mentioned themes could be assessed for their relevance. This ensures that issues which may not occur often, but are expressed with strong emotional or behavioral signals, are still recognized as critical for further investigation.

Table 3 is divided into two parts, the second part can be seen on the following page.

Theme (nr. citations)	Codes (nr. citations)			Interviewee (nr. citations)
Positive patient attitude (8)	-			B(2), C(2), E(4)
Personal support (17)	Mental & physical well-being (4)			C(2), D(1), E(1)
	Online patient tools (13)			C (3), D(4), E(4) Onc. Surg. (1), Asst. Mam.(1)
National healthcare (1)	-			B(1)
Treatment (56)	Ups during treatment (7)			A(1), B(1), D(1), E(4)
	Patient preference (2)			C(1), D(1)
	Downs during treatment (8)			A(2), C(1), D(2), E(2), Asst. Mam.(1)
	Challenges	Combi patient planning	Logistics (13)	DayCo (4), Asst. Mam.(9)
			Half-day time slots (11)	Onc. Surg. (11)
			time prediction surgery (14)	Onc. Surg. (11), DayCo (3)
Improvements (73)	Buddy	Information buddy (6)		B(3), C(1), D(1), E(1)
		Negative about buddy (6)		D(5), E(1)
		Positive about buddy (11)		A(4), B(1), C(1), D(2), E(3)
	Lack of communication (11)			C(5), D(3), E(3)
	Mammography (1)			B(1)
	Opportunities	Patient insights (4)		A(1), C(1), D(1), E(1)
		Waiting for medication after chemo (2)		E(1), Asst. Mam.(1)
		postoperative preparation for patients (3)		A(1), E(2)
		Patient app (19)		D(1), E(2), Onc.Surg.(8), Asst. Mam.(8)
		Software (5)		Onc. Surg (2), DayCo (1), Asst. Mam.(2)
Change in planning (4)		DayCo (2), Asst. Mam.(2)		
Irritations (2)			Onc. Surg (2)	

Theme (nr. citations)	Codes (nr. citations)	Interviewee (nr. citations)			
Positive communication RdGG (40)	Within RdGG caretakers (9)	<i>D(3), Onc. Surg. (3), Asst. Mam.(3)</i>			
	External help - advice RdGG (9)	<i>B(1), D(7), E(1)</i>			
	Clear communication RdGG (13)	<i>B(2), C(2), D(5), E(3), Onc. Surg.(1)</i>			
	Accessibility (9)	<i>A(1), B(1), C(1), D(4), Asst. Mam.(2)</i>			
Advantages RdGG (55)	Trust in staff (6)	<i>A(1), B(2), E(2), Asst. Mam.(1)</i>			
	General (7)	<i>B(1), E(3), Onc. Surg.(2), Asst. Mam.(1)</i>			
	Empathy (11)	<i>B(2), C(2), D(5), E(2)</i>			
	Flexibility RdGG (7)	<i>B(3), D(3), E(1)</i>			
	Fast process (14)	<i>C(4), D(4), E(2), Asst. Mam.(4)</i>			
	Positive current process	<table border="1"> <tr> <td>Medical technical (6)</td> <td><i>Onc. Surg.(6)</i></td> </tr> <tr> <td>Fixed Care Teams (4)</td> <td><i>Onc. Surg.(4)</i></td> </tr> </table>	Medical technical (6)	<i>Onc. Surg.(6)</i>	Fixed Care Teams (4)
Medical technical (6)	<i>Onc. Surg.(6)</i>				
Fixed Care Teams (4)	<i>Onc. Surg.(4)</i>				

- A: Patient A
- B: Patient B
- C: Patient C
- D: Patient D
- E: Patient E
- Onc. Surg.: Oncological Surgeon
- Asst. Mam: Doctor's Assistant Mamma dept.
- DayCo.: Day Coordinators

Table 3. Overview thematic analysis (Themes, Codes, Interviewees)

4.5 Results Thematic Analysis

This section presents the results of the thematic analysis of the conducted semi-structured interviews. The analysis identifies the main themes and codes mentioned during the interviews and shows which topics are emphasized most by patients and caretakers. While patients mainly reflect on their lived experiences throughout the treatment process, caretakers focus on organizational aspects and challenges in delivering care. By analyzing their perspectives, important insights can be identified and built upon with a design proposal.

Patients' perspectives

Patients highlight themes related to their personal experience and emotional well-being. One of the strongest recurring topics is the importance of a **'buddy'** (23 citations). During the interviews, it became clear that many patients wanted to get in contact with family, friends, colleagues etc. who had gone through the same experience or searched the internet for stories similar to theirs. Patients share both positive and negative experiences about having someone who supports them emotionally during treatment. For example, a number of patients indicate that a 'fellow patient' can better understand how you feel as a patient.

"Yes, so I, well, I think I would really like it if it were offered, so to speak. And whether or not you take advantage of it? That's up to you, of course, but yes." - Patient E

"Throughout the entire process, I had a colleague who understood exactly how I felt. She was like a buddy to me. I could tell others that I felt lonely, but someone who has never had breast cancer will never fully understand. That's why it's so nice to talk to someone who has been through the same process." - Patient A

Some patients feel that it can sometimes turn into a comparison of who is struggling the most.

"Sometimes you are curious about how it went for someone else. But then I... I sometimes get the impression, that it becomes a kind of competition about who had it worst. And then there are those stories about when you're done with your treatment, that's when you really fall in a hole..." - Patient D

Many can imagine that it would be valuable if the RdGG could offer patients the opportunity to get in touch with a buddy (i.e., a former patient).

"I was lucky to know someone who had gone through the same process and who was willing to lend a listening ear. However, the hospital does not connect you to someone who has personal experience. I think this could be very helpful for patients" - Patient A

Another prominent theme is **'communication'**. Patients emphasize the value of clear, accessible and empathetic communication. Patients say they feel more comfortable and better informed when explanations are given in an understandable way and sufficient time is taken for them.

"But also just behind the counter, you know, always very helpful. The phone is also easy to reach." - Patient E

"I just think, you know, it's clear... When you call... Then you always get a response. If they don't know the answer, they'll call you back later. I also didn't have any hassle with appointments that had to be rescheduled. No long waiting times." - Patient D

"They are there for the patient. That's the impression I got." - Patient B

At the same time, a **'lack of communication'** (11 citations) is noted as a negative experience, particularly

with regard to the information patients received about wearing a bra after the surgery. Some patients were unable to prepare properly by purchasing a special bra to wear when they left the hospital after surgery.

"There was one moment of uncertainty. I had a question about what I would wear after my surgery when I no longer had breasts. There are special bras for that. [...] And then I was actually sent from the plastic surgeon to the breast cancer center and back again. And that was the only moment when I thought, yes, you know, where should I be now? And at the end of the day, I didn't have an answer and I just went ahead with the surgery. I'll see what happens [...] That was one moment when I thought, "Where should I go for an answer?" - Patient D

"Well, at first I was wearing a bra that was a little too tight, because you don't wear a bra in the hospital (before surgery) and I had bought those surgical bras beforehand, but they were just too tight according to the doctor afterwards. So basically, the information about wearing a bra when you leave the hospital, was wrong" - Patient C

For example, there are special bras on the market for after a mastectomy or reconstruction. However, they did not receive any information about these, or only when they asked for it. Some even wore the wrong garment until their next doctor's appointment.

Patients also comment on the **ups and downs during treatment** (15 citations). They describe moments of gratitude and appreciation for staff kindness and flexibility, but also frustrations related to side effects, treatment burdens, or moments where care felt less coordinated.

"During my chemotherapy, I felt dirty. You feel that your body is not healthy because of the chemo, but I also felt sick because my hair started falling out. That has a big impact on your self-esteem" - Patient A

"The word cancer does indeed evoke a lot of emotions, but also for the people around them." - Patient C

This led to the topic of the role of **'patient tools'** (18 citations). This involves online tools, such as digital portals, wearables and apps and offline tools, such as organizations offering mindfulness, dieticians, psychologists, etc.

"Yes, on that website about reconstructions (breast cancer association). I looked at it a lot." - Patient C

"Yes, yes, I do think it was very well said (by the hospital) that you can go to a dietitian, for example, or a social worker or a psychologist. Or that there are all kinds of people who can help you. They made that very clear. And it also feels like you can just do that or have it arranged for you. But somehow I haven't felt the need for that myself." - Patient E

"And well, I didn't use any certain apps or third parties. No." - Patient C

The RdGG comes across as a hospital with a lot of experience, expertise and patients are happy with their human-centered approach. They emphasize the support they receive, the quality of communication, accessibility and turnaround times. All patients interviewed were generally positive about the treatment process at the RdGG.

"But also just everyone in that department, where you have your intake, where you have to put on that surgical gown, where you see the anesthetist. And everyone tries to do their best. That's really nice." Patient D

"Well, after my first consultation, I had my surgery scheduled within two weeks. So it all happened very quickly." - Patient C

Caretakers' perspectives

Caretakers, on the other hand, focus primarily on organizational processes and logistical challenges within the treatment pathway. The most dominant theme is treatment **challenges** (39 citations), including codes related to the scheduling IBR, such as *predicting surgery time* (14 citations), *half-day time slots* (11 citations) and *logistics* (13 citations). These topics are discussed extensively by the oncological surgeon and day coordinators, who highlight that it is not always easy to estimate the duration of a (IBR) surgery.

Onc. Surgeon: *so, scheduling those combi-patients. There's just a lot involved in that:*

Interviewer: *In short, what are the challenges?*

Onc. Surgeon: *Yes, the daily schedule, the half-day schedule and the time schedule."*

Combi patients are simply more challenging because they require two surgeons in the operating room at the same time. These surgeries can be scheduled quickly if there is availability. If there is no availability, then adjustments must be made on either the plastic surgery or surgical side.
- Assistant mamma

According to the interviewed caretakers, planning IBR is currently the biggest challenge in the breast cancer treatment process. First of all, there is a guideline from the RdGG that states that patients should be taken care of *fixed care teams* (4 citations), by the same caregivers as much as possible (Oncological surgeon RdGG, personal communication, August, 2025).

"We have agreed that you must have done the surgery or start treatment within five weeks of taking a biopsy."
- Oncological Surgeon

For example, the surgeon who conducts the very first consultation at the outpatient clinic is also the one who will eventually perform the surgery. This makes planning a surgery more complicated than if every oncological surgeon could do the surgery.

"In other hospitals, Doctor A tells you that you have cancer, Doctor B performs the surgery and Doctor C gives you the results. [...] We have decided to have as few people as possible change. [...] Of course, that makes it more difficult for yourself, doesn't it?" - Oncological surgeon

In addition, surgeons work eight half-days per week (four days per week in the morning and afternoon), with the doctor's tasks divided into shifts. For example, they have outclinic patients in the morning and perform surgeries in the afternoon. These shifts vary from week to week, which provides variety but can also complicate matters for those responsible for scheduling surgeries. In addition, the plastic surgeon also has varying schedules, which can make it difficult to schedule an IBR, where both surgeons are needed.

"Yes, it's not like I have a monthly surgery schedule. Every Tuesday has this, every Wednesday has that. No, it's random. And there's a slot for a combi-surgery. But it may well be that one week I'm on that combi-slot and the next week it's the other surgeon." - Oncological Surgeon

Finally, the surgeon requesting the surgery (in software HiX), usually the oncological surgeon, must indicate how long he or she expects the surgery to take. They must estimate this in 15-minute increments. Since every surgery and every breast is different, this can be difficult to estimate accurately. This can cause a surgery to run over time or end earlier than planned. Neither scenario is desirable, as running over time leads to delays in other procedures and an operating room that is not in use

costs money and could have been used to help another patient at that time. According to the day coordinators, surgeons regularly do not fill in their predictions. This makes it very difficult for them to plan, as they have less knowledge about the procedure being performed.

"You have to quickly type that thing in (surgery duration indication) [...] you're busy with a few things. So that's sometimes a bit of a hazard and sometimes it doesn't go well on our end either." - Oncological surgeon

"how long the surgery will take. And that's difficult to estimate in advance, but there's also... I think the surgeons also have a responsibility there." - Day coordinators

Caretakers also mention the need for improvements in online tools. For example, digital solutions such as a **patient app** (19 citations) and other **software** (10 citations) are seen as potential ways to increase efficiency and reduce workload. The assistant and oncologist indicate that an RdGG app could be useful in several cases.

"We are very patient-oriented. I don't see anything we need to improve at the moment. Maybe an app or something like that would be useful." - Oncological surgeon

"I am definitely in favor of an app, because I also think that many patients have questions that can be answered quite effectively using standard content or pre-defined questions and answers." - Assistant mamma

Patients can always call with questions, which makes it easier for them but increases the workload for the assistants. If, for example, an assistant could chat with several patients at the same time using an app, there would be a shorter waiting list, which could have a positive effect for both parties.

"I think we get about three to four hundred phone calls per month. So that varies a lot, of course. I always say Monday and Friday are the busiest days on the phone. Because then you're either after the weekend or before the weekend. But I think you get about 30 or 40 phone calls per day." - Assistant mamma

In addition, it is also easier for patients to send documents or request repeat prescriptions via an app than via a patient portal (website).

"Well, I think if you can send a message, the barrier is even lower, right? Yes, I always had to email a photo. That worked, of course, but I think if you can send a message, it's actually even easier." - Patient E

Finally, the caretakers are generally very satisfied with the way communication takes place in the hospital, both among themselves and with patients. They are also very satisfied with the care they provide at a medical-technical level.

"Definitely on the team. Whether you're a doctor's assistant, a trainee, an oncological surgeon, or an internist-oncologist. We really are one. We all need each other a lot. Definitely also the collaboration with other departments." - assistant mamma

"We are doing better than others in this regard. In that sense, we have a lot of them (DIEP surgeries) and the turnaround times are fast. It's just that behind the scenes, there's a bit of groaning and moaning." - Oncological surgeon

These factors are perceived as elements that distinguish RdGG positively from other Dutch hospitals.

Overall, caretakers emphasize the logistical and structural side of care delivery, focusing on challenges in scheduling, planning and coordination, while also pointing out organizational strengths.

Shared perspectives

Patients and caretaker emphasize different aspects of the care process, with several important themes overlapping. **Communication at RdGG** (35 citations) is a central theme for both groups. Patients value clarity, empathy and accessibility, while caretakers recognize the importance of clear communication between staff and towards patients. Both groups emphasize that effective communication forms the basis for trust and positive treatment experiences.

"They were incredibly friendly, calm and kind" - Patient D

"They receive it (letter with details for appointments) by e-mail and post. Because most people still like to have something in their hands. But of course, nowadays, the world is as digital as possible. So we are still in the phase where we do both. I think that in the future, it will only be digital. "

- Assistant mamma

"It really is a team spirit. So I like the way we work. It's not like, first sighing, "Well, what do you want mr. X?" It's really like, "Well, Mr. X, can I help you?" "Yes, of course, I'll check for you." It's the other way around too, but that's nice."

- Oncological surgeon

Another shared topic is the recognition of improvement opportunities. Patients and caretakers see potential in the use of digital tools to streamline processes. Both groups also recognize the importance of accessibility, whether it concerns patients being able to easily reach their care team or professionals ensuring that care processes remain easily manageable and transparent.

"I always had good contact, yes. I could also call the department at any time, but I didn't have to call very often."

- Patient C

"And what I personally find very disturbing is that email (to change something in the schedule) with a question that goes out to so many people. And who is actually responsible for making a decision on a possible change? (if combi planning needs to be adjusted)" - Assistant mamma



4.6 Insights from the Patient and Caretaker Journey Mapping

The patient and caretaker journey map (see next page) visualizes the experiences, challenges and emotions that occur throughout the breast cancer care pathway at the RdGG. These mappings were created using insights from interviews and observations, offering a chronological overview of interactions between patients, caretakers and the healthcare system. The analysis revealed recurring patterns and key areas where the patient experience could be improved, as well as structural factors influencing care delivery.

Overall, the findings show that the care process evokes a wide range of emotions that change from phase to phase. Patients experience both support and uncertainty, often determined by the way information is provided, how clearly it is communicated and how well support is coordinated. Professionals, in turn, face logistical pressures while striving to maintain empathy and continuity of care. The insights can be divided into two main categories: structural and organizational challenges and emotional and experiential challenges.

Structural and Organizational Challenges

Healthcare professionals reported several bottlenecks that directly affect scheduling, workload and the overall efficiency of the treatment process. One recurring issue is the shortage of outpatient consultation rooms, which limits flexibility in planning appointments and causes uneven distribution of patient loads among doctors. On certain days, multiple appointments have to be squeezed into short time slots, while on other days doctors are unable to see any patients.

Addressing this imbalance could improve both accessibility and staff workload.

Another structural challenge concerns the high workload of Mamma Assistants, who handle a large number of phone calls from patients regarding treatment coordination, side effects and scheduling. While these interactions reflect the accessibility and empathy of the RdGG staff, they also highlight the high workload of the assistants. Optimizing contact moments or providing patients with clear, accessible information tools could reduce pressure on staff while maintaining the hospital's supportive character.

Further difficulties occur in combi-patient planning, where surgeries require coordination between oncological and plastic surgeons. The fixed half-day schedules of both disciplines create limitations that result in last-minute rescheduling and occasional delays. Improved coordination tools or digital planning systems could help distribute these cases more effectively across available time slots.

Patients also reported uncertainty about practical matters, such as what to wear after surgery or where to obtain suitable garments. Inconsistent communication between departments caused confusion, with patients receiving different answers from various professionals. Clearer pre- and post-operative guidelines could help patients prepare more confidently.

Finally, patients also reported long waiting times at the pharmacy after chemotherapy, describing this as

a physically and emotionally demanding part of their day. Even though medication preparation follows strict protocols, minimizing waiting times could make the experience less exhausting for patients recovering from treatment.

Emotional and Experiential Challenges

Beyond logistical aspects, the emotional dimension of breast cancer care strongly shapes the overall patient experience. One frequently mentioned issue concerns the mammogram experience, which several patients described as extremely painful and stressful. Small technical or procedural adjustments could make this step less traumatic.

The impact of medical terminology also emerged as a sensitive factor. Words such as "cancer," "amputation," or "mastectomy" were perceived as harsh and emotionally confronting. Patients expressed that more empathetic language, or rephrasing during consultations, could reduce the psychological impact of receiving difficult information.

Lastly, several participants described difficulties with reintegration into normal life after treatment. The period following chemotherapy or hormone therapy was experienced as both liberating and isolating, with less direct contact with hospital staff. Additional guidance or information about this transition could help patients rebuild daily routines and confidence more smoothly.

Summary

The journey mapping shows that RdGG patients appreciate the speed, expertise and empathy of the hospital. However, there is still room for improvement in terms of consistent communication, efficient planning within the RdGG and emotional support for patients. Addressing these challenges will not only improve patient satisfaction, but also reduce the workload of healthcare providers and improve the overall healthcare experience. These insights form the basis for the next chapter, in which the findings are summarized in key conclusions that serve as input for the upcoming design phase.

4.7 Key Takeaways

The thematic analysis of the patient and caretaker interviews, combined with the journey mapping, provides a comprehensive understanding of the breast cancer care process at the RdGG. The insights reveal two complementary perspectives: patients focus primarily on emotional and communicative aspects of care, while caretakers emphasize logistical and organizational challenges. Together, these perspectives expose both the hospital's strengths and its key opportunities for improvement.

Patient Perspectives

Patients repeatedly emphasized the importance of empathy, reassurance and emotional support throughout their treatment. The presence of a buddy, whether a friend, family member, or fellow patient, was described as invaluable in coping with the disease. Clear and compassionate communication from healthcare professionals strongly influenced how patients experienced each stage of care. When information is provided in a calm and transparent manner, trust in the hospital increases, but when this information is inconsistent, it leads to confusion and anxiety.

Patients also described the highs and lows of treatment. Many expressed gratitude for the kindness and flexibility of the staff, while also struggling with uncertainty, side effects and the psychological impact of terminology. Digital tools such as portals and apps were seen as helpful, but not essential, as patients valued human interaction most. Reintegration into daily life after treatment was often perceived as challenging, highlighting the need for early information about this post-treatment period.

Caretaker Perspectives

Planning operations involving both oncological and plastic surgeons remains a complex process. The limited availability of consultation rooms and varying daily schedules also affect the work of caregivers. Caregivers also note that they have a high workload and are heavily dependent on each other to resolve scheduling issues. Despite these challenges, RdGG employees were proud of the fast turnaround times and multidisciplinary collaboration at the hospital.

Caregivers see potential in digital tools to improve coordination and efficiency. These tools must fit in with existing routines and not create additional administrative burdens. They value accessible communication channels that enable rapid updates and contact with patients, but recognize that better integration of information systems could reduce unnecessary tasks and streamline work processes.

Shared Perspectives

Both patients and caretakers underscored the importance of accessible, empathetic communication as the foundation of good care. They described the RdGG as supportive and efficient but identified a need for greater consistency across touchpoints. Information that is easy to find, up-to-date and shared among all involved parties would enhance trust and reduce stress. Both groups also recognized that digital accessibility could make the care process more transparent and manageable, while still preserving personal contact.

Overall Takeaway

The findings show that patients prioritize emotional well-being and communication, while healthcare providers focus on logistical coordination and workload management. These perspectives are complementary rather than contradictory: addressing both simultaneously creates a more holistic and sustainable care experience. The current strengths of the RdGG: speed, empathy and professional expertise, form a solid foundation on which to build. The next design phase will therefore focus on improving the consistency of communication, supporting flexible coordination and creating interventions that connect the emotional and operational aspects of care into a more integrated system.

05

Design Brief

In this chapter, challenges will be explored in greater depth which are selected from the various findings. Subsequently, a new design statement will be formulated, along with a set of design criteria and requirements that the final design must meet.

5.1 Introduction

For a design proposal, the problem must be clearly defined. Therefore, from all the lessons learned from the thematic analysis, one theme is now chosen to proceed with. There are four themes that clearly came up most often during the interviews:

1. **Advantages RdGG (55)**
2. **Improvements (74)**
3. **Positive communication RdGG (40)**
4. **Treatment (56)**

Two themes highlight what already functions well within the RdGG, such as **Advantages RdGG** and **Positive Communication RdGG**. These findings demonstrate the hospital's strengths in delivering fast care, maintaining accessibility and ensuring clear communication with patients. While these elements are highly valuable, they do not present immediate opportunities for further improvement and therefore are not selected as a focus for the remainder of this research.

To identify where interventions could make the most impact, the analysis also explores areas where challenges remain. Two themes stand out: **Improvements** and **Treatment**. Within these themes, three topics emerge that are relevant for further consideration: *the buddy process*, *patient app* and *combi patient planning*. Each of these topics came up frequently in the interviews and offers a potential opportunity to improve the current care pathway. By talking to caretakers from the RdGG and critically examining the challenges described, the following conclusions were drawn.

- The RdGG is currently working on developing a 'buddy' program within the hospital (Oncological surgeon RdGG, 2025). Since the RdGG is already taking steps to set up the 'buddy' program within the hospital, it is decided to raise attention for other opportunities which are not yet been mentioned within the hospital.
- The doctors believe that an app would be an accessible tool for patients to look up or send information. Patients experience this differently and actually find it very pleasant, especially when it comes to cancer, to be able to contact someone by phone and hear the voice of a caregiver. According to the doctors, a general app for standard questions, appointments, viewing medical records, etc. would be useful but is beyond the scope of this study.

"I also know that and this is really related to breast cancer, patients really appreciate the contact with the clinic. That they simply get a voice on the line that listens to them and can answer their questions." - assistant mamma
- Healthcare providers consistently cite the scheduling of combi-patients, or IBR procedures, as the biggest operational bottleneck (most frequently mentioned in the 'Treatment' cluster). Several causes of this problem have already emerged during the interviews. To better understand the problem, it needs to be explored in greater depth. It affects patient flow, waiting times, staff workload and OR efficiency. Within the RdGG, everyone who was interviewed experiences this problem and no solution is currently being actively pursued.

In light of the above reasons, this study will examine the problem of scheduling IBR surgeries in greater depth.

IBR procedures, which require both a Plastic Surgeon and an Oncological Surgeon to be present, are challenging to schedule. Because of the many stakeholders involved, the difficulty of estimating the duration of the surgery and synchronizing the schedules of multiple caretakers makes this a remarkable challenge within the RdGG. Since the RdGG follows the guideline that surgeons perform surgery on their 'own patients' (meaning the surgeon who performed the first consultation also performs the surgery) schedules sometimes need to be rearranged to accommodate this preference. This sometimes results in appointments for other patients being rescheduled, which means that not only the RdGG is a victim of this situation, but also patients.

The aim of addressing this issue is to establish a more structured planning process in which responsibilities are clearly defined, causes less frustration among RdGG staff and scheduling changes no longer have negative consequences for other patients.

5.2 Design brief

Roadmapping

The challenges within the current planning process for IBR surgeries at the RdGG are distributed across multiple departments, workflows and moments in time. These issues are expected not be solved with a single tool, policy change or intervention. Instead, they require a coordinated transformation that gradually improves collaboration, communication and predictability across the entire planning process.

A strategic roadmap is therefore the most fitting deliverable for this thesis. It enables the hospital to:

- introduce improvements step-by-step;
- align departments behind a shared long-term vision;
- balance organisational, digital and cultural changes;
- build solutions that are realistic, scalable and embedded in daily practice.

The roadmap provides clarity about what needs to change, when these changes can realistically occur and what value they will create for care professionals and patients.

Design Statement

*“Design a **roadmap** that **improves the planning and coordination** of IBR surgeries at the RdGG by proposing the **implementation of supporting tools**, **clarifying responsibilities** and **strengthening collaboration** between RdGG caregivers. The interventions should not only **enhance efficiency and reliability** but also **reduce stress, frustration and uncertainty** among the staff involved in the planning process.”*

Design Criteria

Functional

- The design should support a clearer and more structured planning process.
- It should help reduce unnecessary complexity in coordinating surgical care.
- The design must help ensure that planning information is reliable, up to date and easy to interpret.
- It should assist in handling both routine scheduling tasks and unexpected changes that arise.

Experience-Based

- The design should contribute to a calmer and more predictable working experience.
- It should help decrease feelings of stress, frustration, or uncertainty related to planning.
- The design must encourage a sense of shared understanding among those involved.

Organisational & Technical

- The design must be compatible with existing hospital systems and digital capabilities.
- It should be realistic to implement within current organisational structures.
- The design should be flexible enough to evolve or scale if needed in the future.

Target Groups

The design is intended for the professionals who play a role in the surgical planning process for breast cancer care. This includes those responsible for managing schedules, coordinating multidisciplinary

These groups regularly interact with elements of the planning process and are therefore most affected by uncertainty, limited accessibility or inefficient coordination.

Patients indirectly benefit from the improvements, as a more predictable and coordinated planning process reduces their uncertainty and enhances the quality of their care pathway.

Context of Use

The roadmap will be used within the broader context of planning and coordinating surgical care, where various professionals must align activities, information and timelines. It must support processes that take place over different time horizons, from long-term planning and prediction to the coordination of steps leading up to a specific surgery.

The design should be usable in situations where information changes, decisions need to be adjusted or multiple parties rely on shared expectations. It must provide clarity and structure across these moments, helping ensure that planning remains coherent, realistic and supportive for everyone involved.

06

Planning process

This section explains and analyzes the current planning process using the SEIPS method. It also presents an analysis of the tensions and opportunities identified within that process.

6.1 Analysis of the planning process (SEIPS model)

To analyse and improve complex healthcare processes, a structured systems perspective is essential. The SEIPS (Systems Engineering Initiative for Patient Safety) model offers such a perspective by viewing healthcare as a socio-technical system in which people, tasks, tools (technologies), environments and organizational factors interact to shape performance and outcomes (Wooldridge et al., 2016). The SEIPS framework helps to identify how these elements collectively influence care quality, efficiency and safety.

In the context of this study at the RdGG, the SEIPS model is applied to examine and optimize the planning process of IBR surgeries. This process involves multiple actors and departments, each with distinct roles, responsibilities and digital tools. In addition, any tensions between individuals are also examined in order to better identify opportunities. The previous chapters provide a detailed insight into the current planning process. The use of the SEIPS model builds on this foundation by interpreting these findings using a structured framework.

Applying SEIPS will therefore make it possible to:

- Identify how the interactions between people, technology, tasks and organizational structures contribute to planning challenges.
- Pinpoint system-level factors that influence coordination, efficiency and staff workload.
- Discover targeted opportunities that could improve both technical and human dimensions of the planning process.

By grounding the analysis in SEIPS and supplementing that tool with presenting the tensions within the planning process, this study ensures that proposed improvements are comprehensive, evidence-based and aligned with the complex, interdependent environment of RdGG caregivers and their activities.

The following chapters take a closer look at the following socio-technical systems:

- people
- tasks
- tools
- environment
- organizational factors

6.2 Relations within RdGG IBR planning process (People)

The planning of IBR surgeries at the RdGG involves multiple departments and actors, each with their own responsibilities and timelines. The process is highly interdependent, which makes it complex and often leading to delays or frustrations among staff. To better understand how these responsibilities interact, both interviews with stakeholders and a stakeholder relation map were used to clarify the flow of tasks and communication.

The data is gathered through interviews with employees from the ICM, the Surgery dept., Plastic Surgery dept., the Admission Office, Doctor's assistants, Oncological and Plastic Surgeons. In addition, a stakeholder relation diagram is developed to visualize the connections and flows of responsibility between these actors. Together, these materials provide a structured overview of how the current planning process is organized (see next chapter).

Integral Capacity Management (ICM) analyses hospital-wide capacity and determines how the available OR time should be distributed across all specialisms. Based on data from previous years and expected patient volumes, they create a 'basic schedule', a strategic overview of how many OR-sessions each department may use per week (Integrated Capacity Management Advisor, personal communication, September 2025).

The Admission Office operationalises the ICM's long-term planning. They ensure that each day and time block on the OK is correctly assigned to the

departments and that the secretariats of surgery and plastic surgery can fill in the specific surgeons and patients. Next to this they are responsible for managing waiting lists and coordinating changes when schedules need adjustment (Admission officer, personal communication, September 2025).

The Secretariat of the Surgery Department (hereafter Surgery dept.) manages the detailed plannings for all surgeons, taking into account their specialisms, night-shifts and availability. They assign surgeons to specific sessions and are notified by the doctors when changes occur in their schedules (Planner Surgery dept., personal communication, October 2025).

The Secretariat of the Plastic Surgery Department (hereafter Plastic Surgery dept.) oversees the schedules of Plastic Surgeons and organizes their operating sessions. They collaborate closely with the Admission Office and the Surgery Department to coordinate combined oncological-reconstructive procedures and to ensure that both surgical teams are available on the same day (Planner Plastic Surgery dept., personal communication, October 2025).

The Plastic Surgeons perform the reconstructive part of the combined surgeries. They coordinate with oncological surgeons to ensure their availability for combined operations and adjust their own programs when reconstructive procedures such as DIEP flaps or tissue expanders are required (Plastic Surgeon, personal communication, October 2025).

The Doctor's assistants, particularly those working at the Breast Cancer Centre, play a key coordinating role between patients and the planning teams. They schedule outpatient appointments, communicate changes to patients and adjust clinical planning when surgical dates or treatment sequences shift (Breast Cancer Center & Plastic Surgery assistants, personal communication, September & October 2025).

The Oncological Surgeons are responsible for the oncological part of the surgery, including diagnosis, surgical removal of the tumor and postoperative follow-up. They decide on surgical urgency and work in close collaboration with other disciplines within the multidisciplinary breast cancer team (Oncological Surgeon, personal communication, October 2025).

The surgical coordinator is responsible for creating and coordinating the work schedules of all surgeons within the department. This includes dividing available operating room sessions, assigning surgeons to OR and clinic days and ensuring that at least one surgeon is always available for urgent or additional cases. The role requires close collaboration with the secretariat and other sub-specialties to keep the planning efficient and balanced (Trauma surgeon, personal communication, October 2025).

The Quality and Safety Advisory supports the oncological care process from an organizational and patient-safety perspective. This advisor monitors the quality of care within the Breast Cancer Centre, facilitates multidisciplinary evaluations and ensures that clinical processes align with national guidelines and patient feedback (Senior Quality and Safety Advisor, personal communication, October 2025).

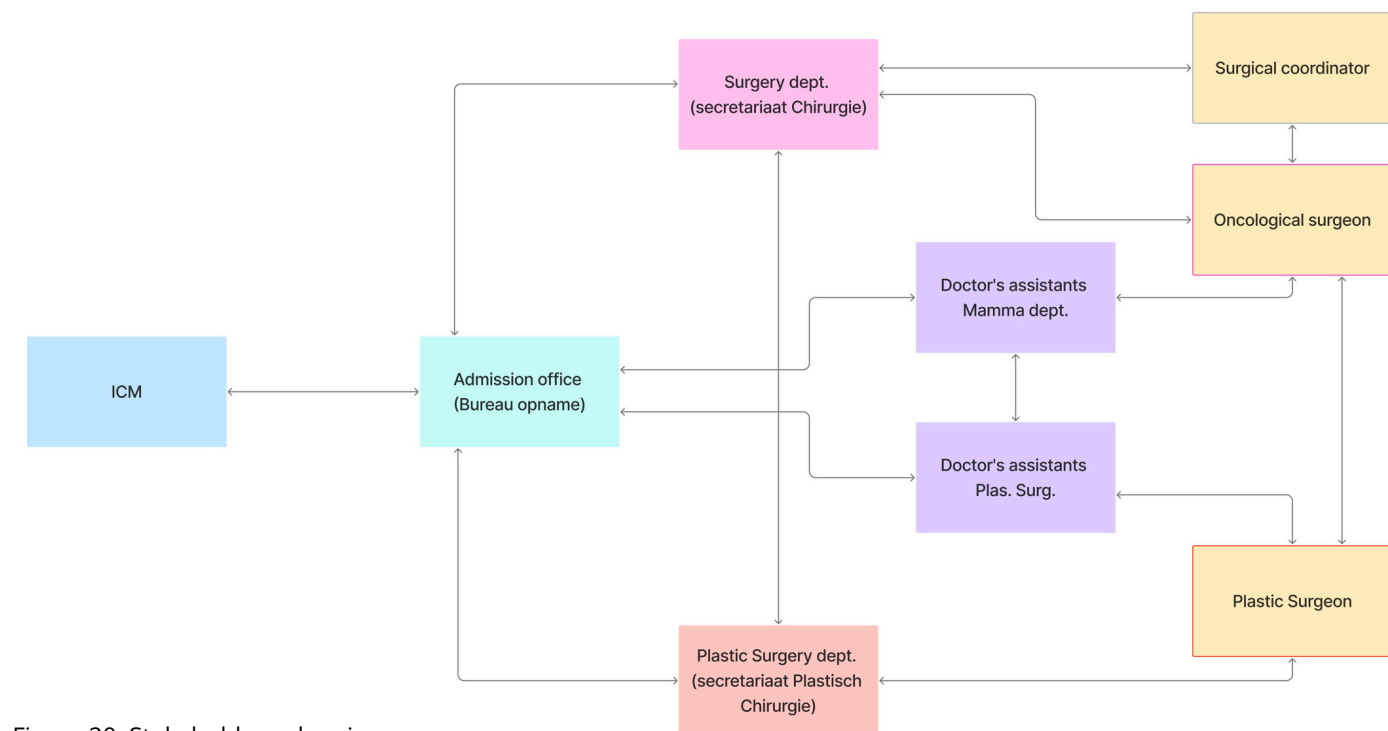
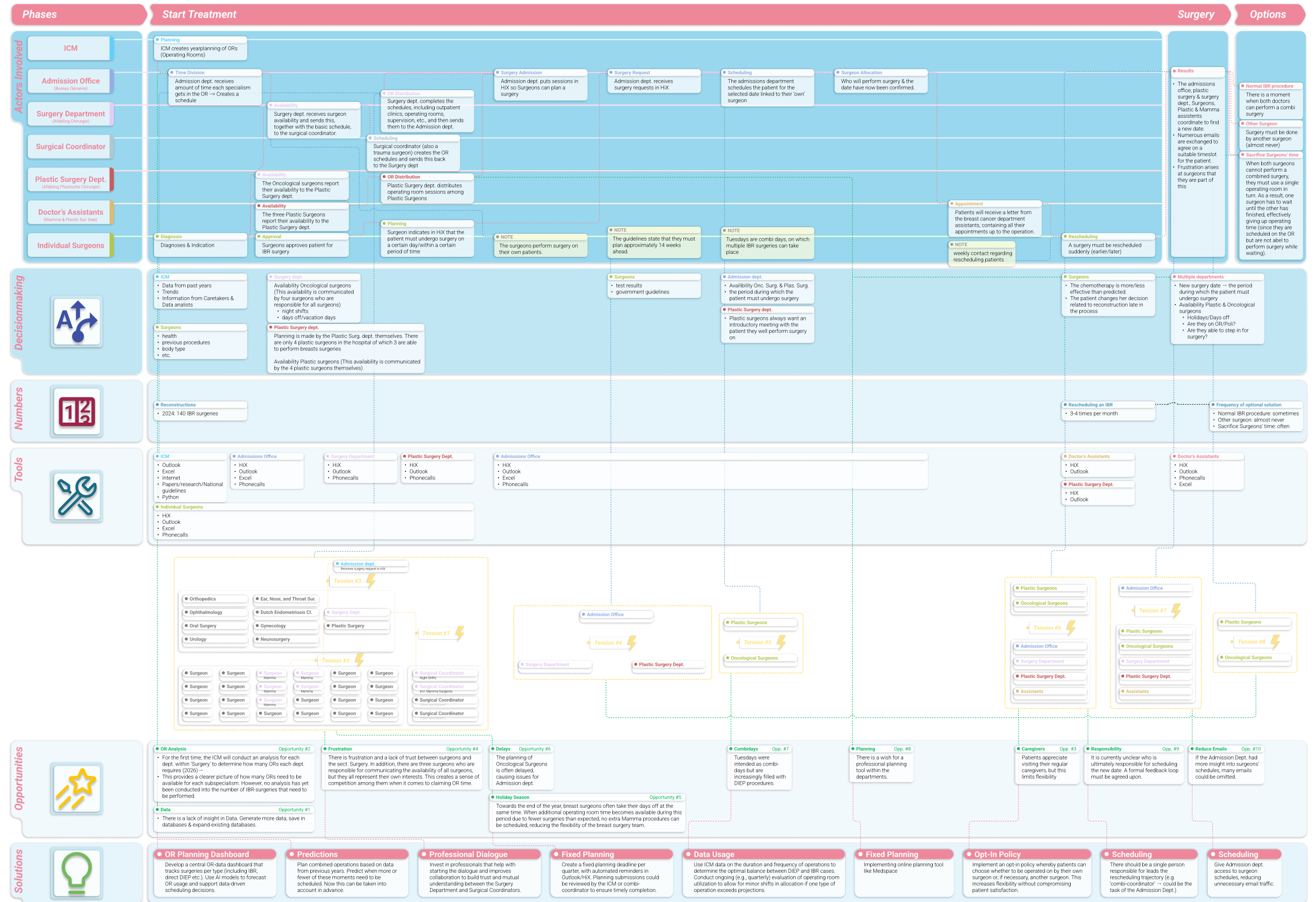


Figure 20. Stakeholders planning process

6.3 Current Planning Process (Tasks)

As can be seen in the last chapter, multiple departments are involved in the planning of IBR surgeries. This chapter describes the current planning process, highlights the roles of the involved departments and discusses the challenges that arise when surgery dates need to be rescheduled.



Step 1: ICM & Surgeons
ICM

Once the ICM completed their 'basic schedule', they send it to the Admission dept., which will then process it further (see visual of step 1,2 & 3 on next page).

Surgeons

Once the diagnosis of a patient is established, the oncological surgeon determines whether the patient is eligible for surgery and, if applicable, an IBR. The decision is registered in HiX. At this stage, the oncological surgeon indicates the timeframe in which the surgery must be performed.

Step 2: Admission dept.

The Admission receives the OR-capacity 'basic schedule' from the ICM and translates it into a practical monthly schedule. They enter the ICM's session allocations into HiX and open the sessions so that departments can plan surgeries within their assigned slots.

Step 3: Surgery dept., Plastic Surgery dept. & Surgical Coordinator

Surgery dept. distributes its allocated OR sessions among the all (incl. oncological) surgeons. Plastic Surgery dept. performs the same distribution among Plastic Surgeons. Currently, the Plastic Surgeons communicate their availability to the Plastic Surgery dept., while the Oncological Surgeons share theirs with the Surgery dept. The Surgery dept. sends this availability to the Surgical Coordinator who assigns the surgeons to the available ORs. The Plastic Surgery dept. manages this process themselves, since there are only four of them and only three perform breast cancer-related surgeries.

The Surgical Coordinator sends the planning for the Oncological Surgeons back to the Surgery dept., which then compiles the overall schedule for all surgeons within that department.

Step 4: Admission dept.

The Admission dept. receives the planning of the oncological and plastic surgeons from the Surgery and Plastic Surgery dept. The surgeons are then entered into HiX on their scheduled days.

Surgeons

In HiX, surgeons enter a surgical request that includes the patient details, type of procedure, preferred date and the surgeons responsible for performing the operation.

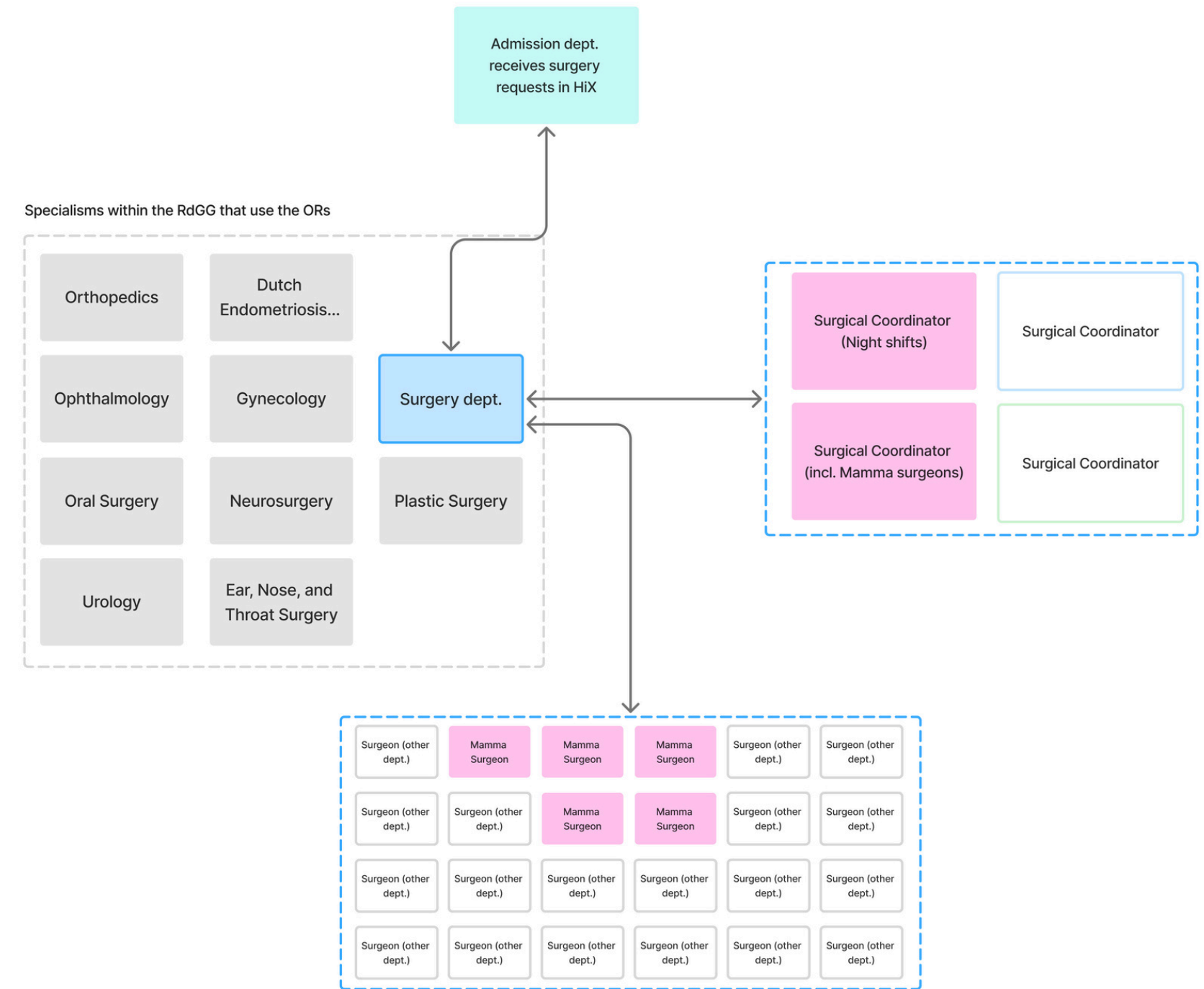
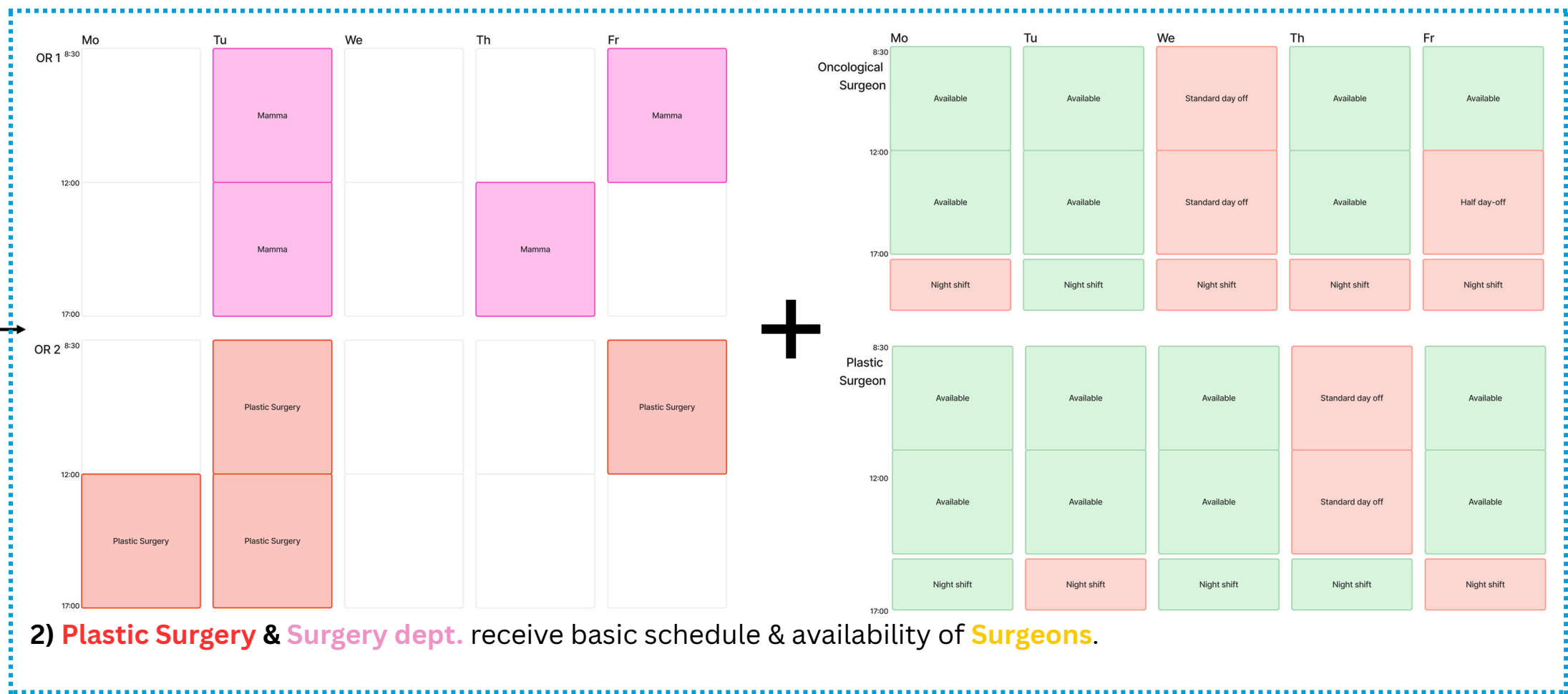
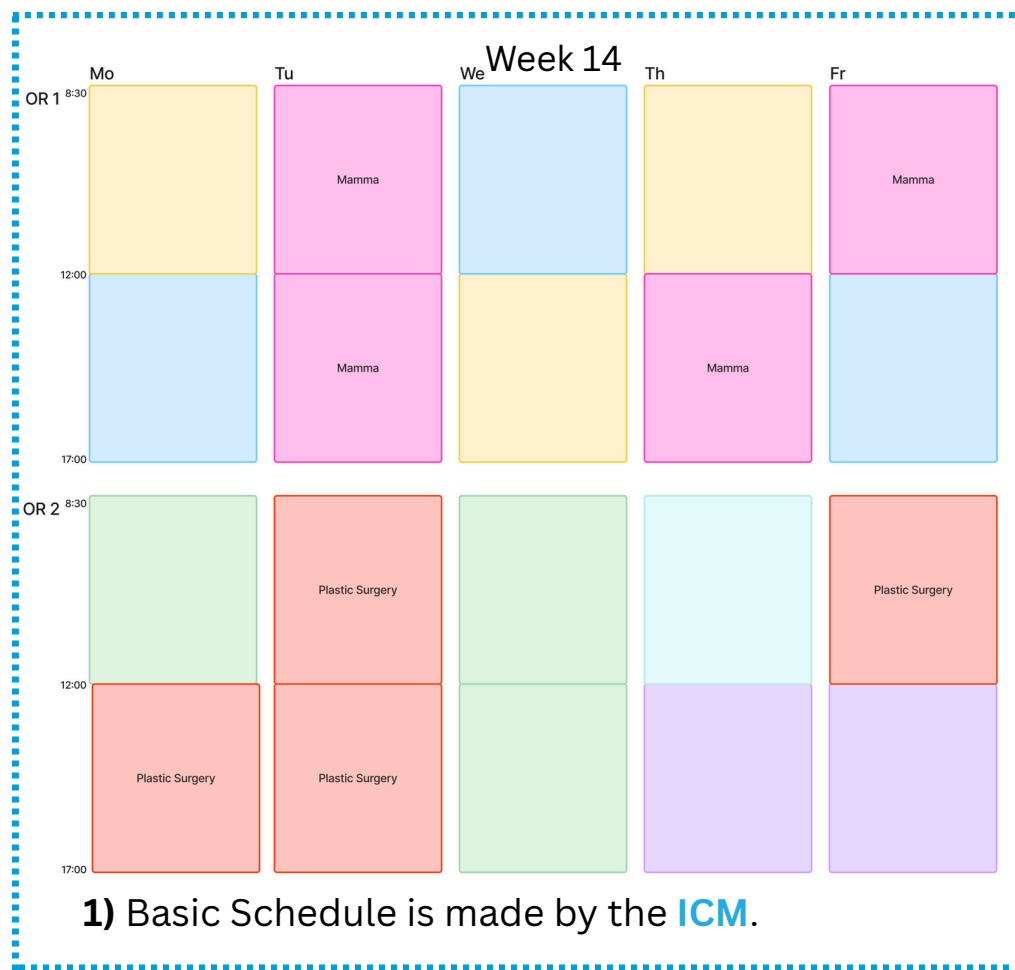
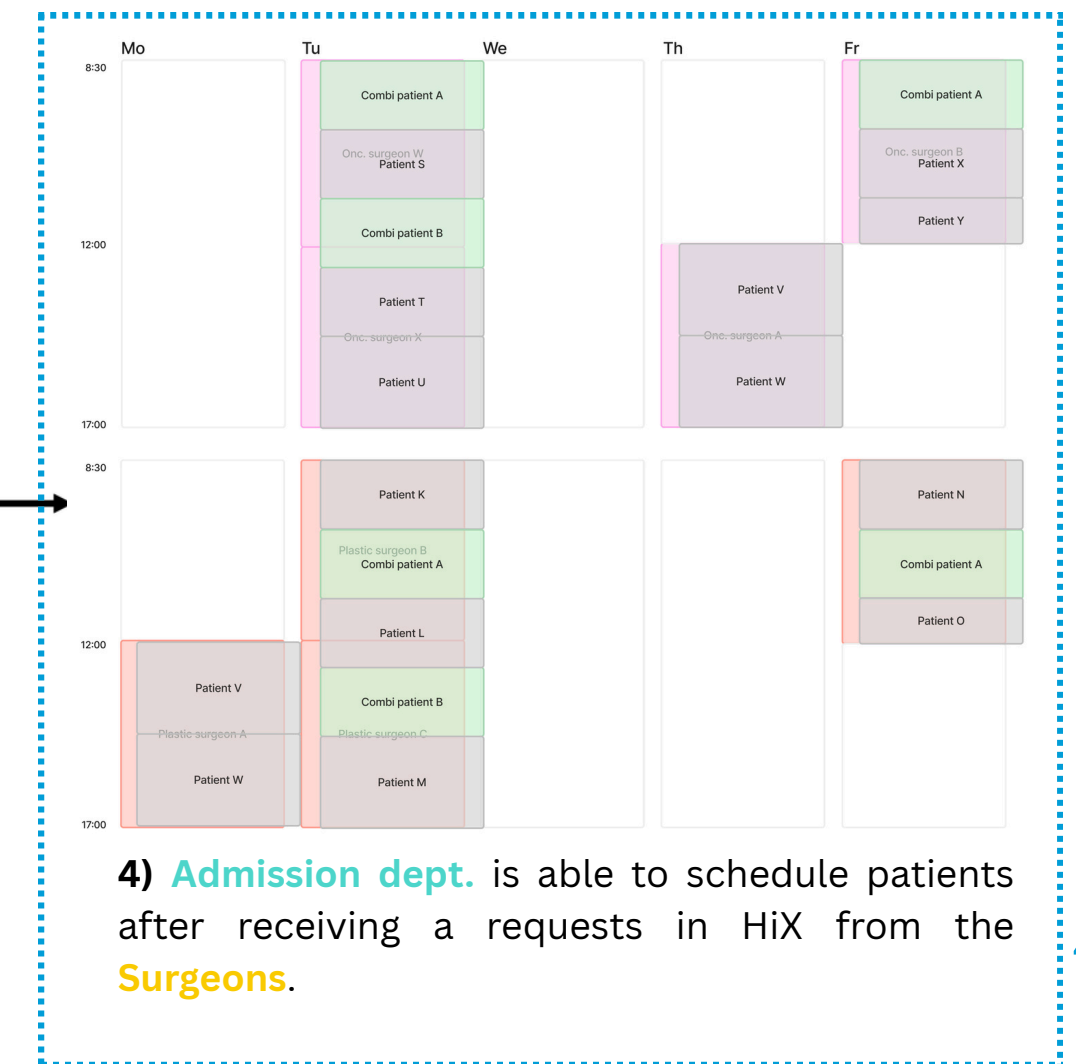
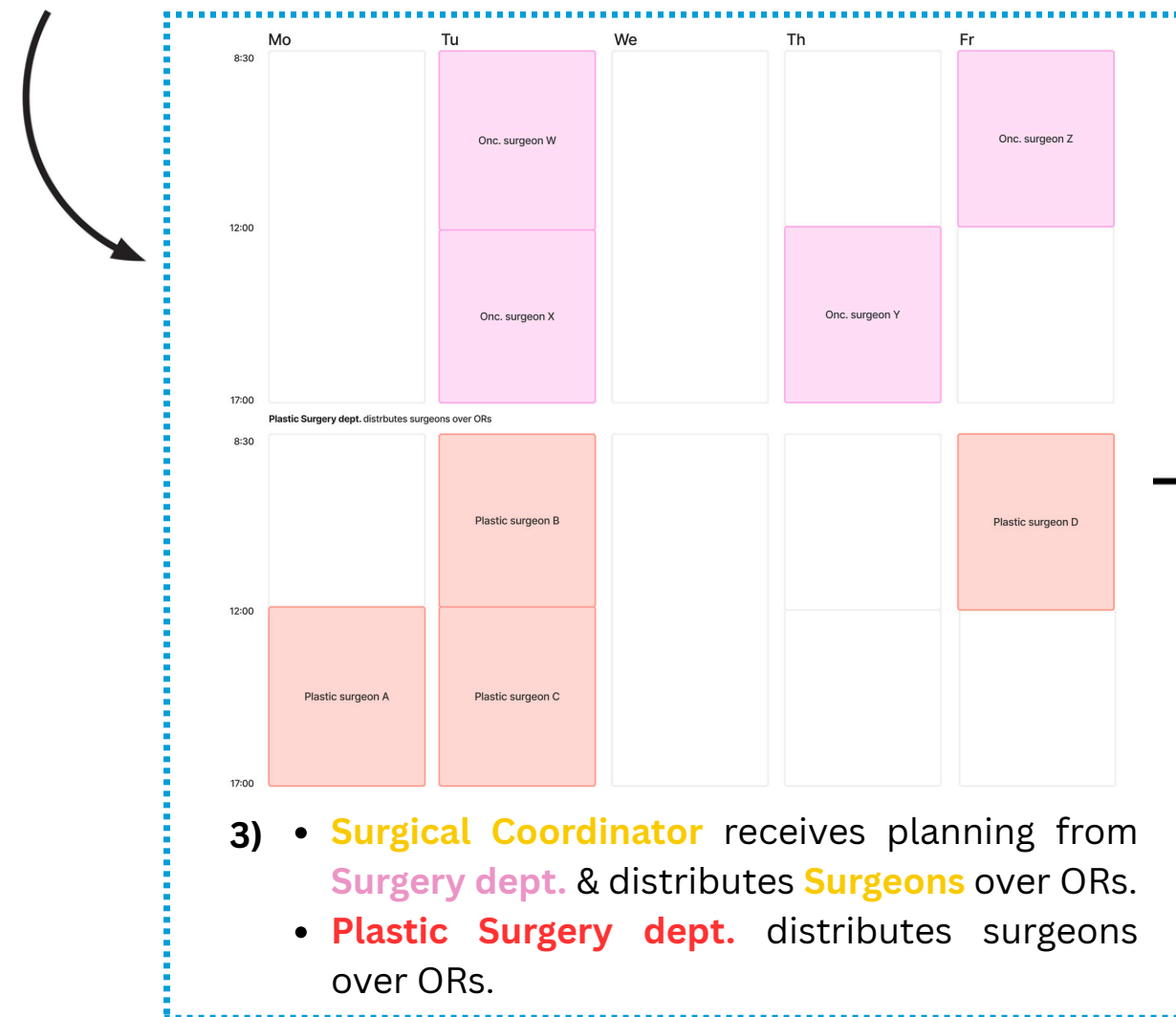


Figure 21. Changing OR rooms during an IBR & direct DIEP surgery

Important: All surgeons within the Surgery Department submit their availability by a set deadline. This information is then shared with the four Surgical Coordinators, who assign the surgeons to the ORs. One coordinator is responsible for the Oncological Surgeons' schedules, while another manages all surgeons' night shifts. The Surgery dept. can only send the complete schedule to the Admissions Department once all coordinators have submitted their parts. Unfortunately, the night-shift schedule is often delayed, causing the overall submission to be late.



Note: this is a simplified version of a 1-week forecast. The ICM creates a basic schedule for the entire year and does so for 10 ORs. While only one Oncological and one Plastic surgeon are delivering their availability in this visual, the Surgery dept. actually receives availability from all surgeons within this specialism and the Plastic Surgery dept. from four plastic surgeons.



Step 5: Admission dept.

In the case of an IBR, the Admission office ensures that the patient undergoes surgery on a day when her own plastic and oncological surgeons are available.

The goal within the RdGG is to have this schedule ready approximately 14 weeks in advance. However, the Surgery dept. is often behind in providing its schedule, the Admission dept. is unable to finalize its schedule on time, causing delays further down the line.

In the Mamma and Plastic Surgery dept., it has been agreed that Tuesday and often Fridays are fixed combi-days, which means that these days are often reserved for performing as many IBR surgeries as possible (see Figure 22). However, lately there have been more and more direct DIEP surgeries taking place on Tuesdays. This means that fewer IBR surgeries can be performed, since two plastic surgeons now spend an entire working day with one patient instead of several patients and as a result, the oncological surgeon can only perform surgery on one combi-patient.

Step 6: Doctor's assistant Mamma dept.

Once the surgery has been scheduled, the doctor's assistant from the Breast Cancer dept. will schedule all appointments leading up to the surgery. The patient will then receive a letter listing all appointments in the run-up to the surgery.

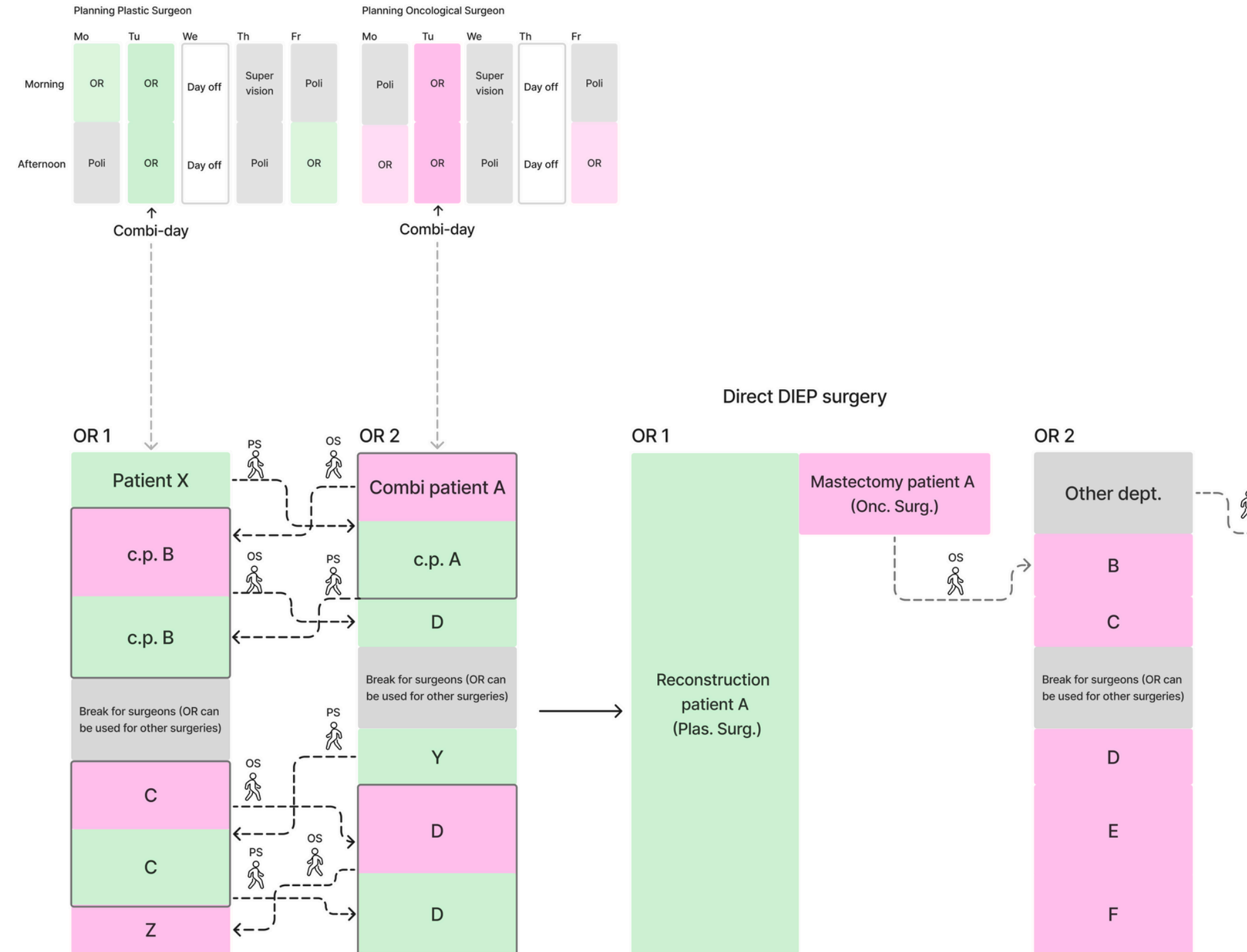


Figure 22. Changing OR rooms during an IBR & direct DIEP surgery

Explanation: On the left, both surgeons have overlapping combi-days. During these sessions, both surgeons work alternately on the same patient: the oncological surgeon performs the mastectomy, after which the plastic surgeon continues with the reconstruction. Because both are scheduled on separate ORs, they move between rooms throughout the day. On the right, the direct DIEP surgery is shown. This is a longer procedure that requires the full-day presence of two plastic surgeons and one oncological surgeon at the start of the surgery. Once the oncological surgeon completes the mastectomy, they leave the OR while the plastic surgeons continue the reconstruction for the rest of the day.

Rescheduling planning process

Even after an IBR surgery has been scheduled, the planning process is sometimes not yet complete. Rescheduling is regularly required due to changes in the patient's treatment plan, surgeon availability, or limited operating room capacity. In some cases, patients decide to undergo reconstruction late in the process, making it difficult to find an available spot. Also, treatment adjustment like unexpected responses to chemotherapy, can lead to surgeries being moved forward or postponed.

Step 7: Rescheduling and Complications

Surgeons

The surgeon indicates in HIX that the operation must take place at a different time or that it will be an IBR surgery rather than a procedure performed solely by the oncological surgeon.

Admission dept.

Once the conflict is identified, often by the Admission dept., a chain of communication begins. The Admission dept. typically sends an email to all involved parties, including surgeons, the Surgery and Plastic Surgery depts. and the doctor's assistants. These email exchanges often involve many recipients because there is no single person responsible for making the final scheduling decision.

Together, the teams try to find a new moment on which both surgeons are available. Numerous emails are exchanged between the Admission office, the surgeons themselves, the Oncological and Plastic Surgery departments and assistants to find a new suitable date.

Solutions

1) The parties involved have succeeded in finding a suitable time for an IBR by making certain adjustments to the schedule.

2) If no suitable moment can be found, compromises must be made (see Figure 24). In some cases, a poli consultation is cancelled so that a surgeon can be available for surgery, or a less urgent procedure is removed from the OR list to create space for the IBR operation. When no overlapping OR timeslot is available for both the Plastic Surgeon and the Oncological surgeon to perform surgery together, one of them must give up part of their own surgery time. On combi days, the surgeons usually switch between ORs, allowing each to perform other procedures while the other works on the combi-patient. However, if their schedules do not align, this flexibility disappears and one surgeon must wait until the other has finished. As a result, valuable surgical time is lost and overall efficiency decreases.

3) In exceptional cases, if rescheduling is impossible, another surgeon may take over the surgery after a short introduction with the patient.

Once a new date has been found, Bureau Opname finalises the change in HiX and communicates the new planning to all parties involved. The mamma-poli assistant then updates the patient's schedule and adjusts any related pre-surgery appointments. In practice, the rescheduling process can be time-consuming involving many email exchanges and coordination between multiple departments.

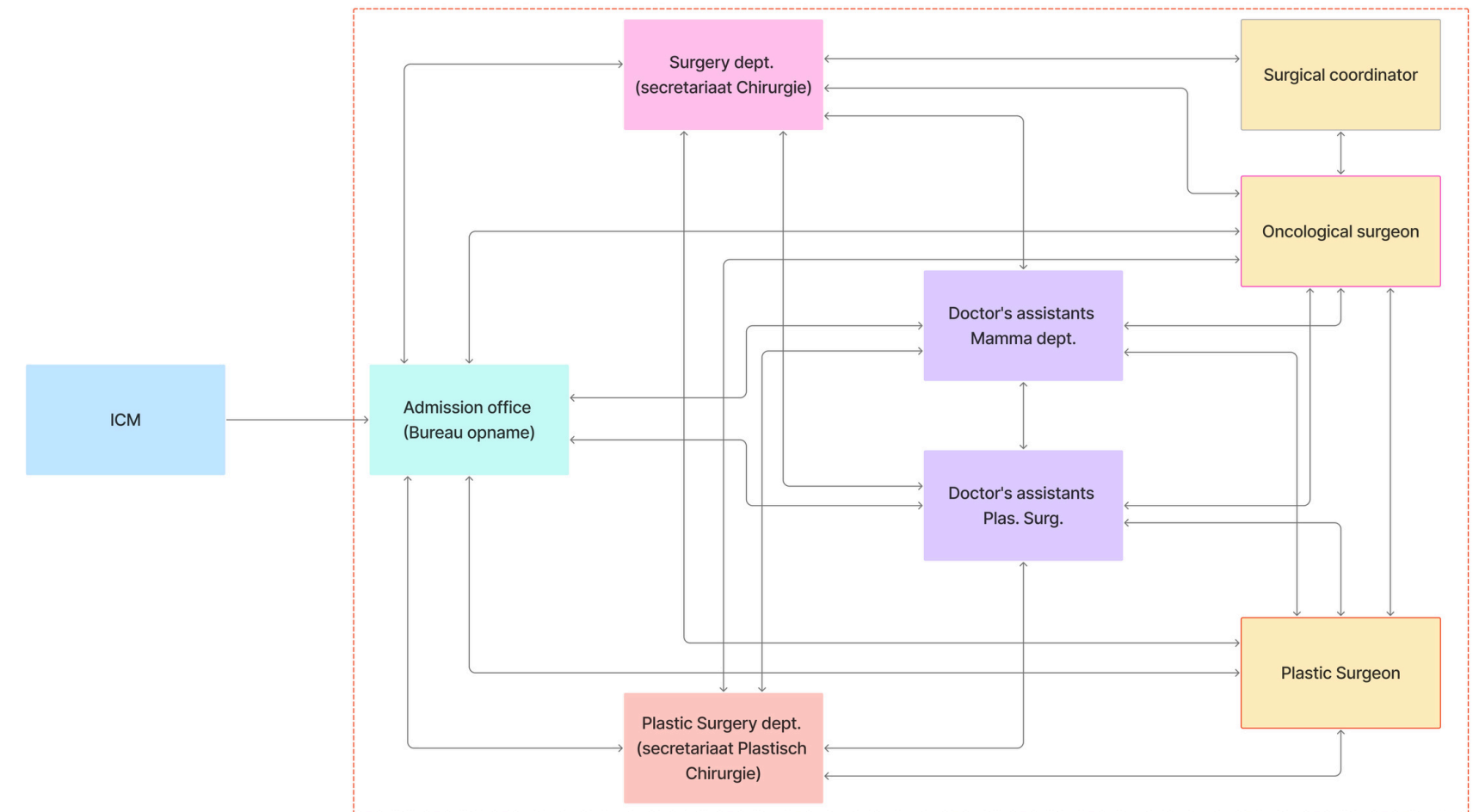


Figure 23. Stakeholders rescheduling process

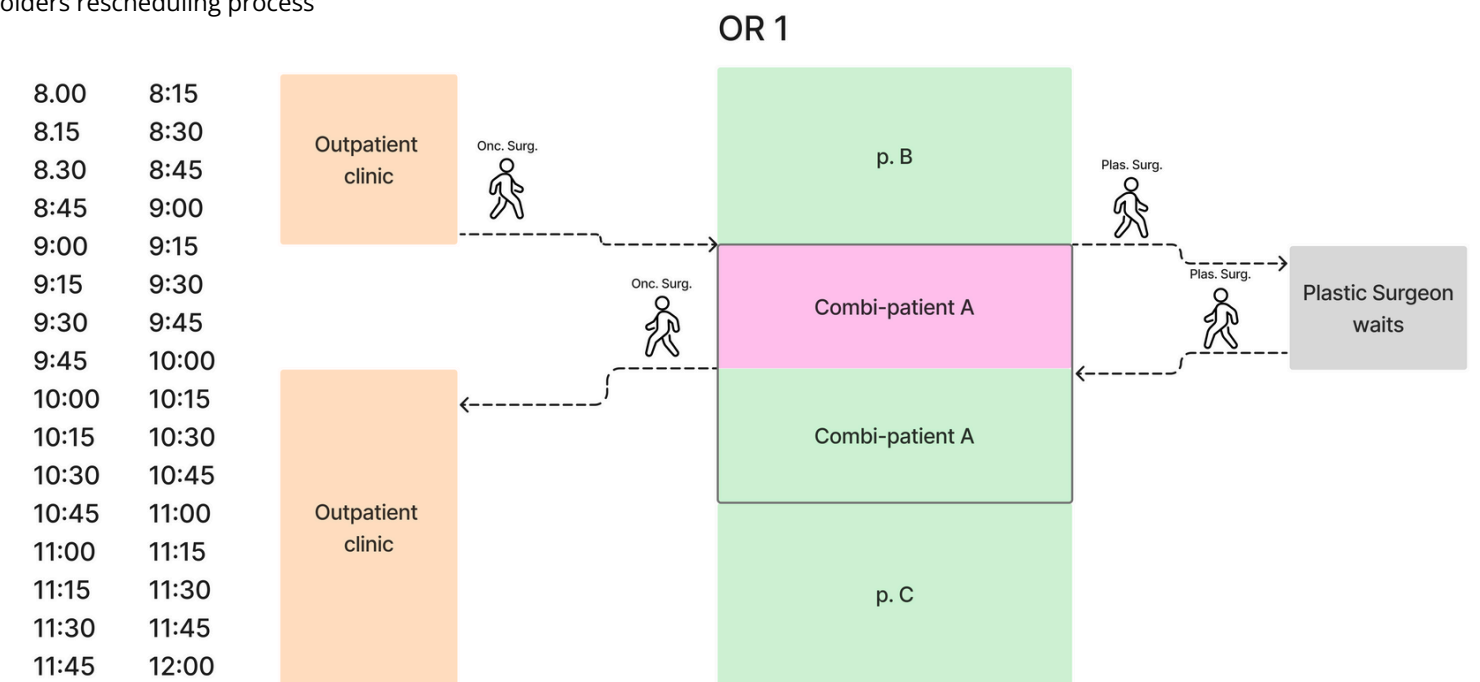


Figure 24. Plastic surgeon must wait until oncological surgeon has finished, i.e. loses time in the OR

Conclusion

The current planning and rescheduling processes for IBR surgeries at RdGG reveal a complex chain of interdependent steps involving multiple departments. Although the ICM forms the basis for operating room planning, coordination problems arise between the Admission dept., the Surgery and Plastic Surgery depts. and the surgeons. Unclear communication and the lack of a uniform planning approach often lead to frustration, especially when both surgeons need to be available at the same time.

Rescheduling is frequent due to changing patient conditions, surgeon availability and overlapping responsibilities. This results in time-consuming email exchanges and inefficient use of Surgeons their time on the OR. Although fixed combi-days offer some structure, the increasing number of DIEP procedures and the late availability of the Surgery department's schedule continue to strain the system. Overall, improved integration between departments and earlier alignment of schedules are crucial to enhance planning reliability and surgical efficiency.

6.4 Tools & Technologies used during the planning process

The planning of combi-patients relies heavily on digital tools and local coordination methods. Several systems like HiX, Excel and Outlook, are used but these are not well integrated. As a result, technological fragmentation causes inefficiencies, extra workload and communication gaps between multiple departments. This chapter summarizes how these tools are currently used, what limitations they create and how they influence collaboration and efficiency in the combination-surgery process.

Current Technological Environment

HiX

HiX is the hospital's main electronic patient record and scheduling system. It is used for registering operations, surgeon availability and patient information. However, several users describe that HiX is not designed for multidisciplinary operations:

- The system can only link one specialism or surgeon to a session, making it difficult to register both the oncological and plastic surgeon in a shared procedure (Oncological Surgeon, personal communication, October 2025).
- Departments cannot easily view each other's schedules or availability, reducing transparency (Planner Surgery dept., personal communication, October 2025)(Admission officer, personal communication, September 2025).
- HiX lacks tools for cross-departmental coordination or automatic conflict detection (Admission officer, personal communication, September 2025).

As a result, HiX functions mainly as a registration tool, not as a system for real-time planning or collaboration.

Excel

To compensate for HiX's limitations, secretariats use Excel to create and adjust planning overviews. Excel allows for flexibility and a quick overview of surgery days but leads to several risks:

- Information is entered manually and often differs from what is in HiX (Planner Surgery & Plastic Surgery dept., personal communication, October 2025)(Admission officer, personal communication, September 2025).
- Multiple versions circulate, causing confusion about which schedule is correct (Source: Admission dept.)

Although Excel offers short-term clarity, it contributes to long-term data fragmentation and double administration.

Outlook (Email)

Because systems are not interconnected, emails and phone calls has become the main coordination channel. Dozens of messages and phone calls are exchanged to confirm availability, discuss patient changes, or find new dates. While fast and accessible, the Admission dept. argues that this creates information overload and unclear responsibility. Important updates are often hidden in long email threads, leading to mistakes and delays.(Mamma Doctor's assistants, personal communication, October 2025)

This shows a fundamental gap: communication tools (Outlook) are disconnected from planning tools (HiX and Excel).

Key Consequences

The use of disconnected systems creates several structural problems:

- High administrative workload: staff must manually re-enter and verify information across systems.
- Inconsistent data: what is planned in Excel or HiX does not always match the actual OR usage.
- Reduced situational awareness: departments lack a shared overview of surgeon availability and OR capacity.
- Communication overload: excessive emailing and calls replaces integrated coordination.

Overall, technology currently acts as a divider rather than a connector between the departments.

Conclusion

The technological environment at RdGG is characterized by fragmented tools that require constant manual coordination. HiX, Excel, phone calls and Outlook each play a role, but together they create inefficiency and hinder collaboration between departments.

By integrating planning systems and linking forecasting tools to daily operations, technology can evolve from a reactive registration tool into a proactive coordination platform — enabling more efficient, transparent and patient-centered surgical planning.



6.5 Organization and Environment of the planning process

Within the planning process, each actor has their own tasks. Although each actor performs their tasks effectively, so all patients can undergo surgery, the process is sometimes inefficient and the communication between departments could be improved. These organizational challenges are closely related to digital and social working environment of the hospital, which together influence the efficiency and flexibility of surgical planning.

All departments work independently of each other, each following their own priorities and routines. When an IBR surgery needs to be rescheduled, various parties must be contacted via email or phone before a final decision can be made. Mamma & Plastic Surgery Doctor's assistants confirm that "no one really knows who makes the final decision" when conflicts arise. This decentralized structure leads to uncertainty about roles, long communication loops and extra work pressure for everyone involved.

Working with 'regular' surgeons makes the process even more complicated. Both Oncological and Plastic Surgeons prefer to perform surgery on their own patients because this makes care more personal and, in their opinion, patients appreciate this. This ensures patient's trust, but limits flexibility when changes need to be made to the schedule.

This creates uncertainty, requires additional communication between departments and/or other procedures (including outpatient clinic appointments) need to be postponed or cancelled to make room for IBR cases.

The work environment reflects some similar challenges:

- OR capacity is allocated well in advance, leaving little flexibility in scheduling. Tuesdays (and Fridays) were originally designated as combi-days, reserved for multiple IBR surgeries. However, these sessions are now frequently used for direct DIEP reconstructions, which occupy an entire day. As a result, fewer time slots remain in which both surgeons are available simultaneously for IBR procedures. With the number of direct DIEP surgeries increasing in recent months, this situation is expected to make planning combi-surgeries even more challenging.
- Socially, the hospital culture is very collegial, but sometimes inefficient. All caretakers have the same goal of treating patients as well as possible, willing to help each other and the tone of communication is in general positive. However, some people sometimes feel that there is an unwritten hierarchy, which can complicate collaboration. Staff often compensate for systemic shortcomings by being flexible, working overtime, or canceling other tasks to make an operation possible.

The organization and environment of the IBR planning process at RdGG show that, although each department functions effectively, cooperation between departments can cause inefficiency. The lack of a central process owner and the limited OR capacity make it difficult to coordinate the schedules of the Oncological and Plastic Surgeons,

especially since the number of direct DIEP surgeries continues to rise. At the same time, the hospital's collegial culture encourages staff to help one another and remain flexible, but this cooperation depends largely on informal communication rather than clear structures or agreements. An approach that combines shared responsibility, clear decision-making and better integration between departments and their planning systems.



6.6 Tensions & opportunities within the planning process

The process mapping and SEIPS analysis of the IBR planning process at the RdGG reveal several systemic opportunities for improvement in the planning and rescheduling of these surgeries. Many of these opportunities arise from tensions between departments, individuals and technologies, which manifest themselves in communication problems, unclear responsibilities and cultural or structural barriers that affect daily activities.

By addressing these core issues, RdGG can significantly enhance coordination, transparency and reliability in its surgical planning process. The identified opportunities are derived directly from the findings and are numbered in the same sequence as in the visual.

★ **1 & 2)** A promising opportunity lies in the capacity analysis carried out by the ICM. This year, for the first time, the ICM will calculate the time required in the ORs for each subspecialism within the Surgery dept., whereas previously it only calculated the different specialisms within the RdGG (see Figure 25). This will lead to a more accurate distribution of OR hours across the subspecialisms. This development represents an important step towards data-driven planning. However, the current analysis does not yet include the specific procedures performed within each subspecialism. For instance, in the Breast Cancer Department, it does not yet estimate the expected number of IBRs, mastectomies and lumpectomies to be performed in the coming year. By performing IBR-specific analyses, the hospital could gain valuable insights into the demand for combination surgeries.

This would enable more accurate forecasts, prevent bottlenecks in planning and ensure that sufficient operating room capacity is structurally reserved for oncological-reconstructive procedures.

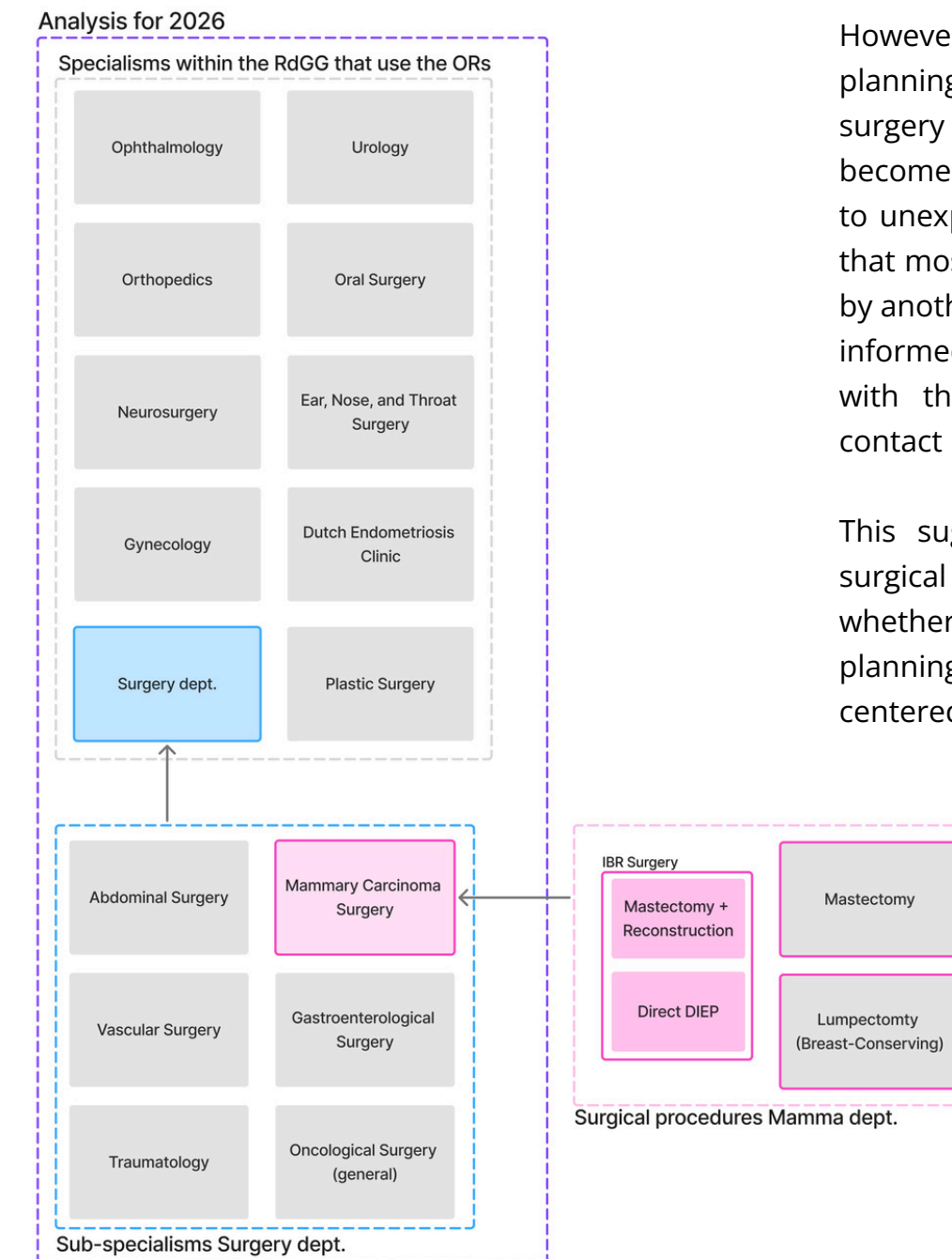


Figure 25. Overview of all subspecialisms within the Surgery dept.

★ **3)** At the RdGG, the guideline is that Plastic and Oncological Surgeons perform surgery on their own patients. This is appreciated by patients and surgeons because it helps build a personal relationship.

However, the guideline reduces flexibility in the planning system. When both surgeons must perform surgery on their own patients, scheduling options become limited and the system struggles to respond to unexpected changes. However, interviews showed that most patients would not mind being operated on by another qualified surgeon, as long as they feel well-informed and supported. They mainly value continuity with the oncologist during chemotherapy, where contact is more frequent.

This suggests an opportunity to explore whether surgical continuity is truly essential for patients, or whether a more flexible approach could improve planning efficiency without compromising patient-centered care.

This offers an opportunity to better investigate whether continuity with their own surgeon is essential for patients or whether they also feel comfortable being treated by another qualified specialist. This maintains patient-centered care and improves the efficiency of planning and the use of ORs.

Current process

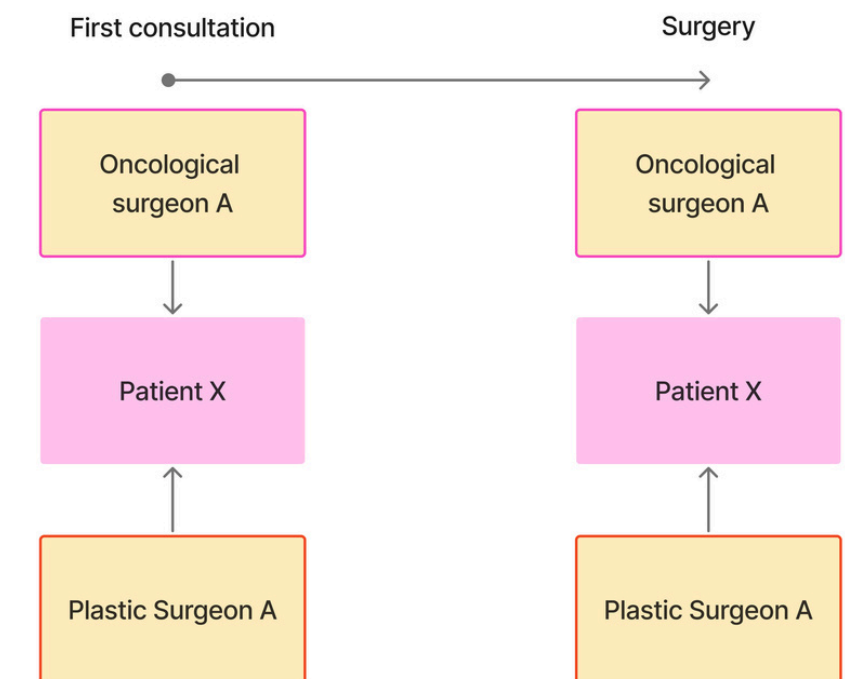


Figure 26. Overview of all subspecialisms within the Surgery dept.

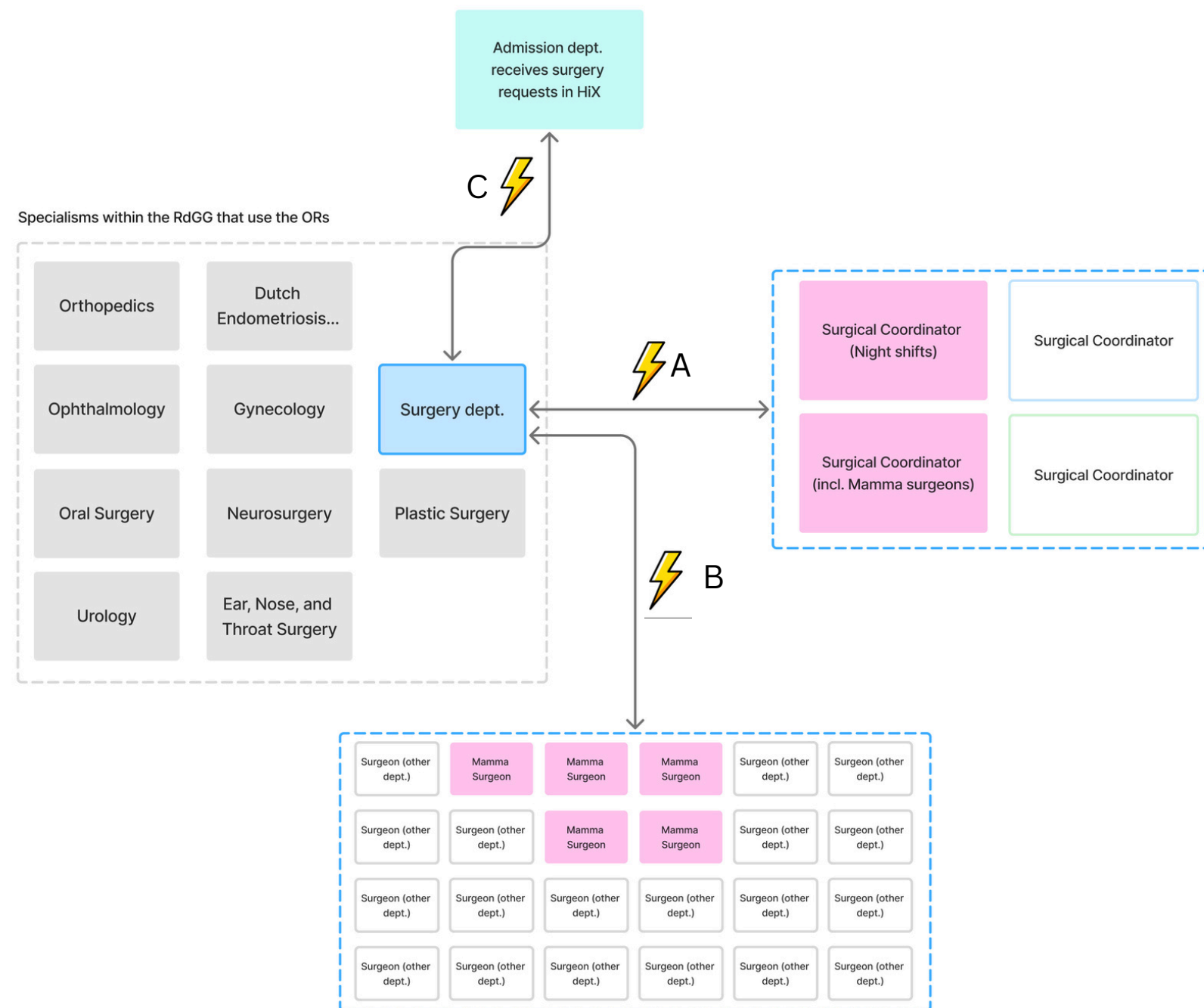


Figure 27. Tensions between Surgical Coordinator vs. Surgery dept. & Surgery dept. vs Admission dept.

★ **4)** The Surgery dept. experiences a sense of not being fully trusted by the Surgical Coordinator when it comes to the planning process (see Figure 27, A). According to the Surgery dept., the coordinator often checks or adjusts the schedule that the surgeons have proposed, which creates the impression that their professional judgment is being questioned. Surgical Coordinators feel that they should have more autonomy in determining when their surgeries are planned, given their insight into patient priorities and sudden interventions. This lack of trust has led to a tension, as coordinators aim to maintain structure and insight in the planning, while the Surgery dept. perceive this as interference in their decision-making. Strengthening mutual understanding and clarifying roles and responsibilities could help restore confidence and improve collaboration in the planning process. Addressing this issue offers an opportunity to strengthen mutual trust and create a more unified approach to planning.

★ **5)** The Surgical Coordinator notes that towards the end of the year (see Figure 27, B), Mamma (Oncological) Surgeons often take their remaining days off at the same time. When additional operating room time becomes available during this period due to fewer surgeries than expected, no extra procedures can be scheduled, reducing the flexibility of the Mamma surgery team. This lack of coordination creates inefficiency and limits the ability of the Mamma dept. to make full use of available capacity. However, it also presents an opportunity to improve alignment of vacation planning among the Mamma Surgeons. By coordinating their days off more

effectively and communicating these plans in advance, the hospital could maintain greater flexibility and ensure more efficient use of the operating room.

★ **6)** The delayed submission of availability by the Surgical Coordinator creates a recurring bottleneck for the Admission dept. because they depend on up-to-date schedules to finalise the OR schedule and put it in HiX (See Figure 27, C). Any delays in receiving the availability shifts from the Oncological Surgeons themselves, prevents the Admission dept. from completing the overall schedule on time. This not only leads to inefficiencies but also generates extra communication loops and last-minute changes across departments. Raising awareness of this problem provides an opportunity to raise awareness among the Oncological Surgeons to deliver their availability on time.

★7) Tuesdays were originally designated as so called ‘combi-days’ to perform multiple IBR surgeries efficiently on one day. Since direct DIEP procedures require the presence of two plastic surgeons and one OR for an entire day, this limits the number of IBR surgeries that can be scheduled, reducing the intended flexibility of the combi-day system (see Chapter 6.3, Figure 22). This development presents an opportunity to reassess how OR time is allocated between procedure types. By structurally distinguishing between combi-days and DIEP-days, the hospital could preserve capacity for both types of surgery.

★8) The Admission, Surgery and Plastic Surgery depts. have expressed a clear wish for a professional, integrated planning tool to replace the current fragmented system of using Excel sheets, sending multiple emails and phone calls. The lack of a unified digital platform leads to limited visibility, an abundance of communication and frustrations among stakeholders. Introducing a professional planning system could transform coordination across departments by combining surgeon availability and OR capacity. Such a tool would also allow for real-time updates, automated conflict detection and data supported adjustments. Implementing an integrated system would therefore not only reduce administrative workload but also enhance transparency, accuracy and efficiency throughout the IBR planning process.

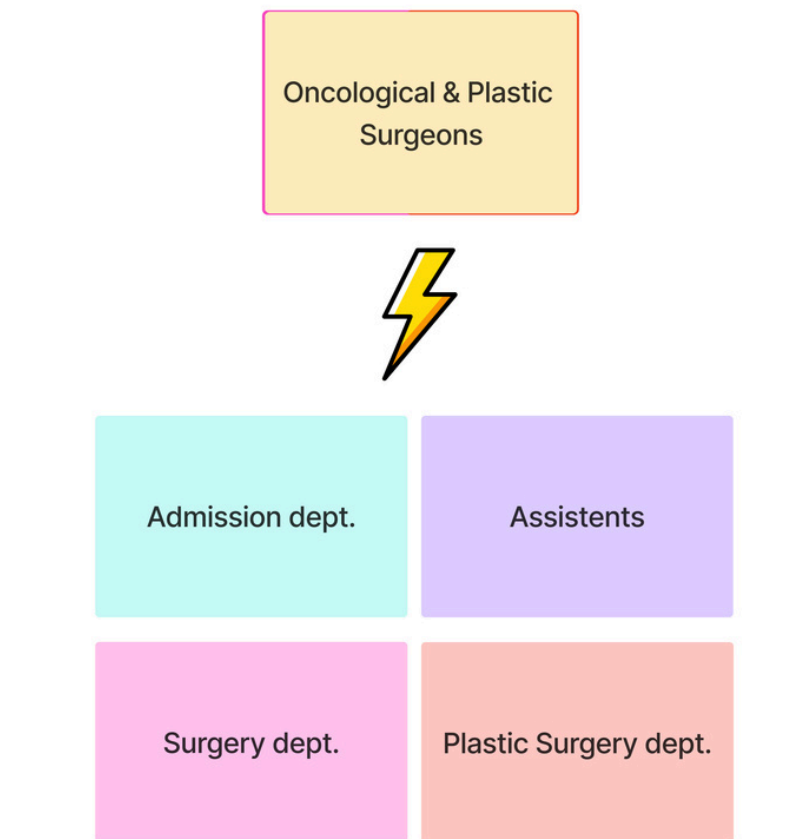


Figure 28. Surgeons are frustrated that they are part of the logistical rescheduling process

★9) As described in the rescheduling analysis (see Chapter 6.3), the current lack of ownership during the rescheduling process leads to inefficient communication loops and frustration among surgeons. There is a clear opportunity to streamline this by assigning a single person/department of responsibility for approving and communicating new schedules. Establishing a clear rescheduling loop in which surgeons are involved only for final approval rather than the entire logistical search would eliminate overlapping efforts, significantly reduce email traffic and better align with the surgeons’ wish to focus on patient care.

★10) To address the communication bottleneck caused by the Admission department's lack of insight into surgeons' schedules (as highlighted in Chapter 6.4), providing direct access to these agendas is a key opportunity. Granting the Admission dept. real-time visibility into regular OR days, outpatient clinics, and planned/standard absences would allow them to check availability immediately without verifying this via email first. This increased transparency directly solves the issue of repetitive and unnecessary confirmation emails and frustration for assistants and surgeons, making the planning process faster and more autonomous.

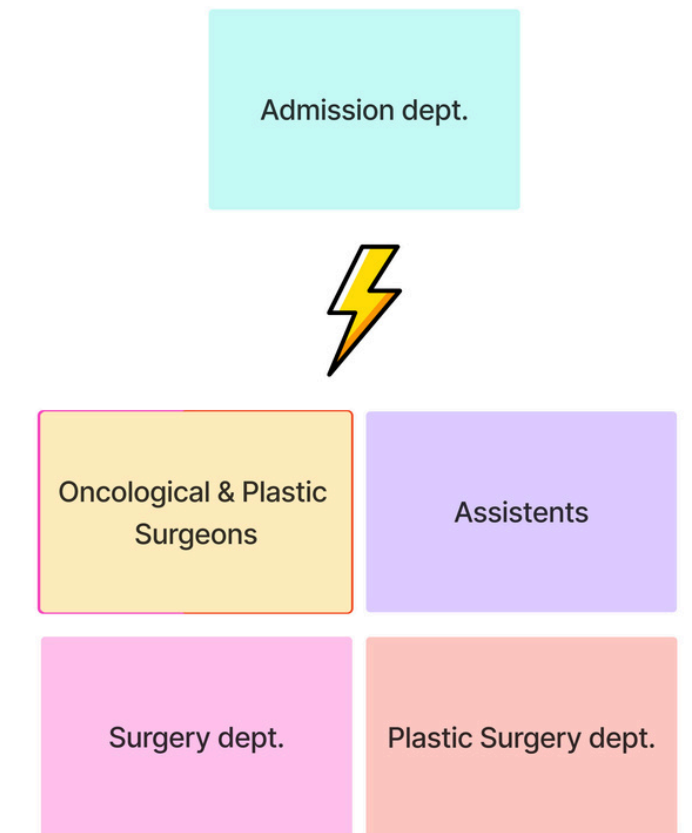


Figure 29. Admission dept. is frustrated that they have no insights in the schedules of the Surgeons

6.7 Conclusions

The analysis of the current planning process for IBR surgeries at the RdGG reveals that the challenges lie not in the motivation or commitment of the staff, but in the fragmented structure of coordination between departments. The SEIPS-based analysis has shown how people, tasks, tools, the environment and organizational structures interact and collide in ways that affect efficiency, workload and collaboration.

Across all interviews and observations, several recurring themes emerged. There is a strong culture of professional autonomy within the planning process: surgeons, coordinators and assistants each take responsibility for their own part of the process. While this supports ownership and patient-centered care, it also limits cross-departmental coordination. The use of multiple disconnected tools such as Excel, Outlook and HiX contribute to planning inefficiencies and increases administrative workload. Additionally, the planning culture differs significantly between departments: the Plastic Surgery dept. works with a smaller and more structured team and can therefore plan further ahead, whereas the Surgery dept. depends on multiple sub-specialisms and changing schedules, making early alignment difficult.

At the organizational level, the ICM provides a strong foundation for strategic scheduling, but its influence currently ends before the operational phase where the Admission dept., the Plastic Surgery & Surgery dept. and the assistants must manually synchronize the detailed schedules. Moreover, the hospital's guideline of having Breast Cancer Surgeons perform surgery on their own patients. However this could be

valuable for continuity of care it also reduces flexibility when last-minute changes occur or when surgeons are unavailable.

Despite the tensions, the system also shows resilience and creativity. Staff members across all roles actively search for solutions, exchange information informally and adapt to daily challenges. These strengths form a crucial basis for improvement. The main opportunity lies in developing an integrated, transparent and data-informed planning process that aligns strategic forecasting with operational execution and supports collaboration between people and departments.

In the following chapters, possible interventions are proposed that build on these insights. They aim to strengthen cross-departmental communication, support decision-making with data and digital tools and align the human, technical and organizational aspects of the planning process. Together, these proposals seek to create a more predictable, efficient and collaborative environment for the planning process of IBR surgeries at the RdGG.

07

Interventions within the planning process

This section outlines the interventions, expected benefits and implementation considerations that will contribute to a more human-centered planning process for IBR surgeries. The subsequent section places these ideas into a roadmap and explains how the RdGG can best implement them.

7.1 Introduction

The opportunities identified in the previous chapter form the foundation for the interventions within the planning process. While many of the challenges in the current planning process are structural and logistical, they also create significant frustration for staff, which can in turn affect the patient experience. Addressing these issues requires not only technical solutions but also a human-centered approach that improves collaboration, clarifies responsibilities and reduces uncertainty. The interventions therefore build on these findings to explore how a new way of working can support the RdGG staff in the planning of IBR breast cancer surgeries.

Table 4 shows which interventions influence the opportunities described in the previous chapters:

Chapters	Related Opportunities
7.2.1	1, 2, (7)
7.2.2	7
7.3	3, 8, 10
7.4	3
7.5	10
7.6	9
7.7	4
7.8	5, 6

Table 4. Interventions related to opportunities from past chapters



7.2 Predictive Approaches to Surgical Planning

7.2.1 Data-driven Planning Process for Surgical Scheduling

This intervention focuses on developing a data-driven planning process designed to reduce the cognitive load and administrative burden for scheduling surgeries. While the system utilizes data to improve efficiency and accuracy, its primary human-centered goal is to transform scheduling from a reactive task into a predictable and supported decision-making process. This allows professionals to focus less on logistical puzzles and more on delivering timely care.

This year, for the first time, the ICM has begun analyzing the required number of OR sessions per subspecialism within the Surgery dept. This approach already contributes to an improved distribution of surgical time within the RdGG. However, integrating AI and data-driven analyses could further enhance the precision and flexibility of this planning process.

Data (procedure types, surgery duration, seasonal trends, staff availability, sick leave patterns etc.) serves as the essential 'fuel' for AI systems, enabling them to learn, identify patterns and make decisions or predictions without being explicitly programmed for every scenario. By utilizing these insights, planners can better anticipate changes in surgical activities, prevent scheduling bottlenecks and make evidence-based decisions about OR allocation.

Concept and Function

The data-driven AI system would continuously analyze data collected throughout the years, including procedure types, durations, RdGG staff availability and seasonal trends. Using this data, it can generate accurate forecasts of OR demand and suggest optimal allocation of time per subspecialism and procedures.

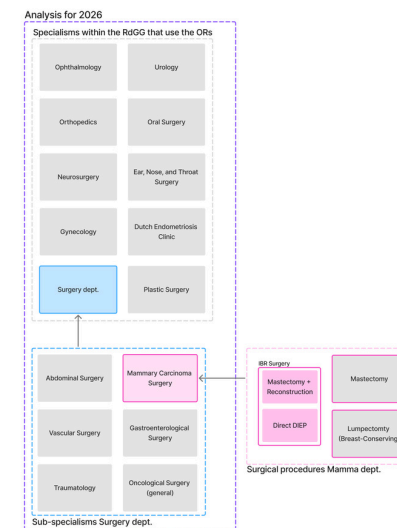


Figure 30. Overview of all subspecialisms within the Surgery dept.

By forecasting the number of specific procedures expected in the coming year, the following planning teams can more efficiently assign surgeons to specific dates. With accurate predictions, the timing of certain procedures is already established, leaving only the task of matching a doctor and patient to each slot. This approach also provides the hospital with a clearer understanding of how many patients can be accommodated for particular treatments.

The system also allows planners to test different scheduling scenarios, f.e. what happens if an extra combi-day is added (removing other procedures). The tool immediately shows how this affects the OR planning, workload and capacity. In addition, AI can automatically detect potential scheduling conflicts or inefficiencies, such as periods of under- or over-utilization and notify planners in advance.

By integrating this predictive simulation tool into the existing ICM workflow, the AI-driven system becomes a decision-support tool that complements, rather than replaces, human expertise in surgical planning.

Expected Benefits

- Improved forecasting accuracy: AI provides real-time insights into expected OR demand and improving long-term planning.
- Increased scheduling flexibility: Provides insight into the effects of changes of procedures, staffing and patient volume. Allowing the hospital to adapt quickly to unexpected circumstances.
- Reduced manual workload: automating data analysis and forecasting minimizes manual calculations, giving ICM and other planning related staff members more time to focus on other things.
- Enhanced collaboration and transparency: shared access to data and forecasts enhances coordination and ensures that information is easily accessible.
- Support for evidence-based management: by analyzing trends, the AI system helps the ICM to evaluate policies and implement expected changes in demand for certain treatments. F.e., more people are diagnosed with breast cancer each year due to improvements in breast cancer detection (See Chapter 2.2).

Implementation Considerations

To implement this system effectively:

- Data quality and integration: ensure that clean data is collected, standardized and securely connected to the AI model.
- Training and trust: planners must be involved early in the development process to build confidence in the system's outcomes.
- It is unlikely that the hospital will develop the tool itself. This must therefore be done in collaboration with a software developer. Before starting the

conversation with them, they must have an analysis carried out to determine what insights they need for certain functions of the tool. This analysis could be carried out by an intern/graduation student with a background in programming.

- Monitoring and evaluation: regularly assess the model's performance against real-world results to continuously improve predictive accuracy.

Discussion

Implementing a data-driven planning process supported by AI will require both technological readiness and organizational commitment. While predictive models can provide valuable insights, their effectiveness depends on data quality and staff engagement. Planners and coordinators must trust and understand the system's output for it to improve decision-making. As this is a new approach for the hospital, close collaboration between ICM, IT specialists and clinical departments will be essential to ensure the system evolves in line with real-world needs.

Conclusion

An AI-driven planning process offers a powerful opportunity to make OR scheduling more data-driven, efficient and customizable. By translating historical and real-time insights into forecasts, the RdGG can improve capacity planning, reduce scheduling challenges and strengthen collaboration between departments. Ultimately, this intervention supports smarter use of OR resources while maintaining the hospital's focus on quality, accessibility and patient-centered care.

7.2.2 Using AI Analysis to Forecast the Number of Direct DIEP Surgeries

This intervention builds on the idea presented in the previous chapter, as direct DIEP surgeries have a significant impact on the number of IBR surgeries (see Chapter 6.3, Figure 22). An AI-based analysis developed by the hospital is used to predict how many direct DIEP reconstructions are expected to take place in the coming year. The goal is to anticipate how these surgeries will influence OR capacity and the availability of Plastic Surgeons for other IBR procedures.

The RdGG is currently in a transition period, as this is the first year in which direct DIEP surgeries are being performed. The growing amount of direct DIEPs in the RdGG has a significant impact on planning flexibility. Using AI to analyze and forecast these trends will help the hospital prepare for future demand and make well-informed strategic decisions about surgical capacity, patient intake and prioritization of reconstruction types.

Concept and Function

The AI system would analyze historical data, patient demographics, treatment preferences and current referral patterns to predict how many direct DIEP reconstructions are likely to be performed in the next planning year (by taking ongoing researches into account). By integrating data, the AI tool could simulate different scenarios, such as:

- The expected number of direct DIEPs per month or quarter;
- The estimated number of Plastic Surgeons and OR sessions required to perform these surgeries;

- The potential reduction in available capacity for IBR surgeries and other procedures.

These forecasts would provide the ICM, Surgical Coordinator, the Surgery and Plastic Surgery dept. with reliable, data-driven insights to support decision-making for the annual OR allocation. The analysis would also allow planners to model the effect of different situations, such as limiting direct DIEPs or adjusting the intake of new patients.

Expected Benefits

- Improved capacity planning: anticipating the expected number of direct DIEPs helps the hospital allocate OR time and staff more accurately.
- Scenario modelling: the AI tool simulates various scenarios, allowing the RdGG to adjust their strategy if the actual number of patients differs from the expected amount.
- Informed strategic decision-making: data-driven insights support discussions about how to balance direct DIEPs, IBR surgeries and other procedures.
- Prevention of scheduling conflicts: early identification of capacity shortages can ensure that decisions regarding to offering certain procedures and the admission of new patients are made in a timely manner.
- Improved patient communication: knowing the expected capacity helps inform patients about realistic timelines and available surgical options.

Implementation Considerations

To implement this intervention successfully:

- Data quality: ensure that the data from HiX and ICM is accurate and accessible for reliable AI analysis.
- Collaboration between departments: engage the involved departments in creating the dataset.
- Policy preparation: prepare clear guidelines for decision-making if forecasts indicate that the demand for direct DIEPs exceeds available capacity.
- Continuous evaluation: update the model regularly with new data to reflect changing patient preferences and resource availability.

Discussion

Using AI to forecast the number of direct DIEP surgeries will improve data-driven decision-making, but its success depends, again, on accurate data collection and close collaboration between departments. Since the hospital is still in a transition period, it is essential that results are interpreted cautiously and updated regularly. The findings should guide not only planning but also strategic discussions about priorities, ensuring that patient preferences and available capacity remain balanced over time.

Conclusion

Introducing AI-based forecasting of direct DIEP surgeries allows the hospital to anticipate long-term capacity needs and avoid unexpected scheduling challenges. If the analysis shows that patient demand for direct DIEPs continues to rise, the hospital will need to make strategic choices—such as limiting the number of direct DIEPs, reducing IBR surgeries, or adjusting patient intake. By approaching this transition period with data-driven insight, RdGG can maintain a balanced and sustainable surgical planning process that aligns patient wishes with realistic operational capacity.



7.3 Implementation of an Online Planning Tool

This intervention proposes implementing an online planning tool, such as MedSpace, to enhance communication and coordination between departments involved in surgical scheduling. The goal is to reduce administrative workload, improve transparency and create a user-friendly and efficient planning environment.

Currently, the planning process within the RdGG is still performed manually, using spreadsheets and HiX. This leads to fragmented communication, duplicated efforts and unclear responsibilities. An integrated digital tool can automate parts of this process and provide real-time insight into surgeon availability, OR capacity and available options for rescheduling.

Although such a system requires a financial investment, digital infrastructure is essential for hospitals to remain efficient and aligned with modern healthcare standards. Without this step, inefficiencies, staff frustration and missed opportunities for innovation will continue to impact daily operations.

Concept and Function

By integrating a shared digital environment like MedSpace, all stakeholders (Surgery dept., Plastic Surgery dept., Admission dept., Surgical Coordinator, Doctor's assistants and Surgeons) would have access to synchronized scheduling data. The system connects with HiX and displays up-to-date information about OR capacity, surgeon schedules and upcoming procedures (MedSpace for Medical Specialists - Medspace, 2024). Medspace is a tool for scheduling caregivers, patients are scheduled HiX.

Users can collaboratively update and confirm schedules within the system, while automated notifications alert relevant staff to changes or conflicts. MedSpace also includes both manual and automatic scheduling tools, allowing planners to generate rosters based on surgeon availability, capacity needs and staffing rules. Analytics dashboards help identify trends and bottlenecks, supporting proactive and data-informed planning decisions.

By creating one shared and easily accessible platform, the hospital can ensure better coordination and improved operational efficiency across departments.

Expected Benefits

- Improved coordination: all departments share access to the same information, reducing miscommunication and unnecessary email traffic.
- Reduced administrative workload: automated updates, centralized scheduling and automatic scheduling minimize manual data entry and repetitive communication.
- Higher user satisfaction: a clearer and more reliable planning system decreases frustration and improves the working experience of coordinators and assistants.
- Better use of data: real-time insights into capacity and scheduling patterns to make faster decisions.
- Future readiness: investing in modern technology ensures that the hospital remains competitive, freeing time for innovation instead of administrative work.

- Integration with mobile devices: MedSpace offers its own mobile application that allows users to access their schedules anytime and anywhere from their personal phones, ensuring they always have an up-to-date view of their agenda.

Implementation Considerations

To ensure successful adoption of an online planning tool:

- Financial commitment: Although initial costs are high, the long-term benefits in efficiency and satisfaction could justify the investment. There is also the ability to receive a free demo so the stakeholders can try out the system for a while to test Medspace.
- System integration: The tool must synchronize with HiX.
- Training and user engagement: early involvement of planners, assistants and surgeons will increase acceptance and reduce resistance to change.
- Phased rollout: Begin with a pilot department, evaluate usability and impact, then expand to other departments within the hospital.
- Monitoring and evaluation: Regularly track user satisfaction to measure improvement.

Discussion

Implementing MedSpace will not only require technical integration but also a cultural shift toward more transparent and collaborative planning. Its success depends on consistent data entry and active participation from all departments. Although the investment is considerable, adopting such a tool is essential for a hospital that aims to modernize,

reduce communication barriers and build a more connected and data-driven working culture.

Conclusion

Introducing an online planning tool like Medspace represents an important step toward modernizing the hospital's scheduling process. While it requires an investment, failing to embrace digital solutions carries the risk that inefficiencies, communication problems and frustrations will persist. By adopting a tool such as Medpace, RdGG can create a more transparent, collaborative and future-ready planning system, freeing time for innovation and ensuring that technology supports high-quality patient care.



Figure 31. Medspace as planning tool

7.4 Patient Opt-In System for Flexible Surgical Scheduling

This intervention proposes introducing an opt-in system that allows patients to consent in advance to being operated on by another qualified surgeon if their primary surgeon (who did the first consultation) becomes unavailable or if scheduling conflicts arise. The goal is to improve the flexibility and continuity of surgical planning without compromising the patient's sense of trust and safety.

The planning process analysis shows that, although patients and surgeons value personal continuity, this approach limits the hospital's ability to respond to unforeseen circumstances such as surgeon absence or changes in treatment plans. Several patients mentioned during the interviews that they would not object to being operated on by another Oncological Surgeon, given that this is clearly communicated and they have confidence in the team's expertise. They also note that contact with the Oncological Surgeon is relatively limited, making the personal relationship less significant for some. Other hospitals do not necessarily work with the same guidelines either (Oncological surgeon RdGG, personal communication, June 2025). Plastic Surgeons, on the other hand, strongly prefer to perform surgery on their own patients, which restricts their scheduling flexibility. Nevertheless, they can adjust their programs easier by postponing less urgent, non-oncological procedures. This intervention primarily affects the Oncological Surgeons and their schedules. The opt-in system therefore aims to formalize this flexibility in a transparent and patient-centered way.

Concept and Function

During the initial consultation, patients would receive clear information about the treatment process and be offered the option to opt-in to flexible Oncological Surgeon allocation. Their decision, whether they consent or prefer to be treated only by their 'own' surgeon, would be registered in HiX and visible to the departments involved with the planning.

If a scheduling conflict arises, patients who have opted in can be operated by another surgeon within the Mamma surgery team, ensuring continuity of care and optimal use of all surgeons their time in the OR.

Expected Benefits

- Improved scheduling flexibility: the opt-in option provides planners with a greater range of scheduling possibilities, providing more options to perform surgery on patients.
- Enhanced patient autonomy and transparency: patients retain full control over this decision. By being informed in advance, they can choose the balance between personal continuity and scheduling flexibility that best suits them.
- Reduced administrative burden: fewer rescheduling efforts decrease the number of coordination emails between the different departments, saving time and reducing workload.

Implementation Considerations

To implement this system successfully:

- A more extensive study should be conducted to see whether a large proportion of patients indeed

agree with this intervention (f.e. during the currently 'patient satisfaction survey').

- Communication protocols must ensure that patients are informed clearly and empathetically about what the opt-in entails and that all participating surgeons meet the same quality standards.
- Integration into HiX is required to register the patient's preference visibly and link it to their surgical file. It should also be easy for planners to see which patients agreed with this option.
- Monitoring and evaluation should be conducted after implementation to assess the impact on planning efficiency and patient satisfaction.

Discussion

It is important to be aware that doctors like to operate on someone they know, as they also want to complete the treatment with a patient. This option does not have to become the new standard, but it does offer the hospital more flexibility when necessary.

Conclusion

The patient opt-in system enables a more adaptive and resilient surgical planning process while maintaining the hospital's patient-centered values. By giving patients a transparent choice and embedding it into the planning workflow, RdGG can reduce scheduling delays, increase OR efficiency and support a smoother collaboration between departments without compromising the quality or trust of the patient.

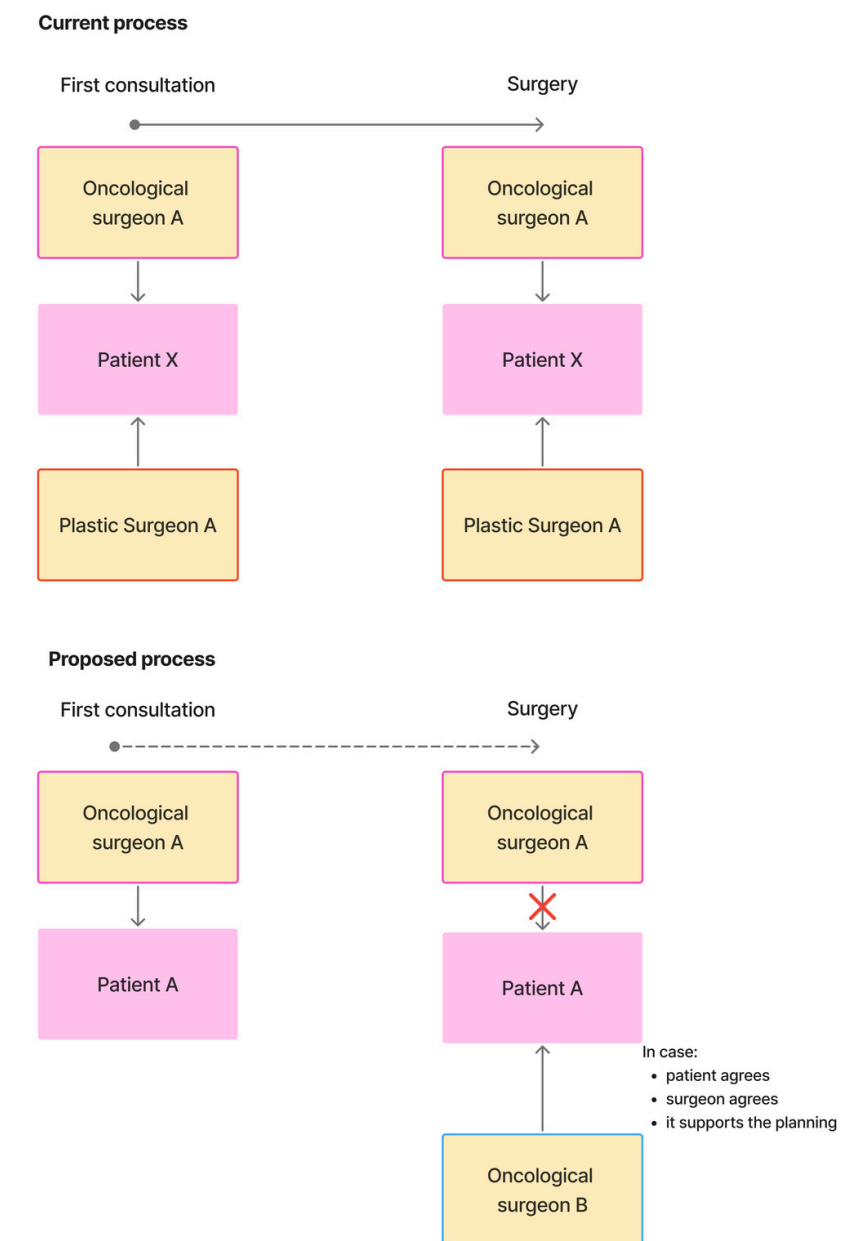


Figure 32. Patient Opt-In System

7.5 Providing the Admission dept. with Access to Surgeons' Agendas

This intervention proposes that the Admission dept. gains direct insight into the agendas of surgeons from both the Surgery dept. and the Plastic Surgery dept. The goal is to improve coordination and reduce the extensive email communication currently required to confirm availability for surgeries. By providing shared access to surgeons' schedules, the planning process becomes more transparent, efficient and less dependent on back-and-forth communication between departments.

At present, the Admission dept. must frequently contact multiple parties to verify the availability of the Oncological and Plastic Surgeons involved in an IBR procedure. This repetitive communication not only causes delays but also creates frustration among staff who already experience a high workload. Granting the Admission dept. access to the relevant schedules would enable them to identify suitable/unsuitable time slots immediately, especially when a surgery needs to be rescheduled, ensuring a smoother planning process.

Concept and Function

The intervention involves giving the Admission dept. insight into the surgeons' agendas. This connection can be established through the existing hospital system, such as HiX:

- Surgeons' planned OR sessions and outpatient clinic days
- Outpatient clinic days
- Nightshifts
- Upcoming absences (holiday, conferences, etc.)

The Admission dept. would be able to view this information in real time, ensuring that they only propose surgical dates when required surgeons are available. Any changes made by the Surgery dept. or Plastic Surgery dept. would automatically update across the system which the Admission dept. is able to see.

By centralizing this information, the Admission dept. can coordinate more effectively and send fewer unnecessary emails, which will reduce frustration among other departments.

Expected Benefits

- Reduced email communication: the number of coordination emails between the Admission dept., Surgery dept. and Plastic Surgery dept. significantly decreases, saving time and preventing miscommunication.
- Increased transparency: all involved parties have a shared view of availability, reducing uncertainty and promoting trust between departments.
- Lower workload and frustration: staff can focus on core tasks rather than administrative coordination, improving job satisfaction and efficiency.
- Faster scheduling process: the Admission dept. can identify available OR slots more quickly, minimizing waiting times for patients and reducing planning delays.
- Improved interdepartmental collaboration: shared insight into agendas encourages smoother cooperation between departments, supporting a more unified workflow across the hospital.

Implementation Considerations

For this intervention to be successful:

- System integration: The agenda access must be securely linked to existing hospital systems, such as HiX, ensuring up-to-date and accurate information.
- Privacy and permissions: Clear access levels should be defined so that the Admission dept. can view availability without altering the surgeons' schedules.
- Training and guidelines: Staff from all departments should receive a brief introduction on how to use the shared system effectively.
- Evaluation: The impact should be measured through indicators such as the number of internal emails, scheduling time per patient and staff satisfaction.

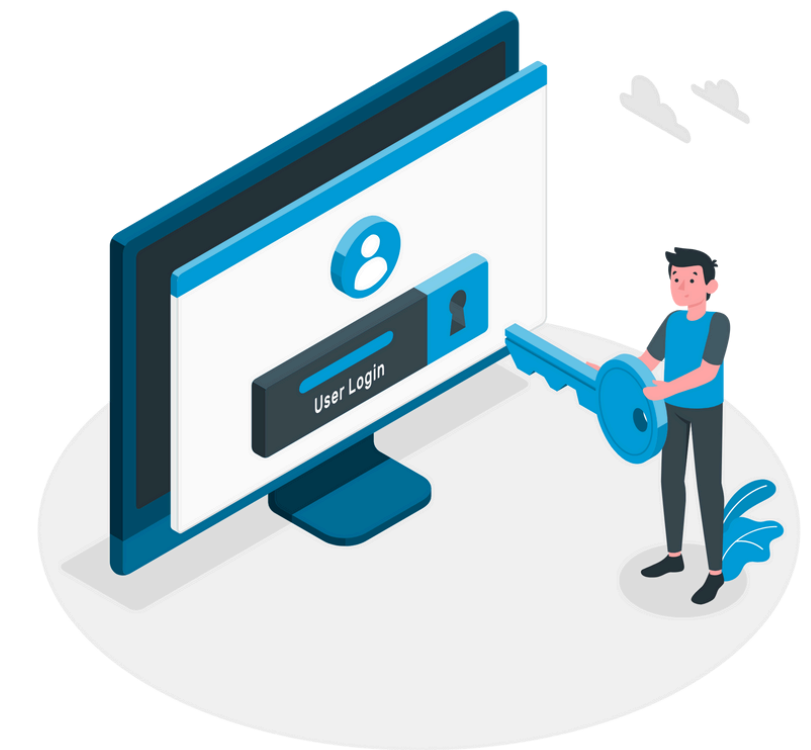
Discussion

The surgeons wish a reduction in scheduling-related emails. However, it is important to avoid giving the impression that their work is being monitored. For this reason, only the Admissions dept. should have access to their schedules, no other extra colleagues. It may be useful to explore whether the HiX platform offers a feature that allows the Admissions dept. to view only the information relevant to their role, rather than the surgeons' entire schedules.

Conclusion

Granting the Admissions dept. controlled access to surgeons' schedules through the HiX system can significantly improve communication, efficiency and overall workflow. By reducing unnecessary email

exchanges and ensuring up-to-date schedule visibility, this approach supports smoother coordination and less administrative burden for all parties involved. This intervention increases transparency and streamlines the planning process. However, it is important to ensure that surgeons do not feel overly monitored. This intervention will improve staff satisfaction and ultimately patient care.



7.6 Assigning Final Scheduling Responsibility to the Admission dept. and Limiting Surgeon Involvement in Rescheduling Emails

This intervention proposes assigning the Admission dept. as the final responsible party for confirming and communicating new dates when an IBR surgery needs to be rescheduled. The goal is to create structure, ownership and accountability in the rescheduling process while reducing the number of unnecessary emails and frustration among staff.

Currently, when an IBR surgery must be rescheduled, many different actors (including the Admission dept., Surgery dept., Plastic Surgery dept., Doctor's assistants and Surgeons) are involved in finding a new date. Both the Oncological Surgeons and Plastic Surgeons are typically included in all early email exchanges, even before a feasible option has been found. This creates long email chains, overlapping efforts and uncertainty about who is responsible for approving and communicating the final plan. Surgeons have expressed frustration about this process, as they prefer to focus on patient care rather than administrative coordination.

By assigning the Admission dept. as the single point of responsibility and limiting surgeon involvement to the final approval stage, communication becomes more efficient, structured and less disruptive. The Admission dept. is well positioned to take on this role, as it oversees both the Surgery and Plastic Surgery depts. and already plays a central part in coordinating OR capacity.

Concept and Function

Under the new structure, the Oncological and Plastic Surgeons will no longer be included in the initial rescheduling emails. The first stage of coordination will take place between the Doctor's assistants, the Admission dept. and the Surgery and Plastic Surgery depts. These groups will work together to review surgeon availability, OR schedules and patient needs to identify one or more suitable new dates.

Once these options have been found, the Admission dept., which oversees both the Surgery and Plastic Surgery depts., will make the final scheduling decision and send a summarized, clear approval email to the surgeons. The surgeons will then provide medical approval or suggest adjustments if needed.

This new process ensures that surgeons are contacted only when there is a proposal for specific moment, while communication and administrative responsibility remain with the coordinating departments. The Admission dept. thus becomes the single point of accountability for confirming new planning dates after approval of the involved parties.

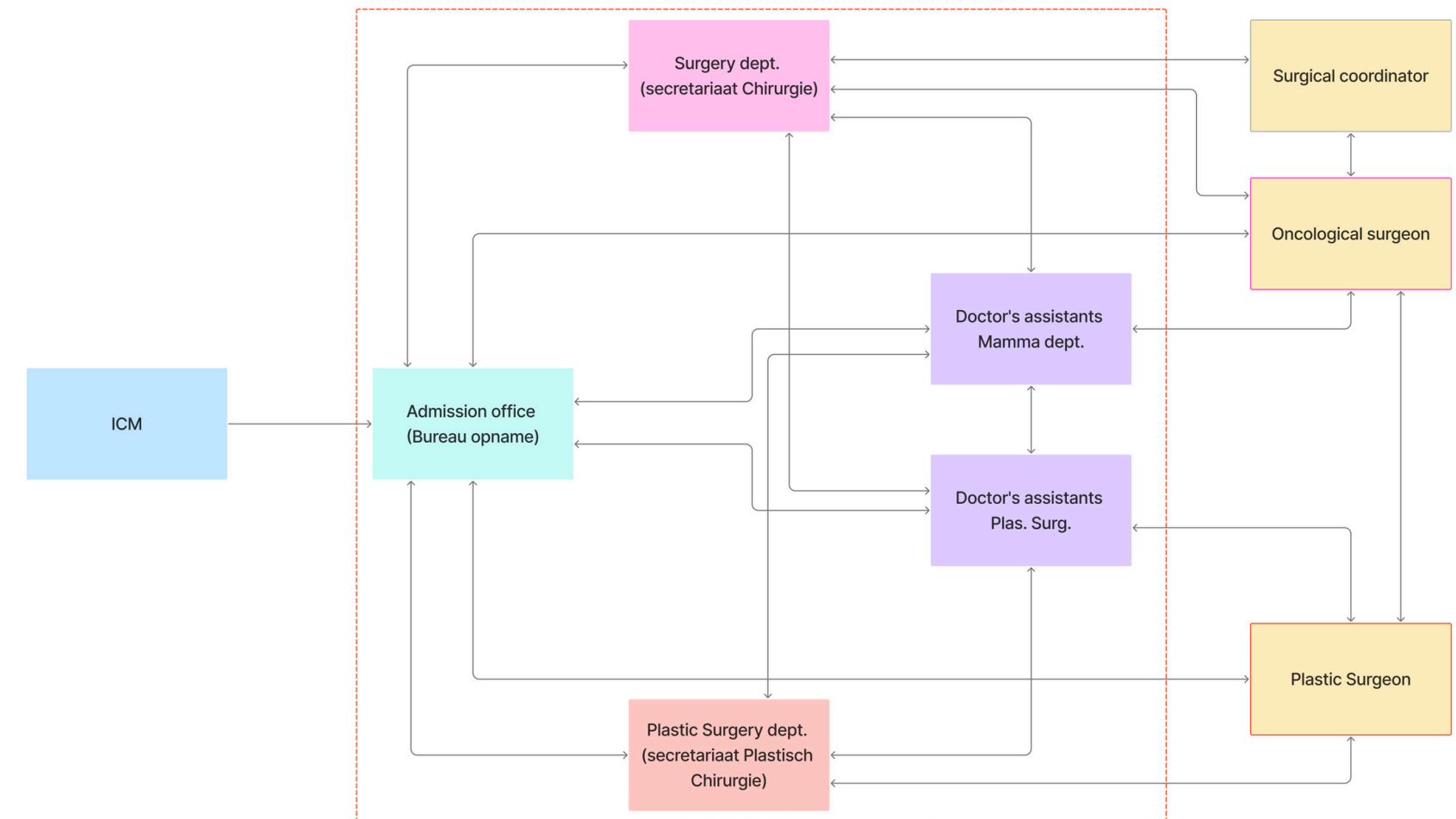


Figure 33. Only the departments within the red border should be involved in the initial rescheduling phase

Expected Benefits

- Clear ownership and accountability: the Admission dept. serves as the final decision-maker, eliminating uncertainty about who holds ultimate responsibility for rescheduling a surgery.
- Reduced email volume and overlap: fewer people involved in early communication lead to shorter, more focused email chains.
- Less frustration for surgeons: surgeons are only contacted when necessary, allowing them to dedicate their time to clinical work rather than coordination tasks.
- Faster and more efficient rescheduling process: a smaller group responsible for rescheduling the surgery, those involved will feel more accountable for contributing to a new surgery date, rather than leaving this to someone else.

Implementation Considerations

To ensure this intervention is successfully adopted:

- Define responsibilities: develop a short written protocol outlining each department's role and clarifying at what stage surgeons should be added to communication:
 - When a new surgery date is proposed;
 - If medical information needed;
 - Unclear about availability;
 - When no suitable date can be found.
- Standardize email communication: use clear subject lines and brief summaries in final emails to surgeons, ensuring clarity and quick responses.
- Monitor results: after several months, evaluate changes in email volume and staff satisfaction.

Discussion

While this new structure simplifies communication and clarifies responsibilities, its success depends on consistent mutual trust between departments. Some staff may initially struggle to adjust to the reduced involvement of surgeons, as this represents a cultural shift toward more streamlined coordination.

To sustain the benefits, regular evaluation of communication flow and staff satisfaction is essential. The Admission dept. should continue to collaborate transparently with both surgical teams to maintain confidence in its decisions. Over time, this approach can strengthen interdepartmental trust, reduce frustration and serve as a foundation for improving other multidisciplinary scheduling processes within the hospital where surgeons are part of the OR scheduling process.

Conclusion

Assigning the Admission dept. final responsibility for rescheduling IBR surgeries and excluding surgeons from early communication creates a clear, structured and efficient coordination process. This intervention defines ownership, reduces unnecessary email exchanges and allows surgeons to focus on patient care. By establishing one central decision-maker who balances input from both the Surgery and Plastic Surgery depts., the hospital can ensure faster decision-making and better alignment across departments.



7.7 Strengthening Coordination Between the Surgery dept. and the Surgical Coordinator

This intervention proposes that the Surgery dept. performs a regular check-in with the Surgical Coordinators at a fixed moment, f.e. every Monday morning/first Monday of the month. During this short email exchange, the Surgery dept. would ask whether there have been any changes in the planning or if updates are required. The goal is to ensure that both parties remain aligned, the Surgery dept. regains control and that the Surgical Coordinators feel seen and heard.

Currently, there is frustration and a lack of trust between the Surgery dept. and the Surgical Coordinator. Interviews revealed that surgeons sometimes feel that they are not trusted with scheduling by the Surgical Coordinators. By encouraging the Surgery Department to take the initiative, they regain a sense of control, restoring mutual respect and shared responsibility.

Concept and Function

Each week (or once per month) the Surgery dept. contacts the Surgical Coordinators to double check the planning is up to date and to discuss any recent or upcoming changes. This can be done through a simple email exchange. During this exchange, the following points can be reviewed:

- Any changes in the OR schedule or surgeon availability
- Adjustments in patient scheduling
- Potential challenges for the upcoming weeks (f.e. expecting more trauma surgeries because of slippery weather)

This proactive approach ensures that the Surgery dept. is actively in charge while giving the Surgical Coordinators the opportunity to address updates early and provide clarification. It also demonstrates shared ownership of the planning process rather than reactive communication when problems occur.

Expected Benefits

- Increased sense of control: by actively asking for updates, the Surgery dept. regains a feeling of ownership over the planning, reducing their feeling of being lower in hierarchy.
- Better collaboration culture: continuous communication fosters a culture of teamwork, transparency and shared responsibility.
- Early detection of issues: regular coordination makes it easier to identify planning conflicts or inconsistencies before they escalate.

Implementation Considerations

For successful implementation:

- Set a clear routine: establish a fixed day and time for the check-in (e.g., every Monday morning or the first Monday of the month).
- Keep communication brief: limit the update to a short email to maintain efficiency and focus.
- Monitor collaboration: after several months, evaluate whether communication and trust between the Surgery dept. and the Surgical Coordinator have improved.

- Professional support: If tensions or miscommunication persist, professional facilitation should be considered to address deeper cultural challenges within the department.
 - F.e., a team training by TeAMZ, which focuses on strengthening non-technical skills, such as collaboration, leadership, decision-making, effective communication and situational awareness (TeAMZ, n.d.).

Discussion

The success of this intervention depends on the willingness of both the Surgery dept. and the Surgical Coordinator to engage in open and consistent communication. Since part of the challenge lies in cultural rather than procedural factors, this intervention should focus on collaboration and mutual respect rather than formal reporting.

If tensions or misunderstandings persist despite regular check-ins, professional support such as team coaching or communication training may be necessary to address deeper issues of trust. Over time, consistent and constructive dialogue can strengthen collaboration, rebuild confidence and serve as an example for improving coordination in other hospital departments.

Conclusion

Scheduling a regular check-in between the Surgery dept. and the Surgical Coordinator encourages active communication, strengthens collaboration and helps rebuild trust. This intervention promotes shared ownership of the planning process, reduces

frustration and the Surgical Coordinator keeps a sense of control. If communication or trust does not improve through this approach, professional guidance should be sought to support cultural change within the collaboration between these departments, ensuring that teamwork remains respectful, transparent and effective.



7.8 Integrating Vacation Planning Reminders and Enforcing Availability Deadlines within the Surgery dept.

This intervention proposes that the Surgery dept. integrates a short reminder in its regular communication with surgeons, including Oncological Surgeons, to encourage them to plan and distribute their vacation days more evenly throughout the year and to submit their availability before the set deadlines. The goal of this intervention is to improve the predictability of OR scheduling and prevent delays that eventually affect the Admission dept.

Currently, surgeons receive regular requests from the Surgery dept. to provide their availability before a specific deadline. However, these deadlines are often not met. As a result, the Admission dept. cannot proceed with its part of the scheduling process on time, leading to delays and inefficiencies in confirming OR plans. In addition, many Oncological Surgeons tend to take their remaining vacation days at the same time toward the end of the year. During this period, other specialisms sometimes perform fewer surgeries than expected, leaving OR time available for other procedures. Since breast cancer surgeries require an oncological surgeon, this unused time cannot be claimed by the Mamma department.

By integrating structured reminders and reinforcing responsibility for meeting planning deadlines, the Surgery dept. can ensure that surgeons communicate their availability earlier and distribute their leave more evenly across the year.

Concept and Function

The Surgery dept. already sends out emails to surgeons requesting their upcoming availability for planning purposes. A short, standardized reminder can be added to these emails to:

- Emphasize the importance of meeting the submission deadline for availability;
- Encourage surgeons to plan vacation days early and spread them evenly throughout the year;
- Inform surgeons that delays in providing availability directly affect the Admission dept.'s ability to finalize the schedule.

This reminder can also be supported by discussing vacation planning and deadline compliance during quarterly/monthly Surgery dept. meetings (approximately 5–10 minutes). By embedding this reminder into existing communication, the intervention requires minimal extra effort while strengthening coordination between the Surgery dept., the Admission dept. and surgeons.

Expected Benefits

- Improved planning predictability: timely submission of availability allows the Admission dept. to proceed with scheduling without delay, improving planning accuracy.
- Optional extra OR utilization: a more even distribution of leave ensures that OR time can be used effectively throughout the year, even when other specialisms have reduced activity.

- Reduced end-of-year pressure: spreading leave more evenly prevents multiple surgeons from being absent simultaneously, maintaining a steady workflow.
- Efficient implementation: the reminder builds on existing communication, avoiding additional administrative tasks while promoting a proactive planning culture.

Implementation Considerations

To ensure this intervention is effective:

- Standardize communication: add a clear sentence to all availability emails from the Surgery dept. reminding surgeons of the submission deadline and encouraging them to plan their leave evenly.
- Quarterly review: discuss vacation planning and adherence to deadlines during quarterly team meetings to maintain awareness and accountability.
- Monitor compliance: track whether availability is submitted on time and evaluate the impact of delays on Admission dept. scheduling.

Discussion

Although most breast cancer surgeries are planned several weeks in advance, unforeseen situations can still occur that require faster scheduling. For example, a new patient may be diagnosed who needs to be operated on urgently, or chemotherapy may not have the desired effect, meaning that surgery must take place sooner than originally planned. In such cases, having up-to-date availability from surgeons and a well-distributed vacation schedule becomes essential.

These interventions, integrating reminders about vacation planning and reaching availability deadlines, help create the flexibility needed to respond effectively to unexpected cases. When availability information is current and surgeons are not simultaneously on leave, the hospital can make use of last-minute OR opportunities and reduce the likelihood of postponed surgeries.

Conclusion

Reminders about both vacation planning and deadlines for submitting availability to the Surgery dept. will help improve the Admission dept. to better plan surgeries in advance and on time. This intervention ensures that availability information is received more on time, preventing scheduling delays and enabling more efficient use of OR capacity. By spreading vacation days more evenly, the Surgery dept. can reduce end-of-year bottlenecks and strengthen overall scheduling stability.



08

Roadmap and its implementation

This chapter presents the roadmap that guides the transition from today's fragmented planning approach toward a future in which information, people, and processes are seamlessly connected. Derived from the insights gathered throughout the project, the roadmap structures the required developments into three horizons, each building on the previous one. It offers a clear direction for how technological tools, organisational structures, and cultural habits must evolve to enable a more reliable and patient-centered planning process at the RdGG.

8.1 Introduction to the Strategic Roadmap (2026–2030)

The previous chapters outlined design interventions aimed at improving collaboration, communication and planning for IBR surgeries at the RdGG. While these interventions address specific challenges in the current planning process, their long-term success depends on effective implementation. This chapter introduces a strategic roadmap that shows how the RdGG can realize these solutions between 2026 and 2030.

Purpose of the Roadmap

The roadmap provides a practical guide for all stakeholders involved in the planning process of IBR surgeries (and may also be of interest to other multidisciplinary teams). It shows how the hospital can transition from the current fragmented and largely manual planning situation to a transparent, efficient and data-informed system. It clarifies the order in which improvements should be taken, the effort required and the value each action creates.

How the Roadmap is Developed

The roadmap builds on insights from interviews, process mapping and an analysis of existing tensions and opportunities.

To structure a long-term perspective, the roadmap uses Simons's (2024) design roadmapping method, which aligns stakeholders around shared ambitions and maps out required actions along a clear timeline. This results in a series of realistic steps that support the RdGG's strategic ambitions to reach the future vision.

Three Horizons of Change

To make the transformation manageable, the roadmap is divided into three horizons. Each horizon contains concrete steps that progressively build toward a coordinated, data-driven planning system which promotes collaboration. These are, in broad terms, the themes of each horizon:

Horizon 1 (2026): Laying the foundation

Focusing on preparation, pilot projects and data collection.

Horizon 2 (2027–2028): Bringing the System to Life

Turning pilot insights into operational solutions, strengthening digital tools and aligning workflows across departments to ensure smooth integration.

Horizon 3 (2029–2030): Growing a connected future

Embedding the new processes into daily practice, optimizing performance and scaling successful approaches throughout the organization.

Each horizon builds on the previous one, making the change realistic and minimizing disruption to ongoing clinical work.

Alignment With RdGg Values

The roadmap aligns with the hospital's core values, particularly the emphasis on collaboration. As expressed on the website of the RdGG:

"Working together matters. It improves quality and patient experience and makes work more enjoyable for employees. Working together is not only more fun, it also helps you get further and achieve more."

RdGG (2025)

These values form the foundation for the roadmap, emphasizing that collaboration and innovation go hand in hand in shaping a sustainable and human-centered healthcare system.

Future Vision

The future vision is described below and will be realized through following the steps in the roadmap:

"By 2030, RdGG's the IBR planning process will be a fully integrated, data-informed and human-centered system in which staff, information and digital tools work seamlessly together. Planning IBR surgeries will be transparent, predictable and collaborative, enabling professionals to work efficiently, reducing administrative frustration and ensuring timely, coordinated, and continuous care for every patient."

This future vision describes a process in which all departments involved in planning IBR surgeries work together through shared information, clear responsibilities and easy-to-use digital tools. By 2030, the planning of these surgeries will no longer depend on fragmented communication or exclusively manual coordination, but will instead be supported by data-driven insights and transparent scheduling systems.

This enables professionals to plan proactively, reduces unnecessary administrative work and ensures that patients experience a smooth and predictable care pathway. The ultimate goal is to create a planning system that supports staff, strengthens collaboration and provides patients with timely, continuous and high-quality care.

Guide to the Following Chapters

The chapters that follow describe each intervention in detail, explaining:

- how it can be implemented in practice;
- which technical, organizational and cultural interventions are required;
- how it contributes to a coordinated long-term planning process.

Together, they translate the design interventions into a clear and actionable direction for RdGg management and the teams involved in planning IBR surgeries. This creates a concrete and sustainable improvement plan for the years ahead.

8.2 Trend Analysis

To understand how the proposed interventions fit within broader developments in healthcare, it is important to examine the societal and technological trends influencing surgical planning and hospital procedures. These trends show that the direction in which RdGG is moving, toward data-driven, collaborative and human-centered planning, aligns with wider changes in the healthcare landscape. The following overview highlights the most relevant sociocultural and technological trends shaping the transition toward a more transparent and efficient planning process.

Sociocultural Trends

Organisational Transparency and Cross-Department Collaboration

Healthcare organisations are increasingly expected to demonstrate transparent processes and clear communication across departments. Recent studies highlight that organisational transparency supports patient trust and facilitates collaboration between clinical and non-clinical staff (Alizadeh et al., 2025). For surgical planning, this trend supports interventions that foster collaboration between departments, reduce confusion and make planning more predictable.

Growing Workload Pressure and Efficient Workflows

The Dutch healthcare sector will continue to face high administrative pressure and an increasing shortage of personnel, which will increase the need for streamlined processes (Consultancy.nl, 2024). This calls for interventions that reduce administrative burdens and prevent frustrations among surgeons,

coordinators and planners in the area of scheduling. The goal is to be able to handle the workload with fewer people.

Decreasing Hierarchy and Shared Decision-Making

Recent studies show that traditional hierarchical structures in hospitals are gradually shifting toward flatter, team-based models, where decision-making is more evenly shared across professional groups (Essex, Hong & Skinner, 2023). This development encourages open dialogue, mutual respect and collaborative problem-solving between clinical and administrative staff. As hierarchy decreases, departments become more willing to share information, trust each other's expertise and take joint responsibility for efficient surgical planning. This cultural shift is an important foundation for smoother collaboration and more predictable scheduling outcomes.

Technological Trends

Integrated Digital Planning Platforms

Hospitals worldwide are adopting digital scheduling and coordination tools to replace manual planning and it improves operations management (Betancor et al., 2024). In addition, the RdGG is also increasingly digitizing its operations, such as making appointments via the online patient portal and video consultations (RdGG, 2024). However, these are primarily focused on making things easier for the patient. The implementation of online (planning) tools at the RdGG are in line with these trends and could reduce the administrative workload.

Data-Driven Decision-Making and AI-Assisted Forecasting

Recent literature shows that AI and machine learning are transforming the optimization of clinical and patient workflows in healthcare (Jansson et al., 2022). To remain an innovative and progressive hospital, the RdGG must keep up with trends in the use of AI and data analysis. Combined with the growing shortage of healthcare personnel, this is an ideal way to make predictions and avoid challenges.

Conclusion

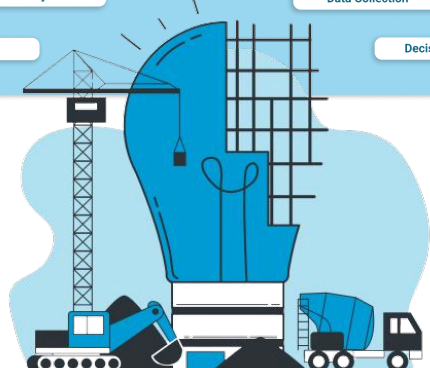
These trends demonstrate that the wider healthcare sector is moving toward a more transparent, collaborative and digitally supported way of working. These sociocultural and technological developments strongly align with the interventions proposed in this project. Organisational transparency, decreasing hierarchy and improved cross-department communication support the cultural changes needed for shared scheduling responsibility and smoother coordination between departments. At the same time, the rise of integrated digital planning tools, data-driven decision-making and AI-assisted forecasting, mirrors the technological direction of the roadmap.

Together, these trends confirm that the RdGG's transition toward a more predictable, efficient and patient-centered planning process is not only feasible but also consistent with the future of hospital care.





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Laying the Foundation

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Bringing the System to Life

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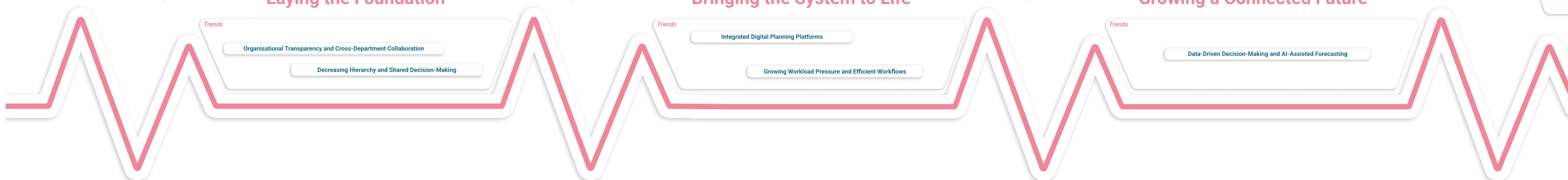
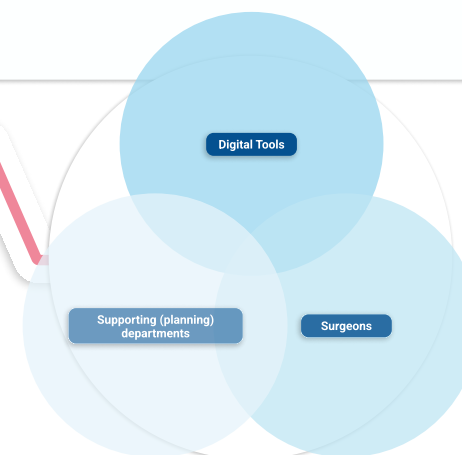
Growing a Connected Future

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Future Vision

"By 2030, the RdGG's IBR planning process will be a fully integrated, data-informed, and human-centered system in which staff, information and digital tools work seamlessly together. Planning IBR surgeries will be transparent, predictable and collaborative, enabling professionals to work efficiently, reducing administrative frustration, and ensuring timely, coordinated, and continuous care for every patient."

Collaboration Transparency Innovation



Strategic Interventions

Technology	<ul style="list-style-type: none"> Data-driven & AI Supported Planning Online planning tool (MedSpace) 	<ul style="list-style-type: none"> Search for partners Replace current planning tools 	<ul style="list-style-type: none"> Implement tool Evaluate impact
Organizational	<ul style="list-style-type: none"> Patient opt-in system Admission dept. → Access to surgeons' schedules Vacation reminders & availability 	<ul style="list-style-type: none"> add in intake Evaluate workload Maintain & evaluate 	<ul style="list-style-type: none"> Evaluate satisfaction Maintain access Maintain & evaluate
Culture	<ul style="list-style-type: none"> Rescheduling responsibility → Admission dept. Coordination: Surgery & surgical coordinators 	<ul style="list-style-type: none"> Maintain & evaluate Gather feedback Own Contribution (decision making) 	<ul style="list-style-type: none"> Integrate onboarding Embed in protocol

Actor Values

ICM	<ul style="list-style-type: none"> Structured data collection Direct schedule access Visibility of availability Fewer rescheduling emails Feel heard and seen by Surgery dept. Less administrative frustration Maintaining high satisfaction 	<ul style="list-style-type: none"> Reliable AI forecasting Predictable schedules Predictable DIEP/IBR caseload Less manual tracking Better forecasting insight Stable OR time Own Contribution (decision making) 	<ul style="list-style-type: none"> Hospital-wide planning stability Stable planning responsibility Long-term planning stability Stable multidisciplinary workflow Predictable workload Embedded collaboration culture Consistent scheduling reliability Maintaining high satisfaction
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Expected Outcomes

Transparency & Coordination
A more transparent and coordinated planning environment emerges. Choices are made regarding the implementation of digital and data-driven tools, responsibilities are clarified and accessible data is being gathered. Staff experience fewer misunderstandings, the Admission dept. gains independence through schedule access, and the first predictive insights and opt-in preferences are introduced into the planning workflow.

Transparency & Coordination
The new planning system becomes functional and reliable. Digital planning tool (MedSpace) is actively used, AI forecasting is introduced to influence planning decisions and collaboration between departments stabilises. Rescheduling becomes a faster and more consistent process and the workload becomes more predictable for planners, coordinators and surgeons.

Transparency & Coordination
The full planning ecosystem becomes embedded in daily hospital operations. Processes run smoothly with minimal email coordination related to planning, forecasting supports long-term capacity planning and the multidisciplinary IBR workflow is consistent and scalable. The organisation experiences fewer frustrations, higher planning stability and a fully integrated, human-centred system.



8.4 Implementation of the Roadmap

8.4.1 Integrating Data and AI for Improved Surgical Planning

This chapter describes how the RdGG could implement a data-driven and AI-supported planning approach built on a centralized data infrastructure. This technological direction connects directly to the solutions discussed in the previous section, including improved data collection and the use of AI to support more accurate planning of IBR procedures (including direct DIEPs).

The two components discussed in those chapters are interdependent: the data infrastructure ensures reliable, structured information, while the AI-supported planning process builds on this foundation to enable predictive and data-informed decision-making. Together, they form the technological and analytical backbone of a future-oriented operating room planning system.

Horizon 1 (2026): Foundation and Exploration

The first horizon focuses on understanding the current data landscape and exploring the feasibility of integrating data-driven methods into the planning workflow. At this stage, the aim is not yet to build a fully functioning tool, but rather to build knowledge, collect data and identify opportunities.

Key actions:

1) Conduct an exploratory study: To start this development responsibly and cost-effectively, the RdGG could collaborate with a graduate student or intern from a data science or technical background (for instance, TU Delft students with a background in computer science, applied mathematics, Technology,

Policy & Management). The goal of this study is to build a practical and evidence-based foundation for a future data-driven planning system. The student would:

- Map and evaluate existing data sources used for OR planning, such as HiX, Excel sheets and ICM capacity overviews.
- Identify data gaps and inconsistencies, f.e. how surgery durations, rescheduling or surgeon availability are currently registered.
- Explore the technical feasibility of connecting or exporting this data into a single environment (e.g., through Excel, SQL database, or Power BI).
- Perform an initial analysis of historical patterns in OR utilization, procedure frequency, waiting times, providing insight into what variables might predict scheduling bottlenecks.
- Assess the potential scope for AI or predictive modelling, such as forecasting expected patient inflow, frequency of IBR procedures (or even departmental capacity needs).
- Deliver concrete recommendations for data structure design, privacy considerations and potential next steps for developing a prototype.

The outcome of this exploratory phase should be a clear implementation plan for data collection and integration, showing what is realistically achievable with current systems and where additional tools or resources would be needed.

This low-risk and research-driven approach allows the RdGG to gain early insights into the potential value of AI for planning, without immediately investing in complex IT development.

2) Establish a cross-departmental Data Working Group (DWG) consisting of representatives from ICM, the Surgery & Plastic Surgery dept., the Admissions dept., IT and Day Coordinators (DayCo's already have Excel sheets listing every operation).

This group will define which datasets are required, determine data ownership and ensure that the information remains up to date. A graduate student or intern could support this process by mapping out the necessary datasets from each department.

To accurately predict the expected number of direct DIEPs in the coming years, the ICM should not only collect data but also analyze emerging trends. As these procedures were introduced at the RdGG for the first time this year, it is essential to systematically build and maintain a dataset that records all future cases performed within the hospital.

To enable data and AI analyses, relevant data must be provided by the RdGG. Therefore, it is essential to clarify what information is needed, who has access to it and who is responsible for maintaining accurate records.

3) Identify technological requirements such as dashboard software (where data is visually displayed), integration options with HiX and explore potential collaboration with external data specialists that could build the actual tool.

At the end of this phase, RdGG should have started with collecting interesting data and written a feasibility report that outlines how predictive analysis and AI tools could support the planning process in the future.

Horizon 2 (2027–2028): Development and Integration

In this phase, the focus shifts from data collection toward developing the actual digital planning tool and embedding it within the hospital's operational and financial strategy. The hospital should view this phase as a key moment to translate the exploratory findings into a tangible and future-oriented system.

Key actions:

- Make financial and strategic decisions about the long-term implementation. The hospital board should determine whether development will take place internally (e.g., with the IT department or external software engineers) or through collaboration with an external technology partner.
- Develop the first functional version of the planning tool, using the findings of the exploratory study as its foundation. This tool should enable data visualization, trend analysis and basic forecasting features to support the work of the ICM.

- Ensure alignment with hospital-wide digitalization goals. This intervention should be positioned as part of RdGG's broader move toward data-supported and AI-driven work processes. By doing so, the hospital follows national and international trends in healthcare, where predictive and data-based decision-making is increasingly embedded in daily operations.
- Involve end-users, like the ICM, in the testing process to guarantee usability and alignment with practical workflows.
- Evaluate performance and accuracy by running pilot tests and comparing the tool's predictions with real-world outcomes, ensuring the model's reliability before scaling further.

By the end of this phase, RdGG should have a tested and validated digital planning tool that is ready for broader implementation and supported by clear financial and technical governance.

Horizon 3 (2029–2030): *Implementation, Prediction and Continuous Improvement*

In this final horizon, the AI data-driven planning tool will be fully implemented within the organization and become a standard part of RdGG's operational and strategic decision-making. The focus shifts from testing and integration toward implementing, prediction and continuous refinement. By this stage, the tool will not only support the Mamma dept. but will be applied hospital-wide, supporting all surgical specialisms in their scheduling processes.

Key actions:

- Implement the planning tool into daily workflows so that the ICM and, consequently, the other planning departments involved, actively use it to guide routine scheduling and capacity allocation.
- Apply predictive modeling to IBR and direct DIEP surgeries, using historical data and trends to forecast demand and optimize scheduling far in advance, reducing last-minute changes and cancellations.
- Extend the predictive planning approach to other surgical specialisms and complex multidisciplinary procedures, enabling proactive adjustments to staffing and resources while improving coordination and capacity efficiency across all departments.
- Facilitate structured reflection and learning cycles, reviewing planning accuracy after each quarter/year to refine algorithms and improve predictive performance over time.

- Train the tool on information discussed during multidisciplinary meetings so that capacity discussions and forecasts are based on shared, data-driven insights rather than manual estimates.

By the end of this phase, the RdGG should have a fully operational, predictive planning environment that supports data-informed decision-making for IBR surgeries (including direct DIEPs) and possibly for more surgical specialisms. This environment enables real-time coordination, enhances OR planning and reduces frustration among the departments related to surgery planning.

Strategic factors

Successful long-term implementation depends on more than technical functionality. It requires financial resources, organizational culture that collects data for data-driven decision-making and continuous improvement.

Key factors include:

- Ongoing commitment from the hospital board and department heads to finance the tool and implement it hospital-wide.
- Cross-departmental collaboration between ICM, clinical teams and supporting departments (related to planning) to ensure consistent data quality and shared accountability.
- Regular evaluation cycles to strengthen digital competence and maintain staff engagement.

Transparent communication emphasizing that predictive tools are designed to support, not replace, human expertise, ensuring trust and responsible use of data across departments. The purpose of these tools are to enable better forecasting of future surgeries that will take place in the RdGG and to better prepare employees for this, so that they can provide the best possible care for patients.

8.4.2 Implementation of the online planning tool (Medspace)

This intervention focuses on implementing an online planning tool, such as Medspace, to provide all departments involved in surgical planning with a shared, real-time overview of OR capacity and surgeons' availability. At present, this information is distributed across multiple Excel sheets, emails and HiX, which leads to inefficiencies and frustrations. An integrated digital platform would centralize this information, increase transparency and support more effective coordination between the involved departments.

During the interviews, several staff members expressed a positive attitude toward Medspace, noting that such a system could significantly simplify their work and reduce the administrative workload. In addition to the findings from interviews with clinical staff, a meeting with the ICT Project Manager at RdGG provided further insights into the hospital's current ambitions regarding digital planning solutions (Project Manager ICT, personal communication, December 2025). During this conversation, it became clear that the ICT department is already in discussion with several providers to potentially implement an online planning tool. The main motivations for this initiative align closely with the challenges identified in this study.

First, the hospital aims to achieve greater uniformity in planning workflows, as different departments currently rely on separate and fragmented systems. Second, transparency was mentioned as a key driver: an integrated tool would give all stakeholders a shared, real-time overview of schedules, capacity and

availability, reducing the need for manual updates and repeated communication. Thirdly, the ICT Project Manager highlighted the need for an integrated planning tool that can schedule healthcare providers across multiple roles at the same time, such as supervision and OR/outpatient clinic, while also being able to register their hours within the same system (without declaring twice as many hours). At present, a staff member manually transfers hours from Excel sheets into a separate software system for declaring operational hours. This planning tool would eliminate this manual step and substantially reduce their workload.

These insights confirm the organisational relevance and feasibility of introducing an integrated online planning system and illustrate that the hospital is already taking steps consistent with the roadmap proposed in this thesis. The implementation steps discussed in this chapter have also been discussed with the ICT project manager. The alignment between the needs identified in this research and the direction pursued by the ICT department strengthens the potential for successful implementation.

Horizon 1 (2026): Exploration and Decision-Making

The first horizon focuses on evaluating the feasibility of implementing an online planning tool and preparing the hospital for adoption. The main goal is to decide whether the RdGG wants to invest in a commercial tool like Medspace or implement a similar tool.

Key actions:

- Explore system options with Medspace (or comparable planning tools): discuss wishes, functionalities, licence costs and integration requirements with HiX.
- Conduct a cost-benefit analysis to determine whether the advantages of purchasing an external tool outweigh the current challenges.
- There is an option to request a demo to introduce RdGG employees to Medspace.
- Organize demonstration sessions with end users to collectively introduce them to the usability and assess its alignment with current workflows.
- Engage IT and data protection officers early to evaluate data privacy and security requirements.
- Involve representatives from the Surgery & Plastic Surgery dept., Doctor's assistants, Surgeons and the Admissions dept. in making a joint decision on the procurement and implementation strategy.
- Present a business case to hospital management outlining the expected efficiency gains, user preferences and estimated costs.

By the end of 2026, RdGG should have made an informed decision on whether to adopt Medspace (or similar tool), supported by a clear implementation plan and funding approval.

Horizon 2 (2027–2028): Implementation and Integration

In this phase, the selected planning tool is implemented and integrated into RdGG's daily coordination and scheduling processes. The focus is on ensuring smooth technical deployment, user adoption and alignment with existing communication structures.

Key actions:

- Install and configure the tool in collaboration with the supplier (Medspace) and the IT department.
- Train all relevant users through short workshops and tutorials, focusing on navigation, data interpretation and workflow adjustments.
- It is optional to first start a pilot within the departments involved in planning the IBR surgeries to test functionality, followed by gradual expansion to other departments within the hospital.
- Replace manual Excel-based overviews with the online tool to ensure everyone works from the same real-time data.
- Collect structured feedback from users to refine settings, improve usability and address integration challenges.

By the end of 2028, the online planning tool should be fully operational and used actively across the involved departments, improving coordination and reducing administrative frustration.

Horizon 3 (2029–2030): Evaluation and Optimization

The final horizon focuses on evaluating whether the planning tool meets expectations and continues to deliver value. The emphasis is on continuous improvement and verifying that the system aligns with the hospital's strategic goals.

Key actions:

- Evaluate user satisfaction (less administrative frustration) and overall usability.
- Assess impact on efficiency, such as shorter planning lead times.
- Conduct annual reviews with involved departments whether additional functionalities are wanted. This could be communicated to the f.e. Medspace.
- Compare performance with other hospitals using similar systems to identify best practices and opportunities for refinement.

By 2030, RdGG should have a stable, well-integrated online planning system that supports daily scheduling and continuous collaboration across departments.

Comparable Tools to Consider

While Medspace is a widely known platform for hospital planning and coordination (some of the RdGG staff already worked with his tool in other hospitals), several other tools could be explored depending on integration needs and budget:

- Qventus
- Torin O.R. Manager
- Opmed.ai
- Workfast.ai

8.4.3 Implementation of a Patient Opt-In System for Flexible Surgical Scheduling

This intervention focuses on introducing a patient opt-in system that allows patients to indicate whether they allow another Oncological Surgeon to perform surgery on them if scheduling requires it. Currently, most patients are operated on by the surgeon who performed their intake consultation, which supports continuity of care but limits flexibility in the OR planning process. By offering patients the choice to opt-in, the RdGG can maintain patient-centered care while gaining additional flexibility to manage OR capacity more efficiently, especially in situations where schedules are full or need to be adjusted at short notice.

Horizon 1 (2026): Exploration and Policy Adjustment

The first horizon focuses on validating whether there is enough patient support for introducing an opt-in system and preparing policy adjustments accordingly.

Key actions:

- Conduct research among patients, f.e. through the periodic 'patient satisfaction survey', to determine how many would be willing to be operated on by another qualified surgeon.
- Conduct a survey among staff to assess whether most oncological surgeons agree to occasionally not operate on their own patients or to take over patients from colleagues.
- Analyze the results to ensure that the potential benefits do not negatively affect patient trust or perceived care quality.
- If a significant part of the patients are open to this option, the Quality & Safety Department should adjust the relevant hospital guidelines to facilitate this practice.

By the end of 2026, RdGG should have data-supported approval to introduce the patient opt-in policy and and wrote the revised planning guideline.

Horizon 2 (2027–2028): Implementation in Daily Practice

In this phase, the new approach becomes part of daily clinical practice. Surgeons begin to inform patients about this option during consultations and the patients preferences are put into HiX.

Key actions:

- Include the opt-in question in the standard surgical consultation: surgeons ask patients whether they agree to be operated on by another surgeon if required for scheduling reasons.
- Record the response directly in HiX, where it is clearly visible for the involved planners (give them a certain color/code).
- Ensure planning transparency: if a patient has not opted in, the RdGG will continue to make every effort to ensure they are operated on by their own surgeon.

By the end of 2028, the opt-in system should be fully integrated into patient consultations and the hospital's planning software.

Horizon 3 (2029–2030): Evaluation and Continuous Improvement

The final horizon focuses on evaluating whether the new approach has improved planning flexibility without reducing patient satisfaction.

Key actions:

- Include targeted questions in the annual patient satisfaction survey to assess perceptions of trust, continuity and overall satisfaction with surgical care and check if this has not decreased because of this intervention.
- Analyze staff satisfaction to determine whether the opt-in system led to improvements in scheduling efficiency or reduced administrative frustration.
- Adjust guidelines if needed, based on evaluation outcomes and patient feedback.

By 2030, RdGG should have confirmed whether the patient opt-in system provide advantages while maintaining patient satisfaction. Although the hospital will continue striving to have each patient operated on by their own surgeon, this policy change provides valuable flexibility and ensures that surgeries can continue smoothly even during high-demand periods.

8.4.4 Give the Admission dept. access to Surgeons' Schedules

This intervention focuses on improving collaboration and communication between the Oncological & Plastic Surgeons and the Admission dept. by granting the Admission dept. access to surgeons' schedules in HiX. Currently, much of the planning communication takes place via email, often leading to many unnecessary emails and frustration on both sides. By allowing the Admission dept. to directly view the availability of Oncological and Plastic Surgeons, they can plan more efficiently and reduce unnecessary coordination steps. This is an organizational improvement aimed at increasing transparency and reducing administrative workload.

Horizon 1 (2026): *Discuss and Access Implementation*

The first horizon focuses on creating mutual understanding between the departments and defining clear expectations before granting schedule access.

Key actions:

- Organize a joint meeting between the Admission dept., Oncological and Plastic Surgeons to discuss the purpose and practical implications of shared schedule access.
- Address concerns among surgeons about being monitored or evaluated based on their schedules. Emphasize that this access is purely intended to facilitate planning and improve communication.
- Establish clear agreements on what information the Admission dept. can view.

- Provide access in HiX for the Admission dept. to view the relevant surgeons' schedules.

By the end of 2026, the Admission dept. should have access to the surgeons' schedules, supported by shared agreements that clarify expectations.

Horizon 2 (2027–2028): *Evaluation of Collaboration and Efficiency*

In this phase, the focus is on evaluating whether this change effectively improves communication and reduces administrative frustration.

Key actions:

- Assess staff experience by scheduling a short meeting with the Admission dept., Oncological and Plastic Surgeons and to determine whether administrative workload and email volume have decreased.

By the end of 2028, RdGG should have validated the positive impact of shared schedule access on planning efficiency and collaboration between the Admission dept., Oncological and Plastic Surgeons.

Horizon 3 (2029–2030): *Maintenance and Continuous Improvement*

No major developments are expected in this horizon. The focus lies on maintaining the access structure and ensuring both departments continue to work transparently and cooperatively.

Key actions:

- Review the collaboration annually to confirm that the shared access remains mutually beneficial.

By 2030, the RdGG should have a stable and trusted system where the Admission dept. can independently view surgeon availability, reducing unnecessary communication and supporting a smoother, more predictable planning process.

8.4.5 Assigning Final Rescheduling Responsibility to the Admission Department and Limiting Surgeon Involvement in Rescheduling Emails

This intervention focuses on clearly defining the Admission dept. as the central point of coordination and responsibility for rescheduling surgeries. Currently, when a patient needs to be operated on earlier, the Admission dept. is often the first to know, as these changes are recorded in HiX by the surgeons. However, since the Admission dept. does not yet have direct access to the schedules of the Oncological and Plastic Surgeons, they must involve multiple parties to find a new date. This leads to long email discussions and unclear decision-making.

By giving the Admission dept. access to these schedules (as described in the previous chapter) and establishing them as the final coordinator for rescheduling decisions, planning can become faster, clearer and less administratively demanding. The Admission dept. will independently coordinate a new date with all relevant parties and keep surgeons out of the process until the final decision moment, when their approval is required. Once the surgeon agrees, the Admission dept. will directly update the schedule in HiX and finalize the rescheduling.

Horizon 1 (2026): Alignment and implementation

The first horizon focuses on aligning responsibilities and directly implementing this new structure.

Key actions:

- The Admissions dept. is ultimately responsible for proposing a new date to the surgeons, but they propose a date in consultation with the other parties involved.

- As soon as a surgeon indicates in HiX that the patient needs to be operated on at a different time, they can add that they want to be involved in finding a new date if they consider this important.
- Document this intervention (agreements) in a short, accessible procedure and distribute it to all relevant teams.
- Implement the new structure directly into daily workflows: the Admission dept. takes the lead on rescheduling decisions, while surgeons are only consulted when (medically) necessary.

By the end of 2026, RdGG should have a clear and functional workflow in which the Admission dept. takes ownership of rescheduling coordination and final submission of the new date to the surgeon for approval.

Horizon 2 (2027–2028): Evaluation and Adjustment

The second horizon focuses on evaluating whether the new approach has improved planning efficiency and reduced administrative workload.

Key actions:

- Evaluate the process by comparing the staff satisfaction related to rescheduling emails and average decision times before and after implementation.
- Collect feedback from both the Admission dept., Surgeons and other involved departments to assess whether the workflow feels clear, balanced and manageable.

- Considering the implementation of other interventions, such as the online planning tool MedSpace, the number of rescheduling-related emails is expected to decrease. This intervention may further reduce frustration among surgeons involved in patient rescheduling.

By the end of 2028, the new process should be stable and efficient, with less administrative frustration among surgeons and where the Admission dept. responsible for rescheduling.

Horizon 3 (2029–2030): Evaluation and Maintenance

No major developments are required in this phase. The focus lies on maintaining clarity, ensuring that all staff are familiar to the new structure and confirm that the intended improvements are sustained.

Key actions:

- Keep evaluating staff satisfaction.
- Integrate the procedure into onboarding materials for both administrative and surgical staff.

By 2030, RdGG should have a stable and efficient scheduling structure in which the Admissions dept. takes ownership of rescheduling coordination and surgeons are involved only when necessary. This approach should lead to a reduction in planning-related emails sent to surgeons.

8.4.6 Strengthening Coordination Between the Surgery Department and the Surgical Coordinator

This intervention focuses on improving the coordination and trust between the Surgery dept. and the Surgical Coordinators. Interviews revealed that, although both groups share the common goal of establishing an efficient and realistic surgical schedule, the Surgery dept. sometimes experiences frustration and feels mistrusted by the Surgical Coordinators. They also feel that their work is occasionally undervalued or frequently changed by the Surgical Coordinators. To address this, the intervention proposes a structured communication routine, where both parties regularly check in about the planning progress and possible upcoming changes.

By encouraging open, predictable communication, this intervention aims to restore mutual trust, ensure alignment in scheduling activities and create a more positive working dynamic.

Horizon 1 (2026): Implementation of Regular Check-ins and Communication Agreements

The first horizon focuses on introducing a structured approach of communication and defining clear expectations for both the Surgery dept. and the Surgical Coordinators.

Key actions:

- Establish a fixed routine for short check-ins. F.e., every Monday morning, the Surgery dept. checks the schedule and upcoming changes with surgical coordinators via email.

- Determine a simple and efficient format for the check-ins, such as a short standardized email exchange.
- Discuss mutual expectations:
 - The Surgery dept. takes the initiative in asking for updates and clarifications.
 - The Surgical Coordinators transparently share relevant changes or potential planning issues.
- Keep communication focused: review only essential topics such as new surgery requests, surgeon schedule changes or upcoming capacity conflicts.
- Monitor the collaboration climate during the first months to ensure both parties perceive the check-ins as constructive and balanced.

By the end of 2026, RdGG should have a consistent communication approach that helps prevent misunderstandings and strengthens the sense of shared ownership over the planning process.

Horizon 2 (2027–2028): Evaluation

Once the check-in routine is established, the next phase focuses on evaluating its impact and addressing any remaining communication barriers.

Key actions:

- Evaluate the effectiveness of the check-ins after several months, focusing on whether they reduce frustration and mistrust.
- Gather feedback from both surgeons and coordinators to understand if the current method of communication is desirable.

- If deeper cultural or communication challenges still exist, involve professional support such as coaching or a team training on communication and collaboration (e.g., TeAMZ training/Consultancy training).
- Encourage constructive feedback during communication between the two parties.

By the end of 2028, RdGG should have an improved collaboration culture, with fewer misunderstandings and higher trust between both sides.

Horizon 3 (2029–2030): Continuous Improvement

In the final horizon, the aim is to embed this strengthened collaboration into RdGG's daily operations so that it continues regardless of personnel changes.

Key actions:

- Include the check-in routine in onboarding materials for new staff to maintain continuity.
- Conduct annual evaluations of communication and teamwork between the Surgery dept. and Surgical Coordinators to identify potential improvements/challenges.

By 2030, the RdGG should have an established and constructive communication culture, where regular coordination between the Surgery dept. and Surgical Coordinators is a natural and smooth part of the planning process.

Strategic factors

- Staff from both departments should emphasize the importance of open communication and trust.
- Commitment from both parties to maintain consistency in check-ins and follow through on agreements.
- Optional professional facilitation or coaching, if cultural or interpersonal challenges persist.
- Recognition and appreciation of both roles as essential contributors to efficient and high-quality surgical planning.

8.4.7 Integrating Vacation Planning Reminders & Enforcing Availability Deadlines

This intervention focuses on improving the timeliness and predictability of the surgical planning process by sending regular reminders to surgeons about upcoming availability deadlines and encouraging them to spread their vacation days more evenly throughout the year. Currently, delays in submitting availability frequently cause planning bottlenecks for the Surgery and Admission dept., resulting in unnecessary stress and frustration among staff. By introducing a structured reminder system and emphasizing the collective importance of timely communication, RdGG can ensure that the planning process runs more smoothly for all departments involved.

Horizon 1 (2026): Implementation and Awareness

The first and only horizon focuses on direct implementation of reminders and creating awareness among surgeons about their responsibility in providing availability on time.

Key actions:

- Send automated reminders to surgeons through Outlook a week before each deadline.
- Include clear communication in the reminders explaining that timely submission is essential for the Admission and Surgery dept. to plan effectively.
- Highlight the importance of balanced vacation planning, reminding surgeons to spread their days off evenly across the year to prevent capacity shortages during specific months.

- Encourage open dialogue between the Surgery dept. and Oncological Surgeons to resolve scheduling questions early and prevent last-minute changes.

No additional steps are required in Horizons 2 and 3. However, it is essential that Oncological Surgeons consistently adhere to the availability deadlines set by the Surgery dept. If delays in submission continue, RdGG management should step in to remind surgeons that late communication disrupts the work of others and that submitting availability on time helps prevent frustration across departments including themselves.

By the end of 2026, RdGG should have a clear and functioning reminder system, with improved awareness among surgeons about the impact of their availability on the overall planning process.

8.5.8 Key Considerations for Implementation

The success of the proposed interventions depends not only on the quality of each individual solution but also on how they are implemented within the organization. Although most of the proposed measures are realistic and feasible within the current structure of the RdGG, their effectiveness will depend on the commitment, cross-departmental collaboration and the hospital's ability to adapt to new ways of working. This chapter highlights the main aspects that require extra attention during the implementation phase of the strategic roadmap.

Shared Responsibility and Communication

Each intervention impacts multiple departments involved in planning IBR surgeries and some may even affect other departments within the hospital. To ensure progress, these groups should take joint responsibility for the interventions that involve them. When changes are introduced, (some of) the departments should meet briefly to confirm mutual expectations and discuss how each intervention will work in daily practice. A clear division of roles promotes consistent implementation across all areas but also requires an open and cooperative attitude from all staff members.

Trust the Process

Adapting existing working methods can initially cause friction and give the impression of increased workload. However, it is important to recognize that these adjustments are intended to improve efficiency and reduce frustration in the long-term.

Digital and Operational Readiness

Some interventions depend on access to intranet (secured internet for hospital usage). Before implementation, IT should verify that these systems can handle new software and ensure that staff members know how to open these programs. Any changes should integrate smoothly into existing workflows to avoid extra administrative work.

Monitoring Progress

After implementation, each department should evaluate whether the intervention achieved the intended results, such as fewer rescheduling emails, faster decisions, smoother collaboration and less frustration. Short evaluation moments every few months allow quick adjustments and continuous learning across departments.

Potential Risks

Challenges may arise if responsibilities remain unclear or staff members are hesitant to change routines. These risks can be minimized by documenting agreements clearly, keeping communication open and introducing interventions in small, manageable steps.

Conclusion

Successful implementation requires structure, collaboration and continuous attention from the departments directly involved in surgical planning. By assigning clear roles, maintaining open communication and regularly evaluating progress, RdGG can ensure that these interventions lead to a more coordinated, transparent and efficient planning process of IBR surgeries.

8.5 Future Planning Scenario: A Fully Integrated IBR Planning Process at RdGG (2030)

1. Early Signal and Demand Forecasting (ICM)

The process begins long before a patient enters the OR.

- The ICM receives data how long the procedures took (via HiX), how many procedures took place (Excel & HiX) and which different types of procedures.
- A data-driven forecasting model predicts the expected volume of:
 - IBR procedures (including direct DIEPs)
 - Breast conserving surgery
 - Other procedures (of other specialisms)
- The model uses historical data, number of referrals, surgeon productivity, seasonal patterns and trends (the increase in the number of women diagnosed with breast cancer, any growing demand for direct DIEPs etc.).

Outcome:

The ICM provides an evidence based basic schedule, highlighting expected peaks, required OR times and recommendations for upcoming planning periods. An example of a recommendation could be that the RdGG should not perform more than 2-3 direct DIEPs per month in order to be able to meet the demand for all breast cancer cases. Surgical departments receive these insights proactively from the ICM.

2. Surgeons Provide Timely Availability (Surgery dept. + Surgical Coordinator)

Before each new planning cycle:

- Surgeons receive automatic reminders to submit:
 - Their availability (incl. night shifts)

- Planned days off (vacation, congress, etc.)

- This allows the Surgery dept. to process availability quicker in a schedule.
- The Surgery dept. is trying to raise awareness about spreading vacation days (for surgeons) evenly throughout the year to prevent capacity shortages at the end of the year.
- The Surgical Coordinator receives the availability of the surgeons and distributes them among Medspace. He will have to make fewer adjustments later on, as the ICM's predictions are much more accurate.

Outcome:

The system actively attempts to determine the availability of surgeons and ensures a better distribution of their vacation days throughout the year.

3. Patient Intake & Opt-In (Surgeons)

During the consultation:

- The oncological surgeon discusses treatment options and expected timelines.
- The patient is asked whether they are open to being operated on by another qualified surgeon from the breast team if the schedule requires it.
- This choice is recorded in HiX and visible to all planners.

Outcome:

A group of flexible patients results in less schedule changes for surgeons, reducing unnecessary emails, while others can still indicate their preference to be operated on by their own surgeon.

4. Initial Scheduling in the Planning Tool (Admission dept. + Bureau Opname + Secretariats)

Using the online planning tool (Medspace):

- The admissions department has direct access to all surgeons' schedules and can view any changes immediately.
- Medspace can also suggest these moments directly to them so that they don't have to search for it themselves. The planning tool automatically suggests optimal dates based on:
 - Surgeon availability
 - Forecasted IBR (direct DIEPs) volumes
 - OR utilization
 - Patient preferences (including opt-in flexibility)

Outcome:

A draft planning schedule is generated more quickly and with fewer manual actions.

5. Weekly Coordination Between Surgery dept. and Surgical Coordinators

- Since changes to the schedule can always occur, the Surgery dept. contacts the Surgical Coordinator at the beginning of the week via a short email to be informed of any changes.
- Together they review:
 - Due to certain weather conditions, another specialty has to operate more. Other specialties have to sacrifice time and/or shift their schedules.
 - Special circumstances (e.g., chemo responsiveness, urgent cases)

Outcome:

Less surprises and misalignment. The Surgery dept. is actively in charge of the schedule, and Surgical Coordinators feel heard and seen.

6. Final Scheduling Authority (Admission Department)

- When the Surgeons are scheduled and a surgeon requested surgery for a patient, the Admission dept. will schedule the surgery at a suitable timeslot.
- The Oncological Doctor's Assistant then prints a schedule for the patient, listing all the appointments she needs to attend until the moment of surgery.

Outcome:

Because the entire scheduling process is faster, the patient can receive her schedule up to the date of surgery sooner.

7. Rescheduling (When Needed)

If a surgery needs to be rescheduled (f.e., due to an unexpected response to chemotherapy):

- The Admission dept. receives the trigger (HiX).
- They immediately check availability through HiX (since they have access to the surgeons agenda) and Medspace.
- If a suitable time cannot be found immediately, they coordinate with Surgery dept., Plastic Surgery dept. and Doctor's Assistants, and try to find a new possible surgery date without the involvement of surgeons yet.

- Once they have found a suitable moment, they will present this to the surgeon.
- Surgeons are involved only at the final approval moment:
 - Surgeon receives the proposed date.
 - They approve with one click in HiX (or Medspace).
- If no suitable date can be found without too much rearranging or surgeons having to give up time in the OR, and the patient has indicated that they are open being operated on by another doctor, the decision can be made to refer the patient to another Oncological Surgeon.

Outcome:

Rescheduling becomes a fast, clear administrative procedure instead of a multi-thread email discussion.

8. Continuous Monitoring and Proactive Adjustment (ICM + Admission dept. + Coordinators)

Throughout the planning cycle:

- ICM monitors OR occupancy, predicted vs. actual caseload and deviations from Medspace, HiX and Excelsheets made by f.e. the DayCo's.
- Surgery and Admission dept. check real-time updates on schedule changes.
- The system suggests the best weeks to schedule additional combi-days (to perform multiple IBR).

Outcome:

Planning becomes proactive, not reactive.

9. Day of Surgeon

- Surgeons can focus more on their own task, namely treating patients.
- Surgeons indicate their availability in advance and are only included in planning processes when necessary.
- The patient is assisted by a surgeon with less underlying frustration.

Outcome:

The right patient receives the right care at the right time, with the planning process taking place efficiently and collaboratively in the background.

How the Future RdGG Planning Process Feels (Summary)

For Staff

- Fewer emails
- Clear roles
- Predictable schedules
- Better communication
- Less frustration
- Better anticipation of workload

For the Organisation

- Higher OR efficiency
- Better long-term capacity planning
- Strong data infrastructure
- Scalable planning process

For Patients

- positive experience with hospital staff
- Own contribution
- Maintaining high satisfaction

8.6 Impact Assessment of the Proposed Interventions

The interventions presented in this project form a comprehensive package to improve the planning and coordination of IBR surgeries at the RdGG. While the roadmap outlines a long-term strategy in which all interventions complement each other, it is possible that the RdGG may choose to implement only certain components based on feasibility, available capacity or strategic priorities.

This chapter provides an impact overview of each intervention. It shows what value each solution adds individually, where the impact is strongest and how the interventions relate to one another. The purpose is to support informed decision-making: helping the hospital determine which interventions to prioritise, even if not all are implemented simultaneously.

Impact Categories

Each intervention has been evaluated on three dimensions:

1. Operational Impact: how much does it improve daily coordination, scheduling and workload?
2. Cultural Impact: how much does it strengthen trust, collaboration and communication between professionals?
3. Strategic Impact: how much does it contribute to long-term predictability, digitalisation and capacity management?

Intervention-by-Intervention Impact Overview

1. Data-Driven Planning Process

Impact if implemented:

- Creates long-term insight into surgical demand and OR capacity
- Enables proactive planning rather than reactive scheduling
- Reduces uncertainty for all professionals involved

Impact if not implemented:

- Predictions will be less accurate, resulting in a later redistribution of OR time.
- Predicting OR time per subspecialism and specific procedure is difficult and will require more staff members, which ultimately also costs money to perform better analysis
- Little insight into capacity shortages or expected overload

When to choose:

- If RdGG wants long-term predictability and better OR allocation
- If leadership values data-supported decision-making

2. AI Forecasting for Direct DIEPs

Impact if implemented:

- Helps anticipate a growing and clinically complex type of surgery
- Supports more accurate OR capacity prediction and surgeon availability
- Reduces frustration caused by other IBR procedures that need to be rescheduled due to (unexpected) direct DIEPs

Impact if not implemented:

- The demand for direct DIEPs remains difficult to predict, creating uncertainty how many procedures will be performed and how much time doctors will spend on them.
- Planning stays more reactive, especially for multidisciplinary cases, rather than predictive

When to choose:

- If DIEP volume increases or becomes structurally relevant to planning
- If RdGG already invests in the broader data-driven system

3. Implementation of an Online Planning Tool like Medspace

Impact if implemented:

- Centralised, real-time overview of surgeon availability, OR capacity, sudden changes in planning and proposed scheduling options.
- Considerable reduction in email traffic
- Faster decision-making

Impact if not implemented:

- Information remains scattered across Excel sheets, HiX and emails
- Communication inefficiencies persist
- Planning remains fragile and fragmented

When to choose:

- If the hospital wants a fast, visible improvement in daily planning
- If reducing frustration and workload is a priority

4. Patient Opt-In System

Impact if implemented:

- Increased flexibility in scheduling

Impact if not implemented:

- Patients are only operated on by their “own surgeon”. It remains a challenge to schedule a patient, the Oncological and Plastic Surgeon at the same time, especially while rescheduling a procedure.

When to choose:

- To reduce frustration among the planning departments by occasionally allowing a surgery to be performed by another Oncological Surgeon.

5. Access to Surgeons' Schedules for the Admission Department

Impact if implemented:

- Immediate visibility of surgeon availability
- Faster rescheduling process
- Fewer emails between planning related departments
- Less frustration among surgeons

Impact if not implemented:

- The admissions dept. continues to send unnecessary emails to check availability
- Not progress in the rescheduling process

When to choose:

- If the hospital wants quick, practical improvement with low technical complexity

6. Rescheduling Responsibility Assigned to Admission Department

Impact if implemented:

- Clear ownership reduces uncertainty in decision making
- Surgeons only approve final decisions which results in less administrative load (less frustration)
- Rescheduling becomes faster and less chaotic

Impact if not implemented:

- Confusion about responsibility continues
- Emails related to rescheduling a surgery remains a cause of frustration for the surgeons and their assistants.
- The parties involved feel less obliged to respond, quickly as no one knows who is ultimately responsible

When to choose:

- If the hospital wants to reduce the number of emails sent, minimize frustration and create a more efficient rescheduling process

7. Coordination Structure Between Surgery dept. & Surgical Coordinators

Impact if implemented:

- Fewer planning surprises caused by misalignment
- Improved trust and collaboration between these departments
- Realign the professional hierarchy

Impact if not implemented:

- Communication remains fragmented
- Ongoing friction affects working atmosphere

When to choose:

- If RdGG wants to strengthen teamwork and reduce interdepartmental tensions

8. Vacation Planning Reminders & Deadline Enforcement

Impact if implemented:

- Availability is more often delivered on time which improves the rest of the planning process
- Better distribution of surgeons' vacation days throughout the year

Impact if not implemented:

- Delayed communication of availability also slows down other departments
- Last-minute planning and frustration remain

When to choose:

- If the hospital seeks low-effort improvement that would positively impact long-term planning

09

Evaluation of interventions

This chapter outlines qualitative evaluation criteria that help assess whether the proposed interventions improved the surgical planning process at the RdGG. Rather than using numerical targets, these criteria offer guiding questions that teams can reflect on during regular meetings to determine whether collaboration, clarity and workflow experiences have improved (in 2030).

Evaluation Criteria

To understand whether the proposed interventions contribute to a more predictable, collaborative, and human-centered surgical planning process, several evaluative questions can serve as a guide for future reflection within the RdGG. These criteria emphasize indicators that can be assessed over time during multidisciplinary meetings, evaluations or randomly when needed. This allows the RdGG to check whether the planning process is running more smoothly, is less stressful, and better meets the needs of the hospital.

1. Experience of Planning and Collaboration

A key consideration is whether the frustrations surrounding the current planning process decrease. During multidisciplinary meetings, the team can reflect on whether the workflow feels calmer, less chaotic and more manageable. Questions such as “Do surgeons and other related departments feel less frustration during the scheduling of IBR procedures?” or “Does the planning process feel more controlled rather than reactive?” can help determine whether the process is moving toward a calmer and more predictable workflow.

2. Clarity of Roles and Responsibilities

One of the challenges identified in the current process is the unclear division of responsibilities, especially in rescheduling situations. A practical evaluation point is whether it has become clearer who takes the lead in different phases of the planning process. This includes assessing whether decision-making lines are better defined, whether staff feel confident about their own role and whether fewer moments of confusion or duplicated efforts occur.

3. Communication Quality and Coordination

This focuses specifically on communication: how information is exchanged between departments and how efficiently decisions are coordinated. The question here is whether the burden of communication has been reduced. During coordination meetings, teams can evaluate whether there has been a noticeable decrease in the number of emails, repeated clarifications, or parallel conversations needed to make a planning decision. This is less about the emotional experience of planning and more about whether the structure and channels of communication have become clearer, more organized, and more efficient.

4. Practical Support and Enablement for Healthcare Professionals

Another relevant consideration is whether the professionals involved in the planning process feel supported by the tools and systems surrounding them and whether these tools actually function well in daily practice. This includes reflecting on whether new workflows or digital solutions genuinely reduce administrative pressure, make information easier to access and allow staff to focus more on patient care.

At the same time, it is important to evaluate the practical integration of these tools: do they fit logically into existing routines, work reliably and prevent double work or technical friction? Guiding questions may include: “Do these tools make my work easier rather than more complicated?” and “Does the system integrate smoothly with our current workflow?” Together, these reflections help determine whether

both the support for professionals and the technical integration of tools contribute to a more effective working environment.

5. Patient Understanding, Confidence and Emotional Progression

Since the proposed interventions do not fundamentally alter the patient journey itself, except that patients may occasionally be operated on by a different surgeon if they agreed to that, this criterion focuses on whether such adjustments are experienced as acceptable and transparent. During evaluations (f.e. patient satisfaction survey), the team can reflect on whether patients feel well informed about the reason for a surgeon change, whether they were comfortable with this change and whether their sense of continuity and trust in the care remains intact.

Conclusion

These criteria are meant to guide reflection and learning, not to set strict numerical targets. By discussing these questions regularly in multidisciplinary meetings, team moments or “roadmap check-ins”, the RdGG can keep track of whether the planning process is becoming smoother, more collaborative and supportive for both patients and staff.

10

Lessons Beyond the RdGG

This chapter outlines how the insights from this study apply beyond the IBR process and offer value in wider hospital and cross-sector contexts.

Hospital-Wide and Cross-Sector Insights

Although this study focuses on improving the planning of IBR surgeries at the RdGG, the underlying mechanisms that shape coordination, communication and predictability extend far beyond this single hospital process. Many of the challenges uncovered in this research, such as fragmented information flows, limited ownership of tasks and insufficient cross-department visibility, are not unique to healthcare. By zooming out, this chapter explores how insights from the RdGG case can inform broader learning within the hospital and can offer valuable lessons for other sectors that also work in multi-disciplinary environments.

Broader Relevance Within the Hospital

While the main scope of this project concerns the planning of IBR surgeries, the patterns identified in this workflow have clear relevance for many other hospital processes. Any service or process that depends on multiple professionals encounters similar coordination challenges. Several findings from this study can therefore be applied hospital wide.

One important lesson is that predictability improves when data is gathered in one place and when responsibilities are clearly assigned. Another lesson is that short, structured and recurring communication moments help reduce misunderstandings and increase trust between departments. A third insight is that shared visibility of schedules and capacity prevents delays, confusion and last minute adjustments. These themes indicate that the needs identified in this project reflect broader organisational patterns, not just issues only related to IBR surgeries.

As a result, the roadmap can serve as a useful reference for other departments aiming to improve multidisciplinary coordination and reduce (planning) uncertainty.

Relevance Beyond Healthcare

The structural challenges identified in this study also resemble issues found in sectors outside healthcare. Many other fields operate under similar conditions in which teams depend heavily on one another, operate under time pressure and must make decisions based on incomplete or fragmented information. Examples include aviation control, military operational planning and logistics. In all of these environments, teams work with complex information, rely on procedures and predictions and often need to coordinate actions closely to ensure safety and efficiency.

The interventions proposed in this roadmap, such as improving transparency between departments, using predictive analytics, establishing consistent coordination routines and implementing digital tools that reduce the need for unplanned communication, align with successful practices in these sectors. At the same time, these sectors can learn from healthcare, particularly in terms of teamwork and completing the task at hand as effectively as possible. By comparing these sectors, this study shows that coordination problems are common in many complex environments and that solutions developed in healthcare can also be useful in other fields.

Conclusion

Zooming out shows that the lessons derived from the RdGG case extend well beyond the immediate context of IBR planning. The findings provide useful insights for other hospital departments and are also relevant to coordination challenges in sectors such as aviation, logistics, the military and emergency response. By connecting local improvements at the RdGG to this wider organisational landscape, the roadmap gains broader strategic significance. It demonstrates that clear roles, shared information structures, predictable communication habits and collaborative decision making form essential principles for any organisation that operates in a complex and multidisciplinary environment.

These insights confirm that the value of this research is not only limited to the specific IBR planning process. The study contributes to a wider understanding of how organisations can improve coordination, reduce uncertainty and enhance performance across different contexts.



11

Conclusion

This chapter provides a brief overview of the topics covered in this thesis. It outlines the focus of the research, the chosen approach, and the key insights that emerged.

Conclusion

The aim of this research was to enhance both patient and healthcare worker experiences within the breast cancer surgical pathway at the RdGG by identifying emotional, communicative and logistical challenges and by exploring opportunities to improve the surgical process. To achieve this, an extensive human centered design study was carried out, combining literature review, walk along observations, semi structured interviews, thematic analysis and patient/caretaker journey mapping. These methods enabled a deep understanding of the experiences, frustrations and needs of both patients and staff, while at the same time revealing systemic tensions within the organisation.

The findings demonstrated that although patients value the empathy, expertise and accessibility of caregivers at the RdGG, they also encounter moments of emotional strain, information overload and uncertainty within the current pathway. For healthcare professionals, the most pressing issue concerns the IBR planning process, which is characterized by unpredictable surgery durations, shifting agendas and fragmented coordination across departments. This confirmed that a more structured, transparent and data driven planning approach is needed.

Focusing on the IBR process was essential because it represents the point where multidisciplinary collaboration is intensive and where misalignment has a significant impact on the well-being and processes of the organization, which can ultimately also have consequences for patient care. Visualising the IBR planning process through system mapping,

SEIPS analysis and journey mapping not only clarified hidden complexities but also helped the RdGG gain new insights into dependencies, bottlenecks and opportunities for improvement.

Based on these insights, a set of interventions was proposed across three domains: organisational, cultural and technological. These include improving interdepartmental coordination, clarifying scheduling responsibilities, strengthening communication routines, integrating digital tools and developing predictive planning and online scheduling support. All proposed interventions were then incorporated into a strategic roadmap for the period from 2026 to 2030, which outlines a phased transformation for the RdGG toward a more integrated, efficient and human centered IBR planning ecosystem.

Although the findings and recommendations are grounded in the context of the breast cancer pathway at the RdGG, their relevance extends beyond this single setting. Many other multidisciplinary healthcare environments, and even sectors outside healthcare that depend on closely coordinated and high pressure teamwork, face similar challenges related to communication, scheduling complexity and emotional load. The insights generated in this thesis can therefore contribute to improvements in a broader range of collaborative and multidimensional service systems.

In conclusion, this study provides the RdGG with insight into their planning processes, revealing their challenges and opportunities. Together with the interventions proposed in the roadmap, this will contribute to a smooth, collaborative, and data-driven planning process.

The next page features a one-pager (see Appendix D for the Dutch version) which provides a concise and clear overview of the insights, interventions, and steps to be taken by the RdGG to reach the future vision described in the Strategic Roadmap (2026 - 2030).



Future-proofing the IBR Planning Process at the RdGG

From Fragmented Coordination to Connected Teamwork

1. The Current Challenge

The current IBR planning process suffers from unclear responsibilities and poor coordination, leading to inefficiencies and last-minute changes.

Although patient satisfaction is high, the internal IBR planning process is frustrating and fragmented.

Key Issues:

- Lack of insight into reliable data which can be used for forecasting.
- Fragmented planning tools and heavy reliance on manual coordination.
- Limited visibility of surgeons' agendas for the Admission Department.
- Unclear ownership of rescheduling leading to delays and confusion.
- Misalignment and weak coordination between Surgery and the Surgical Coordinator.
- Low patient flexibility resulting in last-minute cancellations or limited planning options.
- Late communication of surgeon absences causing disruptions in the schedule.



2. The Vision

"By 2030, the RdGG's IBR planning process will be a fully integrated, data-informed, and human-centered system in which staff, information and digital tools work seamlessly together.

Planning IBR surgeries will be transparent, predictable and collaborative, enabling professionals to work efficiently, reducing administrative frustration, and ensuring timely, coordinated, and continuous care for every patient."

4. Strategic Roadmap (2026 - 2030)

Horizon 1

Laying the foundation

- Collect data and map planning bottlenecks (Intervention 1)
- Explore feasibility of digital tools and AI forecasting (1,2)
- Grant the Admission Department visibility of schedules (3)
- Define clear ownership and responsibilities (4,5)
- Align departments on shared goals and communication routines (5)
- Validate patient willingness for opt-in flexibility (6)
- Introduce reminders and clarify availability expectations (7)

Horizon 2

Bringin the System to Life

- Build and integrate planning tools into workflows (1,2)
- Replace manual overviews with shared digital tools (2)
- Train staff and test new systems or routines (2,5)
- Evaluate early impact on efficiency and communication (3,4,5)
- Adjust policies and refine collaboration practices (4,5)
- Pilot opt-in system in consultations (6)

Horizon 3

Growing a Connected Future

- Use predictive modelling for long-term scheduling (1)
- Fully embed planning tools and new routines (1,2)
- Expand improvements to other surgical specialisms (1,2)
- Continuously monitor performance and adjust workflows (2,4,5,7)
- Evaluate patient and staff satisfaction (3,4,6)
- Maintain clear communication structures across departments (5)

3. Strategic Interventions



Technological Interventions

1. Integrating data and AI for improved surgical planning
2. Implementation of an online planning tool (e.g., Medspace)



Organisational Interventions

3. Giving the Admission Department access to surgeons' schedules
4. Assigning final rescheduling responsibility to the Admission dept.
5. Strengthening coordination between the Surgery Department and the Surgical Coordinators



Cultural Interventions

6. Implementing a patient opt-in system for flexible surgical (re)scheduling
7. Integrating vacation planning reminders and enforcing availability deadlines



12

Reflection

This reflection provides an overview of my personal and professional development throughout my graduation project at the Reinier de Graaf Gasthuis. It highlights the most important lessons I learned, the challenges I encountered and the ways in which this project has shaped my skills and perspective as a designer.

Reflection

Looking back on my graduation project, I gained experience in working within a complex healthcare environment, but also about my development as a designer. During my time at the RdGG, I quickly noticed how strong the sense of teamwork is. The working atmosphere felt genuinely collaborative, with everyone sharing the same goal: improving patients' health and providing the best possible care. I truly appreciated how open and willing all staff members were to work with me, even though their schedules were extremely full.

Throughout the project, I became increasingly aware of how complex hospital processes can be. Many workflows have been in place for years, and understanding the underlying reasons for certain challenges often required me to look beyond the surface and ask critical questions. Reaching the right people also demanded careful planning, as surgeons' agendas are really tight and appointments need to be scheduled well in advance.

One of the most demanding aspects of the project was conducting the thematic analysis in NVivo. It required far more time than I expected, as I had to walk through all the interviews to code them properly. However, this process helped me gain deeper insight into the experiences and needs of both patients and healthcare professionals. Mapping the current planning process was also more complex than anticipated. There were many more stakeholders involved than I initially realized, and the issues turned out to be spread across several layers of the organization.

At the same time, I really enjoyed engaging with so many different people. Speaking with such a wide range of individuals gave me valuable perspectives, and being allowed to observe an IBR surgery left a strong impression on me and enriched my understanding of the clinical context.

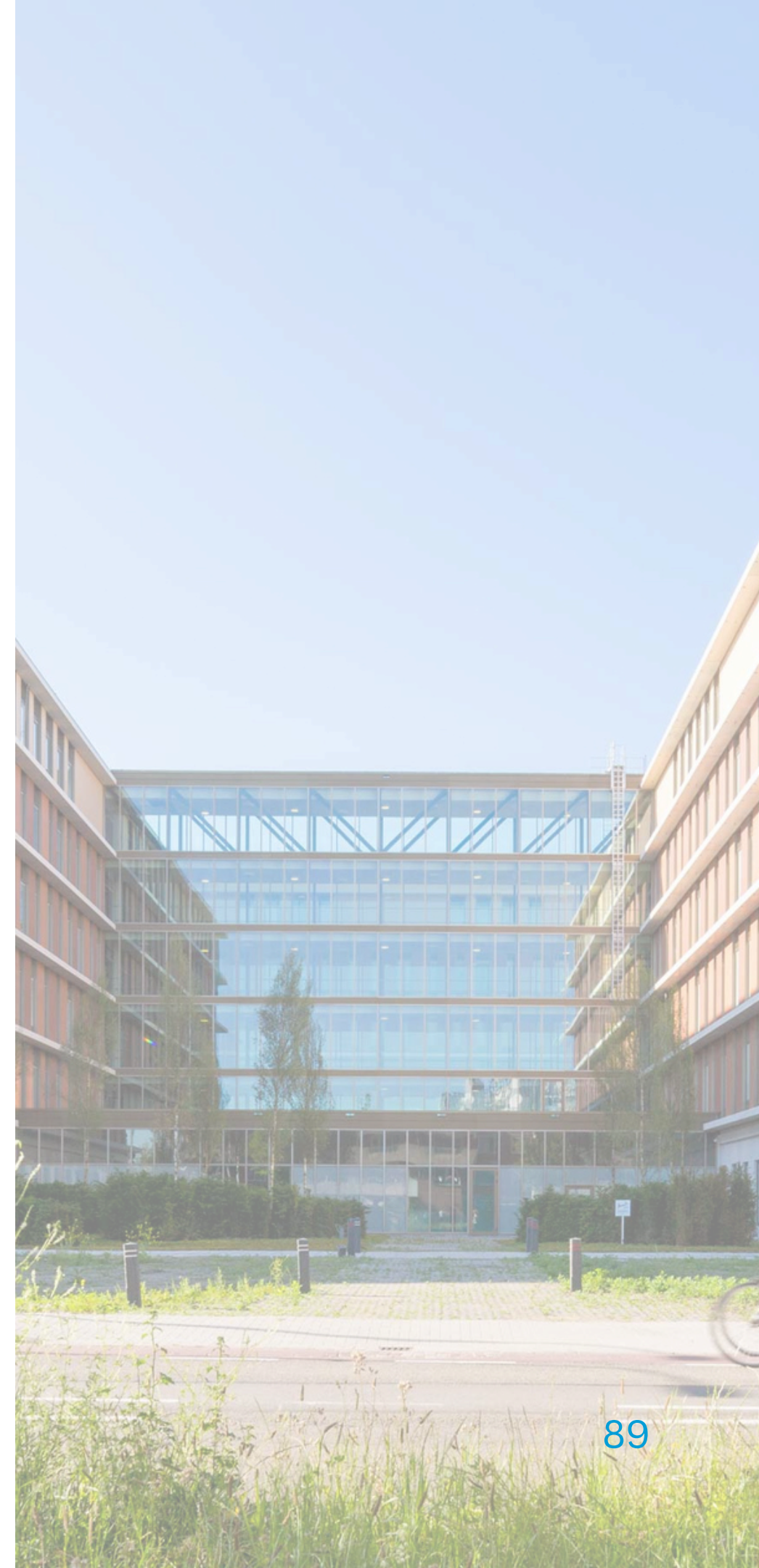
During the project, I also became more aware of the relationship between Human-Centered Design and the more data-driven nature of some of the proposed interventions. Data-driven tools can actually reinforce Human-Centered Design, as long as they are used to support the needs, experiences, and decision-making of those involved. The predictive models, digital planning tools, and improved information flows that are proposed are not intended to make the system itself more technical, but to reduce stress, improve clarity, and enable professionals to work together more effectively. In this sense, the data-driven elements became a way to improve the human experience, and this insight helped me to align both perspectives more consciously throughout the project.

As a designer, I have grown significantly, especially in thinking through the implementation of solutions. Developing the roadmap forced me to consider the concrete steps needed to bring interventions into practice. Additionally, I improved considerably in project planning. Although this used to be one of my weaker areas, I completed this project within the desired timeframe.

I experienced the collaboration between the TU Delft and the RdGG as smooth and constructive. At the same time, the fact that I worked from home for a large part of the project meant that I did not fully feel like I was part of the organization. Nevertheless, I felt very comfortable when I had appointments at the hospital.

If I were to start this project again, I would manage my time more efficiently in the early stage (Before midterm) and keep a more open mindset instead of focusing too quickly on one idea. This was also a key point addressed during my midterm evaluation, and I actively worked on it afterward. Refocusing on the project brief and re-emphasizing Human-Centered Design helped me steer the project in the right direction.

Overall, I look back on this graduation project with pride. It was intensive and challenging, but also really rewarding. I am taking away many new insights, both professionally and personally, that will continue to shape my development as a designer.



13

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Appendix

Appendix A: Patient information flyer



Waarom wordt dit onderzoek uitgevoerd?

Dit afstudeerproject richt zich op het behandelingstraject van de borstkankerzorg binnen het Reinier de Graaf Gasthuis (RdGG). De nadruk ligt op het visualiseren van de ervaring van zowel patiënten als zorgverleners tijdens de fases van diagnose, behandeling en nazorgtraject. Door het gebruik van mixed method (design) methodiek worden verbeterpunten geïdentificeerd in het borstkankerzorgproces vanuit het perspectief van patiënten en zorgmedewerkers. Met de resultaten van het onderzoek zijn mogelijkheden te zien hoe het borstkankerbehandelingstraject geoptimaliseerd kan worden.

Wat houdt dit onderzoek in?

Besluit u na het lezen van de informatiebrief om mee te doen aan dit onderzoek en heeft u het toestemmingsformulier ondertekend? Dan wordt er een interview ingepland van +- 30 minuten. Dit interview wordt gepland voor of na een afspraak die u al heeft staan in het RdGG, zodat u niet extra hoeft te reizen. In samenspraak kunnen we natuurlijk ook kijken naar een andere geschikte locatie.

In het gesprek zullen de volgende onderwerpen worden besproken:

- Hoe ervaart u verschillende fases van het borstkankerzorgproces?
- Hoe zou u uw eigen welzijn omschrijven in de verschillende fases van de behandeling?
- Hoe ervaart u de communicatie met de zorgverlener(s)?
- Hoe ervaart u het verkrijgen en verzamelen van informatie over uw ziektebeeld en zorgtraject?

Wat gebeurt er met mijn gegevens en wat ik tijdens het interview vertel? Het interview zal worden opgenomen met een geluidsrecorder. Deze geluidsopnames worden daarna omgezet in anonieme tekst. De geluidsopnames worden hierna verwijderd. In de resultaten kan niemand terugzien dat het over u gaat. Al uw gegevens blijven vertrouwelijk.



Why is this research being conducted? This graduation project focuses on the treatment process for breast cancer care at the Reinier de Graaf Gasthuis (RdGG) hospital. The emphasis is on visualizing the experiences of both patients and healthcare providers during the diagnosis, treatment and aftercare phases. Using a mixed method (design) methodology, areas for improvement in the breast cancer care process are identified from the perspective of patients and healthcare workers. The results of the study reveal opportunities for optimizing the breast cancer treatment process.

What does this study involve?

If, after reading the information letter, you decide to participate in this research and have signed the consent form, an interview of approximately 30 minutes will be scheduled. This interview will be scheduled before or after an appointment you already have at the RdGG, so you do not have to travel any further. In consultation, we can of course also look for another suitable location.

The following topics will be discussed during the interview:

- How do you experience the different phases of the breast cancer care process?
- How would you describe your own well-being during the different phases of treatment?
- How do you experience communication with the healthcare provider(s)?
- How do you experience obtaining and gathering information about your condition and care process?

What will happen to my data and what I say during the interview?

The interview will be recorded with an audio recorder. These audio recordings will then be converted into anonymous text. The audio recordings will then be deleted. No one will be able to identify you in the results. All your data will remain confidential.

Appendix B: Interview Guide - patients

Semi-structured interview Notes - Patients

Research Project: Design as a link in healthcare for better collaboration and communication in the breast cancer care process

Interviewer: Teije Nolen

Date:

Time:

Interviewee (Initials / Code):

Location (RdGG / online etc.):

Demographic information

Age:

Gender:

Introduction question

1. Could you tell me a little bit about yourself?
2. How are you doing right now?

General introduction & background

1. When were you diagnosed with breast cancer?
2. How did you find out that you had breast cancer?
3. Which hospital did you receive treatment at? Were other hospitals involved?
4. (How did you end up at the RdGG?)
5. Stages of the care process
6. Can you walk me through your treatment process?
7. Can you describe your experience of the process?
8. Which moments from the treatment had a big impact on you? Why? (let them indicate on patient journey)
 - Which moments during the treatment process did you perceive as difficult? or positive?
 - How did you feel when you received the diagnosis?
 - What went through your mind when the treatment plan was explained to you?
 - Is there something else that we are missing? (maybe in patient journey)
 - Were there times when you felt confused or stressed about the schedule?
 - Did you feel alone or well supported at certain moments?

Well-being and support

1. What helped you to cope with difficult moments?
 - Did you receive any mental or physical support? Psychological, patient groups etc.
2. What kind role did family or friends play during the process?

Communication with healthcare providers

1. How did you experience communication with doctors, nurses and other healthcare providers?
2. Did you feel heard and understood by the healthcare providers? Why (not)?
3. Were there moments when you needed more explanation or clarity on the treatment? Or what was going to happen to you?
4. Were you given the opportunity to ask questions about the information you were given or to express concerns about this?
5. With whom did you encounter during the treatment process?
 - Did they use different tools to communicate with you? F.e. app/email/flyer etc.
 - How did you felt about this?
6. Did you use any tools (apps, websites, blogs etc.) to find information on or help you to track your activities, diets etc.?

Well-being and support

1. How did you experience the communication between the oncologist and plastic surgeon?
2. Did you feel that this went smoothly? And why?
3. How did you experience the period during which you had to decide whether you wanted a reconstruction?
4. Did you feel rushed to take any decisions? And why?
5. How did you feel when you heard that a combined surgery was possible?
6. Did you have the feeling that this made things easier or more complicated?

Provision of information

1. Did you actively seek out information about your diagnoses and potential treatment?
 - Where did you find it?
 - Was this information useful?
 - How did you feel reading this information?

Appendix B: Interview Guide - patients

Logistical experience

- How did you experience the organization of appointments, referrals and treatments?
 - Were you well informed about where and when you needed to be?
- How did you experience the accessibility of care (by phone, in person, digitally)?

Reflection and areas for improvement

- Looking back on the entire process, what would you have liked to be different?
- Do you have any recommendations for hospitals or healthcare providers to improve?

Final question

- Is there anything else you would like to say about your experience with the breast cancer care process?

Notable citations

"..."

Observations (non-verbal behavior, tone, atmosphere)

Interviewer remarks (immediately after interview)

- What stood out?
- New insights?
- Follow-up questions for next interviews?

Action points / Next steps

Appendix C: Interview Guide - RdGG Caretakers

Semi-structured interview Notes - Patients

Research Project: Design as a link in healthcare for better collaboration and communication in the breast cancer care process

Interviewer: Teije Nolen

Date:

Time:

Interviewee (Initials / Code):

Location (RdGG / online etc.):

Background Information

- Role/position:
- Specialization and years of experience:

General experience

1. Can you describe your role within the breast cancer treatment process?
2. Which phases of the care trajectory are you most actively involved in?
3. What do you find most challenging in your work with breast cancer patients?

The care process — strengths & bottlenecks

1. From your perspective, which parts of the breast cancer treatment process runs smoothly?
2. If so, where do you (often) see delays, misunderstandings, or inefficiencies?
3. How do you experience collaboration with other specialists (e.g., between oncologists, plastic surgeons, nurses, planners etc.)?
 - Are there specific moments when collaboration between departments or colleagues could be improved?
 - What could be the ideal solution for this?
4. Do patients sometimes not see a caretaker for a long time (f.e. oncological surgeon)
5. Do you know how they do this differently in other hospitals?

Multidisciplinary collaboration

1. Do you feel there is enough room for input and coordination between disciplines?
2. Are there meetings or handovers that could be improved? How?
3. Which software are you using to collaborate with other disciplines?
4. How is the software that you are working with?

4. The DagCo's would like to know how long a surgery will take. Why do they often not hear this?

5. Have you heard of medspace? Would you like to use it and why?

Patient communication & information

1. What is being discussed during all the multiple intakes?
2. How do you ensure that patients are well informed and feel heard?
 - Are there moments when you feel patients are confused or overwhelmed with information?
3. What could be improved in how information is shared with patients and their families?
4. Would an app in which patients could get in contact with you or the doctors help reducing your workload?

Emotional aspects & support

1. Do you think patients get enough emotional support throughout the process?
2. What could be improved to better support patients emotionally?
3. Do you think Caretakers get enough emotional support throughout the process?
4. What could be improved to better support Caretakers emotionally?

Reflection & ideas for improvement

1. Looking back, what are the biggest areas for improvement in the entire breast cancer care pathway?
 - If you could change one thing tomorrow, what would it be?
2. Do you have suggestions for tools, protocols, or design solutions that could help your work and patient care?

Final question

1. Is there anything else you would like to share about your experience or ideas to improve breast cancer care?

Notable citations

- "..."

Observations (non-verbal behavior, tone, atmosphere)

-

Interviewer remarks (immediately after interview)

- What stood out?
- New insights?
- Follow-up questions for next interviews?

Action points / Next steps

Het IBR-planning proces bij het RdGG toekomstbestendig maken

Van gefragmenteerde coördinatie naar verbonden teamwork

1. De Huidige Uitdaging

Het huidige IBR-planningsproces kent onduidelijke verantwoordelijkheden en gebrekkige coördinatie, wat leidt tot inefficiënties en last-minute wijzigingen.

Hoewel de patiënttevredenheid hoog is, is het interne IBR-planningsproces gefragmenteerd en frustrerend.

Belangrijkste knelpunten:

- Gebrek aan inzicht in betrouwbare gegevens die kunnen worden gebruikt voor voorspellingen.
- Gefragmenteerde planning tools en sterke afhankelijkheid van handmatige coördinatie.
- Beperkte zichtbaarheid in de agenda's van chirurgen voor de Bureau Opname.
- Moeizame samenwerking tussen de secretariaat Chirurgie en de OK-coördinator.
- Vertraagde communicatie van beschikbaarheid van chirurgen.
- Onduidelijke verantwoordelijkheid tijdens herplannen van operaties, wat leidt tot vertraging en verwarring.
- Patiënten worden uitsluitend door hun eigen chirurg geopereerd, dit kan leiden tot beperkte planningsmogelijkheden.



2. De Toekomstvisie

“In 2030 is het IBR-planningsproces van het RdGG een volledig geïntegreerd, data-geïnformeerd en mensgericht systeem waarin medewerkers, informatie en digitale tools naadloos samenwerken. Het plannen van IBR-operaties is transparant, voorspelbaar en collaboratief, waardoor professionals efficiënt kunnen werken, administratieve frustratie wordt beperkt en tijdige, gecoördineerde en continue zorg voor iedere patiënt wordt gegarandeerd.”

4. Strategische Roadmap (2026 – 2030)

Horizon 1

De basis leggen

- Verzamel data en breng planningsknelpunten in kaart (interventie 1)
- Onderzoek de haalbaarheid van digitale tools en AI-voorspellingen (1,2)
- Definieer eigenaarschap en verantwoordelijkheden (4,5)
- Geef Bureau Opname toegang tot roosters van chirurgen (3)
- Stem afdelingen af op gezamenlijke doelen en communicatie-routines (5)
- Onderzoek bereidheid van patiënten voor opt-in flexibiliteit (6)
- Introduceer herinneringen en duidelijke verwachting rondom beschikbaarheidsdeadlines (7)

Horizon 2

Het systeem tot leven brengen

- Bouw en integreer digitale planningstools in workflows (1,2)
- Train medewerkers en test nieuwe systemen of routines (2,5)
- Pas beleid en samenwerkingsafspraken aan (4,5)
- Start een pilot met opt-in afspraken in consultatiegesprekken (6)
- Vervang handmatige overzichten door gedeelde digitale tools (medspace) (2)
- Evalueer het vroege effect op efficiëntie en communicatie (3,4,5)

Horizon 3

Een verbonden toekomst

- Veranker digitale planningstools en nieuwe routines volledig (1,2)
- Gebruik voorspellende modellen voor langetermijnplanning (1)
- Monitor prestaties continu en stuur workflows bij (2,4,5,7)
- Evalueer tevredenheid van personeel en patiënten (3,4,6)
- Houd heldere communicatie-structuren in stand tussen afdelingen (5)
- Breid verbeteringen uit naar andere chirurgische specialismen (1,2)

3. Strategische Interventies

Technologische interventies



1. Integratie van data en AI gedreven planning tools om ingrepen te kunnen voorspellen



2. Implementatie van een online planningsysteem (bijv. Medspace)



Organisatorische interventies

3. Bureau Opname toegang verlenen tot de roosters van chirurgen



4. Definitieve verantwoordelijkheid voor het herplannen van operaties toewijzen aan Bureau Opname (en chirurgen hier buiten laten)



5. Versterken van de relatie en samenwerking tussen ht secretariaat Chirurgie en OK-coördinator



Culturele interventies

6. Implementeren van een patiënt-opt-insysteem voor flexibele (her)planning



7. Integreren van herinneringen voor vakantieplanning en het handhaven van aanleverdeadlines

Appendix E: Online patient supporting tools

Treatment process



Appendix F: Planning Operation Room - Combi Patient

14-jul		OK 9			
8.00	8.15	Pat A	Onco	Pat B	Pl chir
8.15	8.30	Pat A	Onco	Pat B	Pl chir
8.30	8.45	Pat A	Onco	Pat B	Pl chir
8.45	9.00	Pat A	Onco	Pat B	Pl chir
9.00	9.15	Pat A	Onco	Pat B	Pl chir
9.15	9.30	Pat A	Onco		
9.30	9.45	Pat A	Pl chir	Pat C	Onco
9.45	10.00	Pat A	Pl chir	Pat C	Onco
10.00	10.15	Pat A	Pl chir	Pat C	Onco
10.15	10.30	Pat A	Pl chir	Pat C	Onco
10.30	10.45			Pat C	Onco
10.45	11.00			Pat C	Onco
11.00	11.15	Pat D	Onco	Pat C	Pl chir
11.15	11.30	Pat D	Onco	Pat C	Pl chir
11.30	11.45	Pat D	Onco	Pat C	Pl chir
11.45	12.00	Pat D	Onco	Pat C	Pl chir
12.00	12.15			Pat E	pl chir
12.15	12.30			Pat E	pl chir
12.30	12.45			Pat E	pl chir
12.45	13.00			Pat E	pl chir
13.00	13.15			Pat E	pl chir
13.15	13.30			Pat E	pl chir
13.30	13.45			Pat E	pl chir
13.45	14.00			Pat F	pl chir
14.00	14.15	Pat H	Onco	Pat F	pl chir
14.15	14.30	Pat H	Onco	Pat F	pl chir
14.30	14.45	Pat H	Onco	Pat F	pl chir
14.45	15.00	Pat H	Onco	Pat F	pl chir
15.00	15.15	Pat H	Onco		
15.15	15.30	Pat H	Onco	Pat G	pl chir
15.30	15.45	Pat H	Onco	Pat G	pl chir
15.45	16.00	Pat H	Onco	Pat G	pl chir
16.00	16.15	Pat H	Onco	Pat G	pl chir
16.15	16.30	Pat H	Onco		

Voorbeeld van een combi progr.
 waarbij we ook rekening moeten houden
 met dat de onco bv een alleen een ochtend sessie heeft
 en er s middags een andere oncoloog moet komen

invullen met een ander
 specialisme??
 anders staat deze ok tijd
 leeg

Appendix G: Project Brief page 1 - 3





IDE Master Graduation Project

Project team, procedural checks and Personal Project Brief

In this document the agreements made between student and supervisory team about the student's IDE Master Graduation Project are set out. This document may also include involvement of an external client, however does not cover any legal matters student and client (might) agree upon. Next to that, this document facilitates the required procedural checks:

- Student defines the team, what the student is going to do/deliver and how that will come about
- Chair of the supervisory team signs, to formally approve the project's setup / Project brief
- SSC E&SA (Shared Service Centre, Education & Student Affairs) report on the student's registration and study progress
- IDE's Board of Examiners confirms the proposed supervisory team on their eligibility, and whether the student is allowed to start the Graduation Project

STUDENT DATA & MASTER PROGRAMME

Complete all fields and indicate which master(s) you are in

Family name	Nolen	7688		IDE master(s)	<input type="checkbox"/> IPD	<input type="checkbox"/> DFI	<input checked="" type="checkbox"/> SPD
Initials	TWD			2 nd non-IDE master	<input type="text"/>		
Given name	Teije			Individual programme (date of approval)	<input type="text"/>		
Student number	<input type="text"/>						
				Medisign	<input type="checkbox"/>		
				HPM	<input type="checkbox"/>		

SUPERVISORY TEAM

Fill in the required information of supervisory team members. If applicable, company mentor is added as 2nd mentor

Chair	Dr. Ir. Armagan Albayrak	dept./section	Human-Centered Design	<p>! Ensure a heterogeneous team. In case you wish to include team members from the same section, explain why.</p> <p>! Chair should request the IDE Board of Examiners for approval when a non-IDE mentor is proposed. Include CV and motivation letter.</p> <p>! 2nd mentor only applies when a client is involved.</p>
mentor	Paula Melo Signerez	dept./section	Design, Organisation and Strategy	
2 nd mentor	Mw. Dr. Petra Kok			
client:	<input type="text"/>			
city:	Delft	country:	Netherlands	
optional comments	<input type="text"/>			

APPROVAL OF CHAIR on PROJECT PROPOSAL / PROJECT BRIEF -> to be filled in by the Chair of the supervisory team

Sign for approval (Chair)



Name Armagan Albayrak Date 27 May 2025 Signature _____

CHECK ON STUDY PROGRESS

To be filled in by SSC E&SA (Shared Service Centre, Education & Student Affairs), after approval of the project brief by the chair. The study progress will be checked for a 2nd time just before the green light meeting.

Master electives no. of EC accumulated in total _____ EC		★	YES	all 1 st year master courses passed
Of which, taking conditional requirements into account, can be part of the exam programme _____ EC			NO	missing 1 st year courses
Comments:				

Sign for approval (SSC E&SA)



Name _____ Date 28 mei 2025 Signature _____

APPROVAL OF BOARD OF EXAMINERS IDE on SUPERVISORY TEAM -> to be checked and filled in by IDE's Board of Examiners

Does the composition of the Supervisory Team comply with regulations?				
YES	★	Supervisory Team approved		
NO		Supervisory Team not approved		

Based on study progress, students is ...				
★	ALLOWED to start the graduation project			
	NOT allowed to start the graduation project			

Sign for approval (BoEx)



Name _____ Date 4 Jun 2025 Signature _____





Personal Project Brief – IDE Master Graduation Project

Name student Teije Nolen Student number

PROJECT TITLE, INTRODUCTION, PROBLEM DEFINITION and ASSIGNMENT

Complete all fields, keep information clear, specific and concise

Project title Enhancing Patient and Healthcare Worker Experience in the Breast Cancer Surgical Pathway by design.

Please state the title of your graduation project (above). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

Introduction

Describe the context of your project here; What is the domain in which your project takes place? Who are the main stakeholders and what interests are at stake? Describe the opportunities (and limitations) in this domain to better serve the stakeholder interests. (max 250 words)

This graduation project will take place at the oncological and plastic surgery section of the Reinier de Graaf Gasthuis (RdGG), a hospital located in Delft which is open for innovation within the healthcare delivery. In the Netherlands, one in seven women will be diagnosed with breast cancer during their lifetime (RIVM, 2023). In 2024, over 18,000 people in the Netherlands have been diagnosed with breast cancer (Kankerbestrijding, 2025). At the RdGG, 377 new breast cancer cases were diagnosed in 2024 (RdGG, 2025). Since so many people come into contact with this disease, it is important that the treatment process runs smoothly. The focus is to enhance both the patient and healthcare worker experience within the breast cancer surgical pathway. This process is complex, emotionally charged, and demands a lot of energy from the patients and doctors.

In this pathway, doctors and nurses operate under high pressure, while patients are going through a vulnerable and uncertain period in their lives. All stakeholders (patients, surgeons, planners, nurses etc.) bring different needs, expectations, and communication styles. This diversity is valuable but could also result in challenges and inefficiencies throughout the patient journey.

The pathway includes interactions, planning moments, and decision points, many of which could be stressful or disconnect patients from care workers. These issues can undermine the quality of care and the well-being of both patients and care providers.

The goal of this project is to make the breast cancer care process more human-centered by identifying and improving logistical and emotional challenges in the current process for both the caregivers and patients.

→ space available for images / figures on next page

Appendix H: Project Brief page 4 - 6

introduction (continued): space for images



image / figure 1

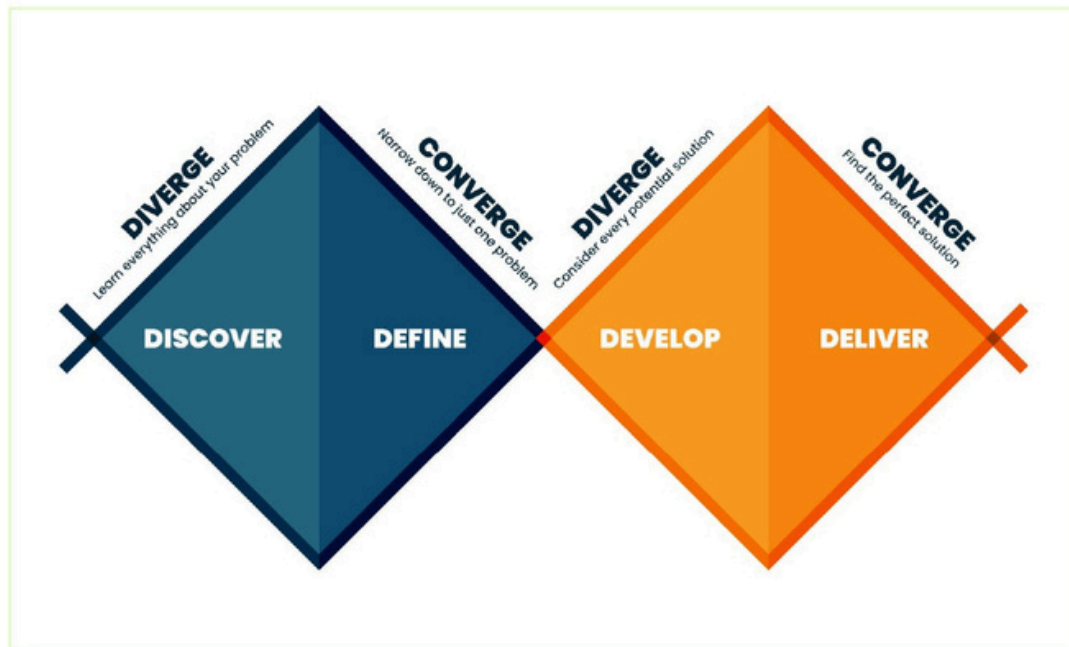


image / figure 2

Personal Project Brief – IDE Master Graduation Project

Problem Definition

What problem do you want to solve in the context described in the introduction, and within the available time frame of 100 working days? (= Master Graduation Project of 30 EC). What opportunities do you see to create added value for the described stakeholders? Substantiate your choice. (max 200 words)

The breast cancer surgical pathway at RdGG faces several challenges that negatively impact both patient experiences and healthcare worker efficiency. Currently, patients can face challenges like unclear or lack of communication, while care providers face logistical inefficiencies and coordination between departments.

For example, patients often feel stressed during doctor visits, this could cause them to sometimes remember only 20% of the information discussed (Kessels, 2003). This can negatively affect how well they understand their treatment and their ability to act on advice such as making lifestyle changes to support their health. Additionally, standardized planning is challenging due to the variability in patients and their individual treatment paths. However, caregivers express a clear need for a more streamlined and manageable planning process. In this project, I want to explore where these challenges lie within the breast cancer surgical pathway.

This project identifies an opportunity to create added value by identifying initial pain points and then optimizing processes within the breast cancer care pathway. By making care more human-centered and aligned with individual patient journeys, both logistical and emotional aspects of the current pathway can be improved.

Assignment

This is the most important part of the project brief because it will give a clear direction of what you are heading for. Formulate an assignment to yourself regarding what you expect to deliver as result at the end of your project. (1 sentence) As you graduate as an industrial design engineer, your assignment will start with a verb (Design/Investigate/Validate/Create), and you may use the green text format:

Design an intervention by addressing the emotional and logistical challenges in the surgical breast cancer care pathway to enhance the overall experience and effectiveness for patients and healthcare professionals at the RdGG.

Then explain your project approach to carrying out your graduation project and what research and design methods you plan to use to generate your design solution (max 150 words)

This project will follow a human-centered design approach. I will begin with a context analysis including an exploratory research phase to understand the current surgical breast cancer care pathway at RdGG. This includes observations, interviews, and conversations with key stakeholders such as patients, surgeons, nurses, and other healthcare providers. By mapping out the existing journey and identifying emotional and logistical challenges, I will gain insight into the needs, expectations, and challenges faced throughout the process. I will be diverging and converging throughout the process to correctly frame the problem and come up with possible solutions.

The deliverables from these findings will be a journey and stakeholder map visualising emotions, expectations, challenges and design opportunities for the next phase. Based on these, I will develop ideas and co-create with stakeholders through iterative creative sessions/workshops/feedback session. Also concepts will be prototyped and possibly tested with these stakeholders. The outcome will be a design proposal that contributes to a more effective and emotionally supportive care experience, aligned with the values of human-centered healthcare at RdGG.

Project planning and key moments

To make visible how you plan to spend your time, you must make a planning for the full project. You are advised to use a Gantt chart format to show the different phases of your project, deliverables you have in mind, meetings and in-between deadlines. Keep in mind that all activities should fit within the given run time of 100 working days. Your planning should include a **kick-off meeting, mid-term evaluation meeting, green light meeting and graduation ceremony**. Please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any (for instance because of holidays or parallel course activities).

Make sure to attach the full plan to this project brief. The four key moment dates must be filled in below

Kick off meeting 7 mei 2025

Mid-term evaluation 10 sept 2025

Green light meeting 12 nov 2025

Graduation ceremony 5 dec 2025

In exceptional cases (part of) the Graduation Project may need to be scheduled part-time. Indicate here if such applies to your project

Part of project scheduled part-time	✓
For how many project weeks	27
Number of project days per week	4,0

Comments:
Since

Motivation and personal ambitions

Explain why you wish to start this project, what competencies you want to prove or develop (e.g. competencies acquired in your MSc programme, electives, extra-curricular activities or other).

Optionally, describe whether you have some personal learning ambitions which you explicitly want to address in this project, on top of the learning objectives of the Graduation Project itself. You might think of e.g. acquiring in depth knowledge on a specific subject, broadening your competencies or experimenting with a specific tool or methodology. Personal learning ambitions are limited to a maximum number of five. (200 words max)

Graduating at the RdGG offers me a unique chance to design within a complex, human-centered system. As a Strategic Product Designer, I'm motivated by the opportunity to create meaningful impact in healthcare by improving the work of doctors and/or lives of patients. Healthcare interested me for a long time, especially since several of my family members and friends work in the healthcare sector, including with breast cancer patients. Their experiences have partly inspired my interest in this project.

Being in contact with people is something that attracts me and since hospitals involve diverse stakeholders with varying needs, makes it for me an interesting and challenging environment.

The RdGG has, according to the doctors, many challenges and that means that there are also many opportunities for innovation. Working within such complexity excites me as it demands both creative and critical thinking.

Through this project, I expect to grow by designing within a dynamic system, conducting research to the current system and identifying opportunities that aligns the user's needs.

