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A Simulation Game Approach for Improving Access to Specialized Healthcare Services in Sweden

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A Simulation Game Approach for Improving Access to Specialized Healthcare Services in Sweden

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Abstract

In Sweden, where a decentralized healthcare system is applied, all patients are registered at a primary healthcare center. To access most of the publicly funded specialized care clinics, patients need to be referred by a general physician at the primary healthcare center. However, long waiting times and queues to access specialized care clinics in Sweden, has been a serious problem and concern for decades. Addressing this issue is important for improving patients' transition to specialized care and the functionality of the Swedish healthcare system. The aim of this thesis is to explore the Swedish healthcare system to analyze the transition of patients to specialized care clinics and identify the reasons for long waiting times and queues. This was done by analyzing the Swedish healthcare system and develop a serious game prototype which models the process of access to specialized care within the Swedish healthcare system. The prototype was used to understand the delay that happens in patients' transition and access process to specialized care services.

A system analysis including a literature review is conducted to gain an understanding of the Swedish healthcare system and gather data to be used in the designed prototype. The outcome of the system analysis is a visual representation of the Swedish healthcare system including laws and stakeholders. A game frame is developed from the system analysis. Maps, tables, and a flow-diagram are developed to visualize patients' access to specialized care. All of this was used to design the game prototype. The final prototype is developed through an iterative process, where several prototypes are designed and tested through game sessions with experts. The prototypes are evaluated after each game session. Finally, learning and findings gained from the prototypes design and the game sessions are documented. This includes reasons for long waiting times for a first visit at a specialized care clinic such as the structure of the Swedish healthcare system, mainly that the PHC is the foundation of the system. Staff shortages, and the need for a referral to access most of the specialized clinics are also discussed and stated along with other reasons.

Keywords

Swedish healthcare system, primary healthcare center, specialized care, private care provider, care access, care quality, waiting time and queue, serious games.

Sammanfattning

I Sverige tillämpas decentraliserat sjukvårdssystem där alla patienter registreras vid en vårdscentral. För att få tillgång till de flesta offentligt finansierade specialistvårdsmottagningar remitteras patienterna av en allmänläkare vid vårdscentralen. Dock har långa väntetider och köer till specialiserad sjukvård varit ett allvarligt problem och bekymmer i Sverige i årtionden. Att hantera denna fråga är avgörande för att förbättra patienternas övergång till specialiserad vård och för att den svenska sjukvården ska fungera smidigt. Målet med detta projekt är att utforska det svenska sjukvårdssystemet för att analysera patientövergångar till specialistvårdsmottagningar och identifiera orsakerna till de långa väntetiderna och köerna. Detta uppnåddes genom att analysera det svenska sjukvårdssystemet och utveckla en prototyp av ett seröst simuleringsspel som simulerar processen att få tillgång till specialiserad vård inom det svenska sjukvårdssystemet. Prototypen användes för att förstå förseningar som uppstår under patientövergångar och tillgång till specialvårdstjänster.

En systemanalys inklusive en litteraturoversikt genomförs för att få en djupare förståelse för det svenska sjukvårdssystemet och samla in data som kommer att användas i den utformade prototypen. Resultatet av systemanalysen är en visuell representation av det svenska sjukvårdssystemet, inklusive juridiska lagar och berörda parter. Genom systemanalys utvecklas ett spelramverk. Kartor, tabeller och ett flödesschema utvecklas för att visuellt framställa patienternas tillgång till specialiserad vård. Allt detta användes sedan för att designa spelprototypen. Den slutliga prototypen utvecklas genom en iterativ process, där flera prototyper designas och testas genom spel sessioner med experter. Prototyperna utvärderas och dokumenteras efter varje spel-sessioner. Slutligen dokumenteras de lärdomar och resultat som erhållits från prototyputformningen och spel-sessionerna. Detta inkluderar orsaker till långa väntetider för ett första besök på en specialiserad vårdmottagning såsom strukturen i den svenska sjukvården, främst att PHC är grunden i systemet. Personalbrist och behovet av remiss för att komma åt de flesta specialiserade klinikerna diskuteras också och anges tillsammans med andra skäl.

Nyckelord

Svensk sjukvård, primärvårdscentral, specialiserad vård, privat vårdgivare, vårdtillgång, vårdkvalitet, väntetid och kö, allvarliga spel.

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Stockholm, December 2023,

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Chapter 1

Introduction

According to the constitution of the World Health Organization (WHO), access to healthcare is a fundamental human right [1]. Moreover, access to healthcare is an essential health policy issue and part of the Sustainable Development Goals as it aligns with goal 3: Good Health and Well-being [2]. Accessibility of healthcare means receiving care and treatment at the right time when it is needed [3]. The healthcare system is a complex social system with many components and stakeholders working together to provide good and affordable healthcare.

Sweden is a welfare state where public tax money is spent on health care to ensure high-quality care for everyone [4]. The Swedish healthcare system is decentralized, where basic medical care is referred to as primary care [4]. Every patient is listed at a primary healthcare center (PHC); thus, it is the first point of contact between the patient and the care. Healthcare services that are targeted to a particular field of medicine other than general medicine are referred to as “specialized care” [5]. It encompasses services that need the skill and knowledge of a specialist rather than a general physician. To access specialized care, patients in most cases must seek care from the PHC to get an appointment with a general physician and get a medical assessment. If needed, a referral asking to take over the responsibility of the patient is sent to the specific specialized clinic. The referral is then managed, and the patient is invited for a first visit to the clinic. This makes the PHC the foundation of the Swedish healthcare hierarchy and an entrance to the system.

In Sweden, long waiting times are not only associated with surgical procedures, but it also reaches available appointments within primary and specialized care. The Swedish healthcare system has suffered from long care queues for decades [6]. The problem has been debated at least since the mid-1980s which makes it a long-standing concern [6]. Waiting times for Swedish patients is the longest compared with all other patients in Europe [6]. About 70% of the Swedish patients stated that they got an appointment with a doctor or a nurse within 7 days after seeking care for the first time [7]. When it comes to waiting time for specialized care, Sweden is ranked in the bottom tier [7].

To reduce waiting times, a care guarantee has been introduced, which sets limits for the waiting time to access care at different levels. According to the guarantee, Swedish patients can wait more than 6 months to get specialized care. This wait period is still considered acceptable. In other countries such as the Netherlands, the maximum waiting time for the first visit to a specialized clinic is 4 weeks. In several European countries such as Germany and France, there is no guarantee of care because waiting lists are not long [6].

Due to the long waiting time to access primary health care centers in Sweden, some patients go to the emergency departments to access care. Which leads to crowding there and longer waiting time for patients who need urgent care. They can also be sent back to the primary health center. Patients feel stuck in between primary health

care and the emergency department, never reaching the specialized care quickly. As a result, some patients choose to seek care at private insurance-driven centers [8]. This increases the inequity and decreases the function of the welfare state model of Sweden by reducing the funding for public systems. In 2017, 13% of employed individuals had private insurance [9].

Long waiting times and queues for specialized care in public facilities have caused dissatisfaction among all citizens in Sweden [10]. Therefore, it is important to analyze and identify the reasons causing these queues and understand the factors that affect access to specialized care. PHC is the foundation of the Swedish healthcare hierarchy and acts as a gatekeeper for accessing the system. For this reason, the problems and challenges that are faced within the PHCs cause a series of reactions throughout the whole system. Thus, addressing the problems within primary care helps in understanding and solving problems at other ends such as specialized care.

Previous studies of the Swedish healthcare system have focused on patient centralization, diseases, and promoting equal health[11]. Furthermore, to address the issue of long waiting times, different participatory and non-participatory approaches have been used. These include qualitative studies such as surveys and interviews, comparisons between countries, grounded theory studies. Quantitative studies used include statistical tests, observational studies, data analysis, and measuring the capacity of the healthcare system against demand, co-design, and open design.

Due to the complexity of the Swedish healthcare system, identifying the parameters that affect the waiting time is a challenging task. The focus of previous studies was on mapping patient flow within the primary care and emergency departments. However, the patient's pathway to access specialized is not well studied. Previous studies focused on involving patients indirectly through surveys and, on analyzing available statistical data on waiting times, costs, differences within specialist types, staff shortage, effectiveness of waiting guarantee, and inequality based on gender, age, or ethical background.

The solutions suggested to reduce waiting times had limited stakeholder involvement. Since serious games are used in many fields related to stakeholders and complexity, this thesis will focus on analyzing patients' transition to specialized care, and what factors are causing the long waiting times using a simulation game approach. Serious games are also used in many fields such as system management, education, and training within healthcare.

1.1 Aim

The aim of this thesis is to design a serious game prototype as a research tool by modelling parts of the Swedish healthcare system related to referrals to specialized treatments to understanding waiting times.

The value of this approach lies in giving the opportunity to real stakeholders to engage using their expertise and perspectives. This allows us to analyze the problem and suggest solutions by involving decision-makers and main stakeholders. The game will make it possible for stakeholders to explore and interact in a safe environment and to reflect the learnings back to real-life.

The following objectives are stated:

1. Design a serious game prototype which models the process of access to specialized care within the Swedish healthcare system.
2. Use the game prototype as a research tool to understand the constraints of the Swedish healthcare system and learn about the reasons for long waiting times and queues for the first visit at a specialized care clinic.
3. Analyze the transition of patients to specialized care within the Swedish healthcare system and examine the challenges associated with the primary healthcare center being the foundation of the system hierarchy. This is by doing a system analysis as a part of the game design process.

Chapter 2

Background

This chapter introduces the Swedish healthcare system focusing on parts that are related to the research question of the thesis and the designed game. In addition, it explains the design and implementation process of serious games and their usage area. It also introduces related previous projects.

2.1 The Swedish Healthcare System

The Swedish healthcare system is decentralized, nationally regulated, and locally administered [9]. There are three levels of the Swedish government: the Ministry of Health and Social Affairs which sets the overall healthcare policy and regulation, 21 regional bodies, and 290 municipalities [9]. In addition, there are 8 independent government agencies involved in healthcare with various responsibilities presented in Table 1 below [9]. The Swedish health system has a good performance with good access to high-quality care [4]. Three basic principles are applied to all healthcare in Sweden; Human dignity, Need and Solidarity, and Cost-effectiveness. This means that all human beings have equal rights, those who are in greatest need are prioritized when it comes to treatment and there must be a reasonable balance between costs and benefits to ensure the quality of health [9].

TABLE 1, THE INDEPENDENT GOVERNMENT AGENCIES INVOLVED IN THE SWEDISH HEALTHCARE SYSTEM.

Swedish Name	English Name	Responsibility
Socialstyrelsen	The National Board of Health and Welfare	<ul style="list-style-type: none">• Licenses and supervises healthcare personnel.• Develops norms for medical care and ensures that these norms are met.• Health data registries and official statistics.
E-hälsomyndigheten	The Swedish eHealth Agency	<ul style="list-style-type: none">• Promotes information sharing between healthcare professionals and decision-makers.• Transfers and stores electronic prescriptions.• Statistics on drug and pharmaceutical sales.

Inspektionen för vård och omsorg	The Health and Social Care Inspectorate	<ul style="list-style-type: none"> • Supervising health care. • Supporting people with disabilities with various activities.
Vård- och omsorgsanalys	The Swedish Agency for Health and Care Services Analysis	<ul style="list-style-type: none"> • Evaluating and analyzing health policy. • Making sure that the health care information is available to citizens.
Folkhälsomyndigheten	The Public Health Agency	<ul style="list-style-type: none"> • Providing knowledge about infectious disease control and public health.
Statens beredning för medicinsk och social utvärdering (SBU)	The Swedish Council on Technology Assessment in Health Care	<ul style="list-style-type: none"> • Promotes the use of health care technologies.
Tandvårds- och läkemedelsförmånsverket	The Dental and Pharmaceutical Benefits Agency	<ul style="list-style-type: none"> • Assessing pharmaceuticals.
Läkemedelsverket	The Medical Products Agency	<ul style="list-style-type: none"> • Regulation of development, manufacture, and sale of drugs.

2.1.1 Regulations and Laws

Since some of the constraints within the study scope are derived from legal frameworks, some laws and regulations of the Swedish healthcare system are included in the thesis. The following section describes some of these laws such as, patient fees, and healthcare financing.

In Sweden, the regional bodies are responsible for financing and delivering health services to the residents, while the municipalities are responsible for long-term, elderly, and disabled care [6]. According to the “Health and Medical Care Act” the principals should have some freedom to design the efforts according to local and regional needs and therefore the operations should not be controlled in detail [12].

When it comes to financing and payments, the regions finance healthcare services with funding that comes primarily from taxes at the regional and municipal levels. The central government provides grants to regions based on need and to finance specific initiatives, preliminary reducing waiting times [9]. Fees for providers and co-payments rates for services are set at all levels of care by the regions such as visits to primary

healthcare centers [9]. The covered services include inpatient, outpatient, dental, mental health, long-term care, and prescription drugs. Furthermore, typical patient co-payments and safety nets are used to set the maximum out-of-pocket costs for patients for each service such as hospitalization and specialist consultation [9]. This is to ensure the equality and cost-effectiveness of care.

2.1.2 Care Quality

The definition of care quality is the "Degree of goal fulfilment in care work" [13]. High-quality care according to "The National Board of Health and Welfare" is providing patients with good and safe care [14]. Good care is obtained by fulfilling the patient's needs for security, continuity, and safety and establishing good contact between the patient and the medical staff [14]. Thus, quality of care is also associated with patient satisfaction. To deliver high-quality care, patients need to be satisfied with their experience of the delivered care. Therefore, patient satisfaction is a way to measure quality. Moreover, quality is highly linked to accessibility in terms of receiving care at the right time. Which makes the long care queues a quality-related problem.

Regions are responsible for ensuring that all patients receive high-quality care. Sweden's Municipalities and Regions (SKR) and the National Board of Health and Welfare publish data on the quality of care. SKR has published approximately 120 quality indications for primary care quality [15]. In addition, providers are evaluated for meeting quality targets associated with a pay-for-performance scheme [9]. Information from patient registries, national quality registries, patient satisfaction surveys, and dialogue meetings between providers and regions are used to evaluate the quality of care [9]. Besides, there is a survey called "The health care barometer" which captures the population's view of healthcare. The survey has questions concerning trust in healthcare and perceptions of the accessibility of healthcare [16]. Lastly, the National patient survey also gives the citizens an opportunity to tell and answer questions about patients' experiences of care [17]. The results of all these are used to improve and develop care from a patient perspective.

2.1.3 Healthcare Guarantee

To increase accessibility to healthcare and ensure that patients receive the care they need within a reasonable time, Sweden has a healthcare guarantee. For care that is not assessed as medically urgent, patients can have to wait over six months to receive their care [9]. The law guarantees that for patients registered at a specific PHC, the patients should get in contact with the primary healthcare center the same day they seek care. Furthermore, the patient should receive a medical assessment from a healthcare professional within three days of their first contact with the PHC. When needed, the patient should be offered the first visit at a specialized care clinic within 90 days after a referral is sent [18]. Lastly, the patient should get the treatment, for example an operation within 90 days after a decision on treatment has been made.

2.1.4 Patient Access to Specialized Care

Open Specialized care is the care that patients get without being admitted to a hospital. According to the Health Care Act, specialized care refers to healthcare

services within medical and dental fields of activity that relate to the prevention, examination, care, and treatment of diseases, pre-hospital emergency healthcare, on-call, and medical rehabilitation [5]. The patient visits doctors who are specialists in areas other than general medicine.

In Sweden, open specialized care is covered by publicly funded healthcare. When a patient needs specialized care, there are three options for seeking it: specialist regional hospitals (public provider), private providers with an agreement with the region, and private providers without an agreement with the region. Seeking care from a public provider gives further three options depending on which specialist clinic is sought. The patient either contacts a specialist directly and books a first visit, writes a personal care request, or visits the PHC to get a referral.

To access a publicly funded specialized clinic, the patient must first be referred to the clinic. The patient can contact only a few receptions directly without a referral such as gynecologist clinics, receptions that treat venereal diseases, and infection prevention clinics.

However, although self-referral is there to increase accessibility, very few clinics give the patient an option of writing a self-referral. Therefore, the most common and authoritative option is to visit the PHC and book a time with a general physician. Phone availability, doctor availability, appointment, and registration influence accessing the PHC. After meeting the general physician, if a patient needs further assessment a referral is sent to a specialist clinic. When a referral is sent (either by the patient or by the PHC), the reception of the specialized clinic assesses it and decides whether the patient can receive care from them or not.

The referral is an act by health care professionals that constitutes an order for a service or a request to take over care responsibilities for a patient [19]. Here is a set of rules and laws that control sending the referral [19]:

- It must describe symptoms and medical history and be of such quality that the receiving care provider can assess the medical need.
- It must be written in consultation with the patient and sent to a healthcare provider according to the LEON principle of minimum effective level of care.
- It must be sent as soon as possible and only exceptionally later than three working days after the referral decision.
- Urgent referrals must be sent on the same day that a decision is made.

When a referral is sent, it must be assessed at the specialized clinic. Here are the rules that control the referral assessment [19]:

- Referrals received must be assessed and prioritized as soon as possible and only exceptionally later than three working days after receipt.
- The referrals must be assessed and prioritized by staff with formal and real competence for this.
- A referral confirmation must be sent to the sender immediately.
- The patient must be informed that the referral has been received. This must take place within five working days, either in the form of a notification about the appointment, or with information about the estimated waiting time, information about the care guarantee and a telephone number for the reception where the patient can contact.

After the referral has been assessed, the patient is either booked a first visit at the clinic or informed that no time can be booked within 90 days as the care guarantee states [19].

When seeking care from a private clinic, the patient can choose between a clinic that has an agreement with the region and a clinic that does not [20]. The patient gets an almost directly booked first visit to a specialized clinic without needing a referral in most cases. While the last option appears to be the quickest and easiest choice for the patient, it is the most expensive way to go. Not all patients can afford the cost, leading to the exclusion of people from lower socio-economic backgrounds.

An additional option to access specialized care is seeking care from the emergency department. This is not a formal option offered by the Swedish system, but rather a solution invented by patients to get faster access to care. When there are no available times or very long waiting times at the PHC, many patients choose to seek care at the emergency department for symptoms or illnesses that are not classified as urgent or dangerous situations such as back pain. The reason is that the patient prefers to spend a couple of hours waiting at the emergency department instead of waiting for several days or more to visit the PHC. This leads to crowding at the emergency department and a stream of patients who have serious and simple conditions waiting together. The patient either gets a referral to a specialized care clinic or is sent back to the PHC where the patient is registered.

Even today, queues and lists are increasing, in July 2023 it was reported that 482 684 patients were waiting to get their first visit at a specialized clinic [21]. 35 percent of these patients were even waiting for more than 90 days, which indicates that the care guarantee is not completely fulfilled. The percentage of patients on waiting lists varies by type of specialist, with the highest percentages reported for specialists in ear, nose and throat, ophthalmology, orthopedics, allergy, general surgery, and dermatology. While the lowest reported for general psychiatry, women's health, and urology [22].

2.1.5 Private Provider of Healthcare

Private healthcare providers offer Swedish citizens alternative healthcare with shorter care queues and almost direct access. This alternative reduces the pressure on the public tax-funded system when patients leave the public queues and seek care at a private center. Thus, private healthcare is needed as a complement to public healthcare [9].

The Stockholm region has the shortest waiting lists for care compared with the rest of Sweden, and the highest proportion of people with private insurance [23]. This indicates that private care contributes to reducing the length of public care queues to some extent. On the other hand, the private healthcare sector in Sweden has been accused of making large profits from patients who already are paying taxes to get tax-financed healthcare [24]. This has led to discussions in the Swedish parliament about whether private healthcare centers should be banned.

The cost of private care varies based on if a provider has an agreement with a region. The fees are the same for accessing private healthcare clinics as public healthcare clinics when there is an agreement with the county council. In case there is no agreement, the patient pays the entire cost of the care as an out-of-pocket cost at private clinics. This leads to very costly care and exclusion of people who cannot afford these costs and therefore increases inequality. However, private insurance compensates part of the cost when receiving care from private healthcare clinics without an agreement with the region [25]. The waiting times also differ based on the agreement signed with the private healthcare provider. An agreement with the region leads to longer waiting times compared to an agreement with insurance companies. Within most healthcare insurances, the waiting time for a visit to a specialist is a maximum of seven working days and for an operation a maximum of 14–21 working days [25]. Moreover, many private care providers offer shorter times with almost direct access for both regionally funded care and insurance patients [25].

2.2 Serious Games

Serious games are an effective tool for education and exploration. Through creating an abstracted environment, serious games enable the change of the day-to-day activities and tactical or strategic levels in a large organization [26]. The point of departure is a complex real-life situation/problem, and the result is a simulation game where it is possible to explore and learn about complex problems and translate the experience and findings back to real-life [26]. Serious games are applied in a variety of areas such as training and consultation [27]. Simulation games are used as an educational tool, they have been shown to close the gap between practice and theory. This is by giving the participants the opportunity to observe and analyze the outcomes of their actions and take responsibility for decision-making through problem-solving competencies. Which leads to active engagement and reception of knowledge [28].

Simulation games also provide stakeholders with the role of participants/players in the game tools to contribute with their experience to solve real-life problems. Participants can apply their knowledge and skills in a risk-free simulated environment. This enhances their problem-solving abilities and empowers stakeholders to make informed decisions and develop strategies that can be translated into the real-world. Simulation games have a positive effect on learning outcomes on various levels such as cognitive, behavioral, and affective [28]. People find games memorable and valuable (memories from games have proven to be vivid after more than 10 years) [26]. Moreover, serious games reproduce social life including many complex activities. This enables learning about very complex situations where participants try out organizational changes with systemic knowledge, and practical and emotional involvement resulting in a way that no other method can provide [26].

2.2.1 Designing Serious Games

A fundamental concept in game design as Harteveld proposes in his book [29] is “Triadic game design”, which consists of 3 elements and takes place in the center of the diagram as we see in Figure 1. The three elements are reality, meaning and play.

A good and effective serious game must include all the aspects of these elements. While reality represents the real-life problem to be modelled in the game, meaning is about the purpose of the game and the learning approach. Lastly, play is how interacting with the game world works through game mechanics [30]. Thus, the real-life problem must first be defined to identify the change that will be made by playing the game. Then the game mechanics that will deliver the change are designed.

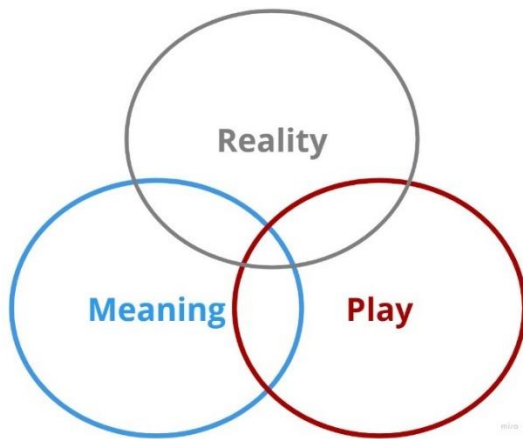


FIGURE 1, TRIADIC GAME DESIGN.

Simulation games represent complex real-life situations that have too many elements with complicated relationships into a simpler one, the reality of the game. This is done using reduction, abstraction, and symbolization [27]. This approach allows the study and analysis of complex adaptive systems such as the healthcare system. Creating a simulated environment is a challenge that requires skill, imagination, and logic. The designer must keep an eye on the level of detail and combine a balance between the reality of the real-life problem and the reality of the game, keeping in mind that the simulation game is an abstraction of reality. The game must serve as a mirror for the participants to raise awareness of the addressed problem with an insight into the solution.

The healthcare system is composed of multiple agents and organizations driven by personal interests and institutional factors [31]. The relationships in this system are numerous, non-linear, and independent with dynamic and delayed feedback [31]. Several health system subsystems have high change thresholds but are influential due to their numerous unofficial connections to the rest of the health system. As a result, the health system displays path dependence and lock-in since transformative change's essential conditions and tipping thresholds are rarely fulfilled [31]. The complexity of such systems makes the design process of serious games impossible to do in one single step. The design consists of four main phases including 10 several steps within [27]. The four following phases as illustrated in Figure 2 are as follows:

1. Design specifications
2. System analysis
3. Game design
4. Game construction.

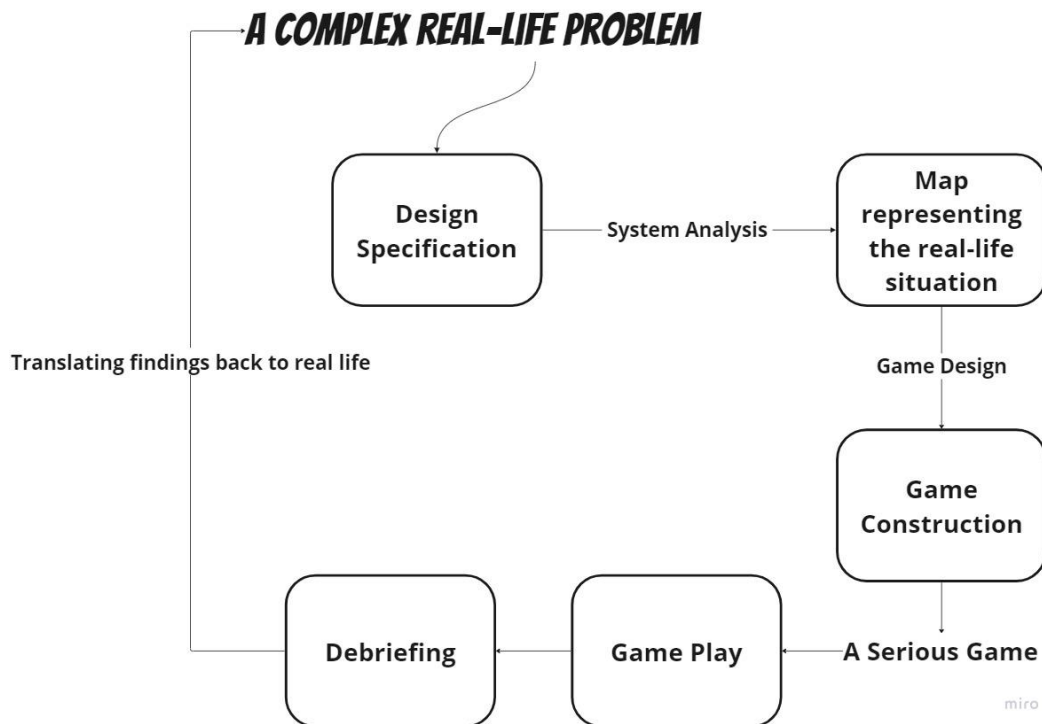


FIGURE 2, OVERVIEW OF THE DESIGN PROCESS.

In the first step, game specification, the background of the problem must be described in terms of a summary of the problem characteristics and environment including different stakeholders, organizational structures, and issues [32]. The need of a game should be identified including how the problem affects the organization and how finding the solution for the problem will help to benefit the organization [32]. This is done in the form of a checklist that has many questions for several topics: background of the problem, goals of the game, design process, general considerations for the design, elements of the game and the use of the simulation game [27].

The goal of the second step, system analysis, is to unfold the real-life problem into parts and take a deep look at these parts including their interrelations as well. Considering the system as built up from several related subsystems and aspect systems is powerful in this step [33]. The endpoint is a clear and detailed description of the problem area in the form of a schematic representation including tables, diagrams, scratch drawings, or loose notes. Information is collected using various methods such as interviews with stakeholders, literature review, brainstorming with key informants, document analysis, and observation of the problem's processes [27]. When analyzing a complex real-life situation, it is very common to end up with a quantity of several hundred themes and aspects [27]. Taking time to understand and analyze the problem is an essential step to having a successful simulation game.

The third step, game design, requires a combination of engineering and design. The process consists of the following steps [27]:

1. Selection of the system components
2. The matrix of system components and gaming elements
3. The choice of a game format

4. Concept report

The selection of the most relevant and important components takes place in this step. The system analysis is transformed from a model of the problem to a model of the game [32]. Furthermore, an appropriate format for the game is determined. The formats vary widely, and the designer chooses a format that accomplishes the game objectives [32]. Then the game concept report is written. The game concept is described to include the objectives of and in the game, the participants, scenario, macro and micro cycle, roles, events, data, indicators, tools and paraphernalia, and rules for the implementation of the game such as preparation, and facilitation [27].

The last step is the game construction where the game is built. The game is also extensively tested in this step which leads to changes until the final version is developed and built.

After the game design is finished and the game is played, participants are invited to a debriefing session. Where a connection is made between the experiences in real-life situations and the experiences gained by the participants after playing the game [34]. The serious game learning objectives are to be made manifest at this phase.

2.3 Previous Work and Limitations

Participative approaches in healthcare modelling and simulation have shown significant results in addressing various problems [35]. Previous research focused on finding solutions for many topics. In Sweden, several studies and implementations with participatory design approaches have been done in the healthcare field. It involved healthcare professionals and patients to improve healthcare services.

The approaches were applied to the development of electronic health record systems, patient care planning, mobile health applications, medical education for equity in health, quality improvement projects in primary healthcare, and exploring barriers to accessing primary care for marginalized groups. In addition, serious simulation games were used to explore several complex problems within healthcare, such as delivering healthcare interventions for mental healthcare [36].

Serious games use in healthcare is on the rise in different subject areas such as medicine, computer science, and health professions [37]. Various serious games were developed focusing on telemedicine, logistics management in pediatric emergency medicine, healthcare management, and surgical skills training. In terms of education, serious games were used in healthcare professions education, pharmacy, antibiotic use, and antimicrobial resistance for public education [38].

In Sweden and the United Kingdom, a serious game was developed for the early detection of autism in preschool children [39]. Serious games were developed to improve patient flow management at emergency departments and train healthcare professionals. Serious games were also used to do research on the strategic decision-making of government, medical institutions, and patients. In the context of primary care, serious simulation games were used to improve evidence-based patient care [40], and sexual health services for breast cancer survivors [41].

One of the most investigated problems within the Swedish healthcare system is the long waiting times to access care. Previous research focused on the problem using different approaches. A large amount of previous work is available, many articles and reports have tried to discover the reasons for the problem and to provide solutions. However, few solutions and suggestions have been addressed which gives a lot of designed approaches and models but limited progress in the provided solution and therefore an unsolved problem. Several aspects of the problem were covered by previous research with varying results. Some significant results are summarized as follows:

- **Socioeconomic inequalities in waiting times for primary care:** A negative association between household income and waiting times in Sweden for a primary care appointment was found [42].
- **Priority setting in primary care:** 49% of the patients in Sweden stated that tax-financed health care cannot afford all treatments and some services must be excluded [43]. Furthermore, patients agreed that treatment outcomes must be considered to influence decision-making regarding centralization of low-volume, highly specialized care in Sweden [44].
- **Support to patients when the guarantee is not fulfilled:** There are insufficient care contracts and soft-law regulations that undermine care providers' willingness to consider patients' health literacy when informing them about the waiting time guarantee [45].
- **Ensuring valid and useful waiting time monitoring in specialist care:** Policy makers and administrative management should monitor waiting times to ensure that they are presented to suit management needs and enable the study of single cases in this field [46].
- **Reduce waiting times:** Staff shortage was concluded to be a reason that led to waiting list growth [10]. The implemented solutions to reduce waiting times were co-operation more with primary care staff, setting longer intervals between appointments, continuously measuring accessibility key factors in terms of demand and capacity, improving referral process, and lastly understanding and managing patient flow through the healthcare system [10].

Chapter 3

Methodology and Game Design

This chapter provides a detailed description of the methods used. It describes the design of the game divided into subsections for each part of the design process. This is to give a detailed and complete description of the methods used when designing the game. The following figure is a flow diagram that represents the thesis graphical abstract.

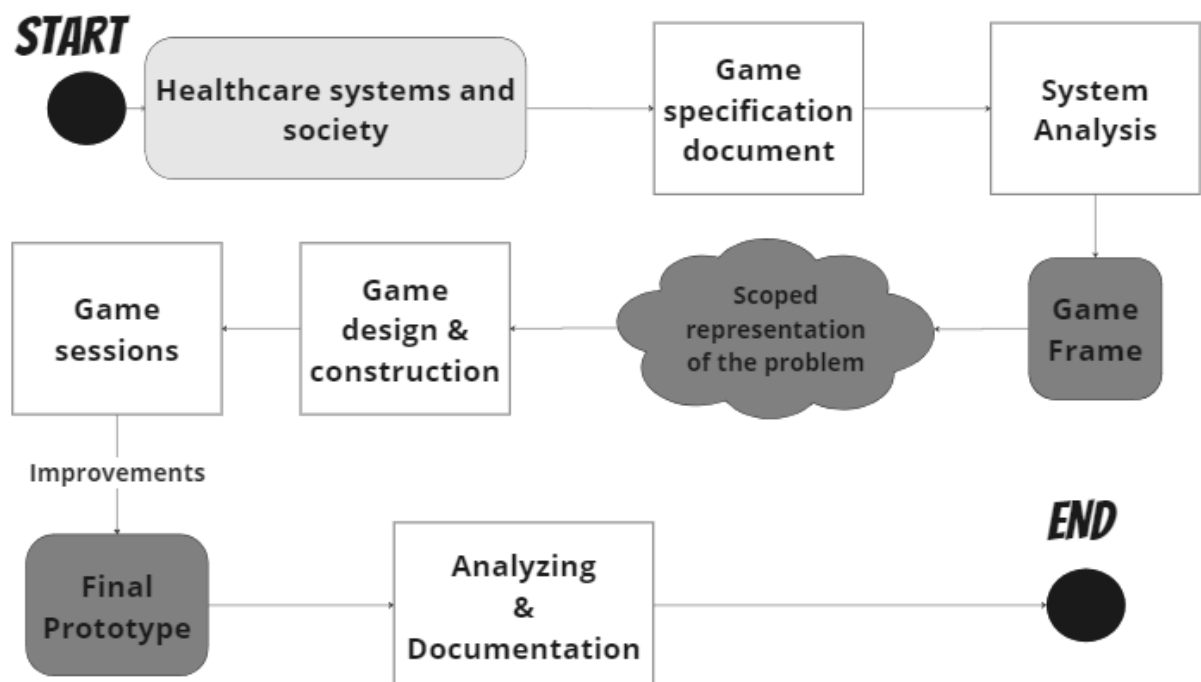


FIGURE 3, FLOW DIAGRAM REPRESENTING THE THESIS GRAPHICAL ABSTRACT.

As it is shown in Figure 3, first the answers stated in the game specification document were answered. Then the system analysis was performed, which included literature study, direct observation through the available materials and collecting qualitative and quantitative data. These steps resulted in the creation of a “Game Frame” from which different game scenarios can be designed depending on different perspectives of the problem. The game frame was then used to create a directed graph representation of the studied real-life problem to design the game. The game was then designed and constructed to be tested under game sessions. The following paragraphs explain further in detail the mentioned steps.

3.1 Literature Review

The literature review was performed to explore the Swedish healthcare system focusing on the waiting time and care queues problem. In addition, previous and ongoing research were determined to see what type of approaches were published regarding the analyzed problem. The literature study included several types of

publications such as books and articles from different databases including Google Scholar, Web of Science, Scopus, and PRIMO (The KTH library archive). The relevant publications were picked considering the time of publication to select the most useful and recent publications. When searching for appropriate articles and sources, different search terms were used in both English and Swedish since the research was about the Swedish healthcare system. The terms were used in different combinations to enhance the research results. Table 2 below includes the used terms:

TABLE 2, THE USED TERMS IN THE LITERATURE REVIEW IN SWEDISH AND ENGLISH.

English terms	Swedish terms
"Participatory design approaches for healthcare"	"Väntetider"
"Simulation games AND Sweden"	"Vårdköerna"
"Simulation games AND health care"	"Vårdgaranti*"
"Serious AND simulation AND games AND primary AND care"	"Vårdkvalitet"
"Serious AND simulation AND games AND specialized AND care"	"Vårdcentralen"
"Simulation games", "Serious simulation games"	"Specialiserad vård"
"Serious OR simulation AND games AND primary AND care"	"Remisshantering"
"Serious OR simulation AND games AND primary AND care AND waiting times OR queues"	
"The Swedish healthcare system", "Primary healthcare delivery" "Specialized healthcare delivery" "Primary healthcare center"	
"Private sector in Sweden"	
"Referral" "Quality of care"	
"Access* OR reach*" "Waiting times OR queues"	

In addition, The Swedish Association of Local Authorities and Regions (SALAR) website was used to gather information and statistics [47]. The Swedish Agency for Health and Care Services Analysis website was used to find reports about the healthcare system [48]. Lastly, the National Board of Health and Welfare website was used to find definitions and laws [49].

3.2 Game Design

Designing the game was done through several phases that consisted of many steps as explained below. The following sections describe the used methods in detail including:

1. Game Specification
2. System Analysis
3. Game Design and Construction
4. Prototype Testing
5. Evaluation and Validation

3.1.1 Game Specification

The first step of the design process was to answer the questions specified in the game specification document. The following questions were first considered to get the scope of knowledge required. A very clear understanding of the Swedish healthcare system was required to be able to answer the questions. The queue problem was to be identified in a very detailed and accurate way to make it as clear as possible:

- What is the purpose of the game?
- What are the objectives of the game?
- Who the stakeholders are?
- What will the game look like?

The queue problem was divided into parts to gain a better understanding including:

- The Swedish healthcare system: regulations, financing, laws, etc.
- The transition of patients to specialized care.
- The reasons for long waiting times and care queues.

The literature review provided the scope for questions documented. However, some systemic factors were investigated posteriori. For example, an appropriate decision regarding the format of the game, participants (players), and some design details was possible was taken after the system analysis phase was performed. This is because a complete and detailed image about the real-life context was obtained after initial prototype iterations.

Appendix 1 provides the final version of the game specification document. Questions marked as “To be discussed” were not answered in subsequent analysis and game design phases.

3.1.2 System Analysis

The aim of this phase was to create a map to explore 3 main questions [27]:

1. What are the boundaries of the field we must transform into the game?

2. What are the most important elements in the system?
3. What are the relations between these elements?

The map was to inspect patient transition to specialized care, and factors that affect the long waiting times problem. The map was created using Miro [50]. The system analysis was done through 4 steps using a bottom-up approach, where elements were collected to create an image of the problem. The 4 steps were:

1. Identify the stakeholders and their relationships.
2. Collecting the elements of the problem to classify them into categories and relate them together.
3. Describe the Swedish healthcare system in terms of theory and laws.
4. Visualize the findings in terms of tables, diagrams, drawings, and notes.

First, the stakeholders were identified with their goals, interests, responsibilities, resources, and conflicts. For some parts, brainstorming and observation were used together with the literature review to obtain the desired results. Secondly, systems and subsystems within the Swedish healthcare system were listed to collect the loose elements. The parameters and elements were identified through the literature review depending on their role in the accessibility and transition to specialized care and their effect on the length of care queues and waiting times. Then the elements were classified into several categories and related together. Several conceptual topics of the Swedish healthcare system were described such as regulation, social, political, and economic. This is to define the Swedish healthcare system considering relevant laws, rules, and theories.

In addition, qualitative data were collected to be used in the system analysis. These data were available mainly at SALAR. Different kinds of qualitative data were used such as descriptive, categorical, observational, interview data, and text data. Moreover, quantitative data were collected to be used when designing the game. This is to relate the designed game to reality. These data were available at SKR, The National Board of Health and Welfare, and the “Care in Numbers” websites [51]. The quantitative data included:

- Care costs and budget
- Patient satisfaction
- Number of visits to PHC
- Number of PHC doctors
- Number of waiting people for PHC visits
- Number of waiting people for different specialized care first visit
- Estimated waiting time for different specialized care first visit.
- Percentage of people buying private insurance
- Estimated waiting times at private centers.

The findings were visualized as various tables and diagrams. A flow diagram was developed to illustrate patient flow and transition to specialized care within the Swedish healthcare system (see Figure 3 for reference). The first map represents the Swedish healthcare system in general including components, actors, and laws. This resulted in the creation of a game frame (accessed via [52]) that can be used to design different serious games depending on different perspectives of the problem.

This game frame can be viewed as a general representation of the Swedish healthcare system.

The last step in the system analysis phase was to create a scoped representation for the problem stated in this thesis. The map was to be narrowed down to sharply represent the most important aspects and factors related to transition of patients or obtaining referrals to specialized care. Thus, the general map of the Swedish healthcare system was reduced to include the essential parts that either affect the transition of patients to specialized care or the length of waiting times and queues. This was enough to begin the design phase of the game.

The representation for the problem included five maps, tables, and a flow diagram as follows:

1. A table including stakeholders, their resources, conflicts, interests, and responsibilities.
2. A map of the interactions and relationships between stakeholders.
3. A flow diagram of patient access to specialized care within the Swedish healthcare system.
4. A map of eight categories of the Swedish healthcare system with several sub-factors and elements for each category.
5. A map of these inner factors represented with linkages among them to illustrate their relationships and effect on the waiting time and queues.

All the obtained maps, table and flow diagram can be accessed at this Miro board [52] for better view. Table 4 provides the stakeholders table where the interests, responsibilities, resources, and conflict for each stakeholder are stated.

TABLE 3, THE STAKEHOLDERS IDENTIFICATION.

Stakeholders	Interests	Responsibilities	Conflict/Tension	Resources
Patients	<ul style="list-style-type: none"> Minimal wait times for specialized care Receive high-quality care. 	<ul style="list-style-type: none"> Seek and choose healthcare providers. Provide feedback. 	<ul style="list-style-type: none"> May experience frustration and dissatisfaction if waiting times are long. Affordability: People may not like to pay more to reduce waiting time. Would like to meet specialists or get diagnosis from best possible person. 	<ul style="list-style-type: none"> Health insurance Feedback to municipality
General physician	<ul style="list-style-type: none"> Competitive salary and compensation Experience and knowledge 	<ul style="list-style-type: none"> Accurate diagnoses Referring patients to specialists Patient interaction for explaining options. 	<ul style="list-style-type: none"> May feel torn between their professional autonomy in diagnosing and referring patients and the systemic pressures to conform to standardized referral protocols. This tension can 	<ul style="list-style-type: none"> Diagnostic tools and medical equipment Healthcare support staff (nurses, physician assistants) Standards and information from Swedish national agencies and universities

			<p>impact their decision-making process.</p> <ul style="list-style-type: none"> • Workload or exhaustion when patient load increases. • Personal risks during emergencies 	<ul style="list-style-type: none"> • Technology tools such as AI or databases
Healthcare administrator	<ul style="list-style-type: none"> • Ensure the efficient and effective operation of the healthcare center. • Improve patient access and satisfaction. 	<ul style="list-style-type: none"> • Strategic planning and decision-making • Budget and resources allocation • Financial management, payment • Staff • Appointment booking • Journal writing • reception service • Statistics and follow up. • Referral management • Optimize patient flow. • Compliance with healthcare regulations and policies • Daily operations management • Contact with authorities and patients. • purchase of materials • archiving • managing health records • assessment of lab results 	<ul style="list-style-type: none"> • Balancing long-term strategic planning for the primary healthcare center with the immediate needs of patients. Administrators may need to allocate resources for future improvements while addressing current patient demands. • Administrators are responsible for budget allocation, which may lead to conflicts with staff and physicians who prioritize maintaining or enhancing the quality of care. Decisions on resource allocation can affect the level of care provided. • Hiring and maintaining an adequate number of staff members to meet patient demand while staying within budget constraints can create tension. • Ensuring the financial sustainability of the healthcare center can sometimes conflict with the goal of improving access to care. Administrators must balance budgets while addressing the need for expanded services. • Efficient appointment booking is necessary for patient flow, but it can lead to frustration among patients if they perceive that they cannot secure 	<ul style="list-style-type: none"> • Budget and financial resources • Healthcare facility management systems • Administrative staff and support • Regulatory guidelines and policies

			timely appointments.	
21 regional bodies	<ul style="list-style-type: none"> Ensuring equitable access to healthcare. Cost control: Ensuring that patients pay don't exceed the maximum values. 	<ul style="list-style-type: none"> Financing Delivering health services to residents Regulatory compliance. 	<ul style="list-style-type: none"> Balance budget constraints with the need to ensure equitable access to specialized care. 	<ul style="list-style-type: none"> Regulatory authority. Financial resources. For example, contracts between regions and private specialists are usually based on a tendering process in which costs constitute one of the variables used to evaluate providers.
Private healthcare provider	<ul style="list-style-type: none"> Provide high quality care at lower waiting time. Maintain profitability. Accessibility: Attracting patients seeking shorter wait times Compliance to all regulations 	<ul style="list-style-type: none"> Offer quick access to specialized care. Providing high-quality specialized care 	<ul style="list-style-type: none"> Competition with public healthcare for patients. and other providers Balancing profit motives with healthcare quality. 	<ul style="list-style-type: none"> Specialized medical expertise. Financial resources to hire or attract other doctors. Faster adoption of new technologies.
Specialized care regional clinics	Assess and prioritize the received referrals as soon as possible.	<ul style="list-style-type: none"> Treat patients. Hiring specialized doctors Referral assessment: Immediately confirm to the remitter that the referral is accepted. Confirm to the patient within five (5) working days that the referral is accepted. Either in the form of a notification about the appointment, or with information about the estimated waiting time, information about the care guarantee and a telephone number for the reception where the patient can contact. 	<ul style="list-style-type: none"> The clinic must allocate its limited specialized care resources efficiently. This can create tension when there are more referrals than available appointments, forcing decisions about which patients to prioritize. Effective communication between the clinic and referring physicians is crucial for patient care. Delays or miscommunication can lead to frustration and tension between the two parties. Patients referred to the clinic may have high expectations for quick access to specialized care. Meeting these expectations while managing the 	<ul style="list-style-type: none"> Appointment Slots: The availability of appointment slots for patients is a critical resource. Managing and allocating these slots efficiently is essential to meet patient demand. Patient Records and Data: Access to patient records and historical medical data is essential for providing personalized care and making informed medical decisions. Referral Guidelines: Clear referral guidelines and criteria are a resource that helps the clinic make informed decisions about which patients to accept for specialized care.

			clinic's capacity can be a source of tension.	<ul style="list-style-type: none"> Specialized personnel, equipment
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The interactions between the stakeholders are presented in Figure 4. In the figure, we see that the patient is the center of the interactions:

- **The patient:** seeks care and book time at a PHC, meets a general physician at the PHC, interacts with the PHC care administrator, gets information from the specialized clinic, and visits private healthcare centers.
- **The general physician:** sends a referral to specialized care clinics, interacts with care administrator at the PHC, and meets patients.
- **The PHC care administrator** interacts with the general physician, interacts with patients, and the 21 regional bodies.
- **The 21 regional bodies:** interact with PHC care administrators and private healthcare providers.
- **The private care providers:** receive patients and interact with the 21 regional bodies.

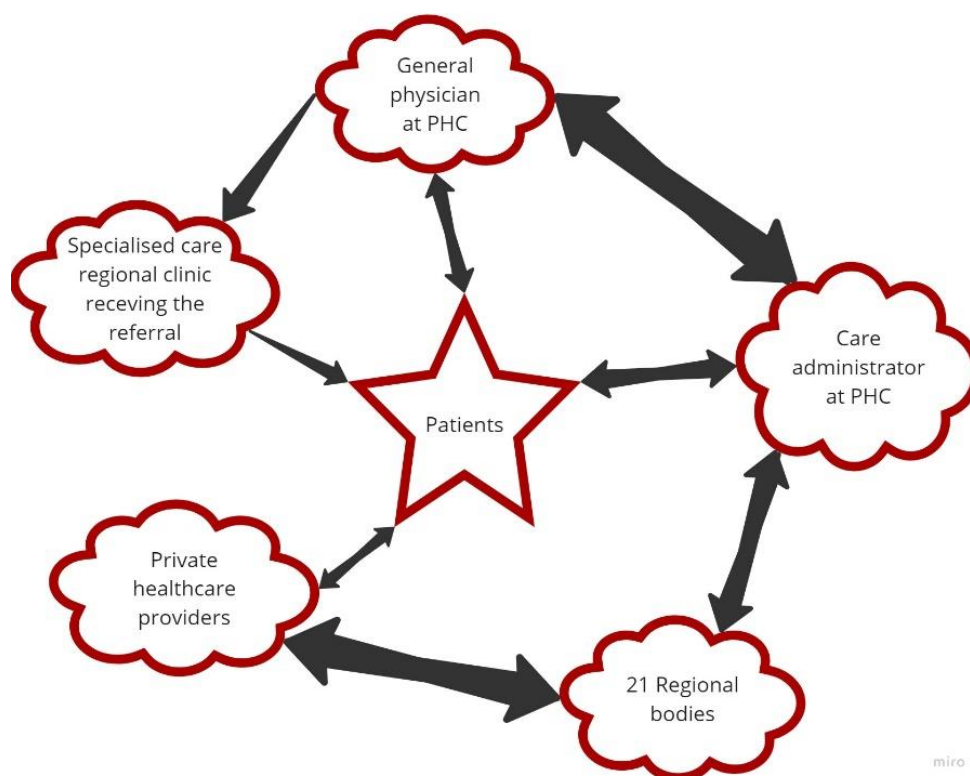


FIGURE 4, THE STAKEHOLDERS RELATIONSHIPS.

The flow diagram is presented in Figure 5, where the three options (as explained in the background section 2.1.4) for accessing specialized care are visualized together with the additional option of the emergency department. The options are represented by the black rectangles in Figure 5. The obtained flow diagram inspects the transition of patients to specialized care within the Swedish healthcare system.

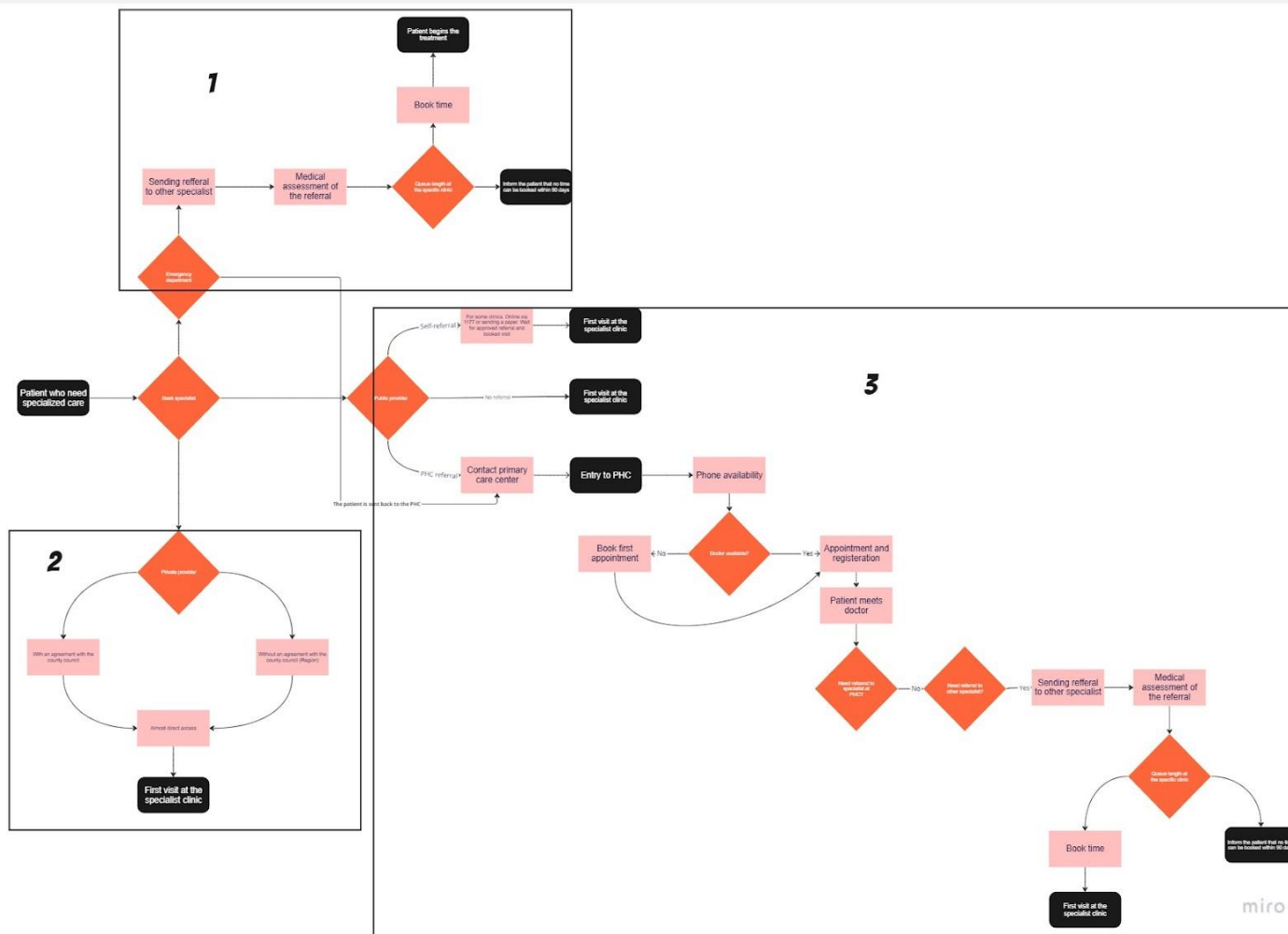


FIGURE 5, OVERVIEW OF PATIENT FLOW TO ACCESS SPECIALIZED CARE.

The additional option as illustrated in Figure 6, is seeking care at the emergency department. If a referral is sent to a specialized clinic the referral is then assessed and depending on the queue length, either a first visit is booked, or the patient is informed that no first visit can be booked within 90 days.

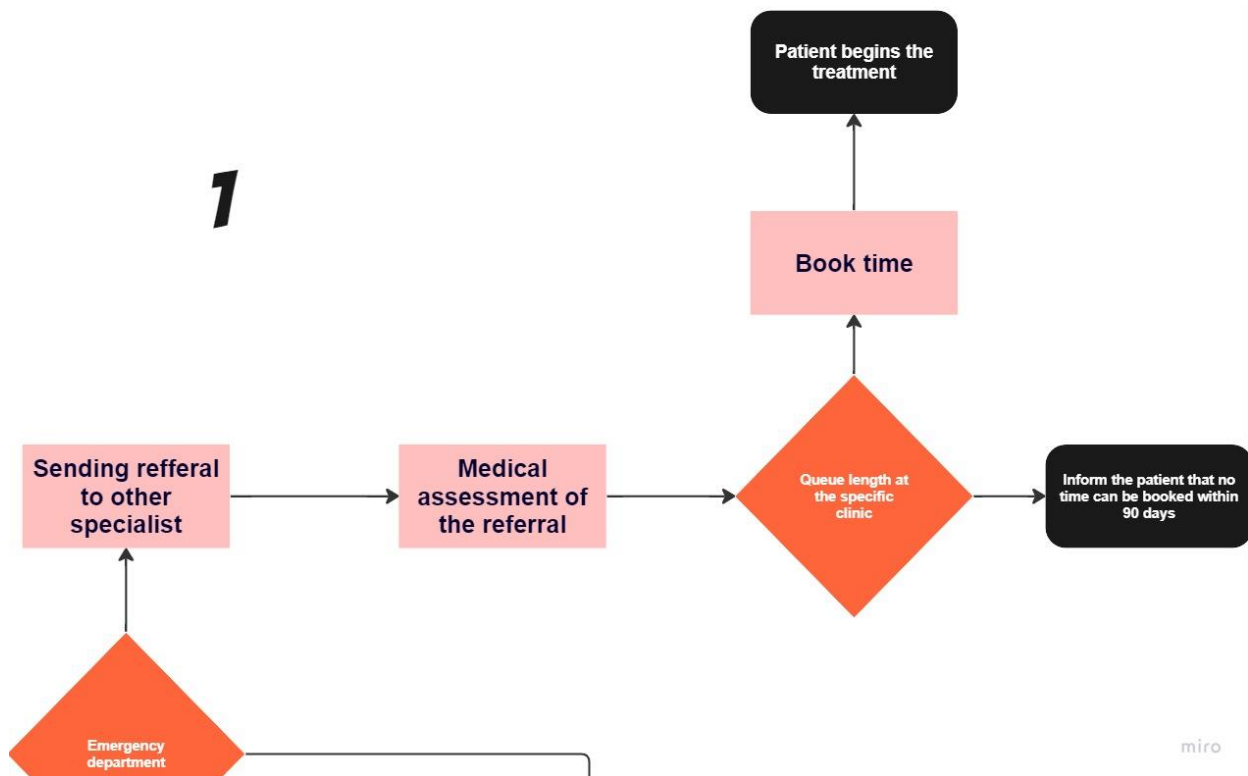


FIGURE 6, SEEKING CARE FROM THE EMERGENCY DEPARTMENT.

In Figures 7 and 8, the choice of seeking care from a public provider is visualized. As explained in the background, the patient needs a referral to access publicly financed specialized care clinics. There are also clinics where patients can book their first visit without a referral or where patients can write a self-referral.

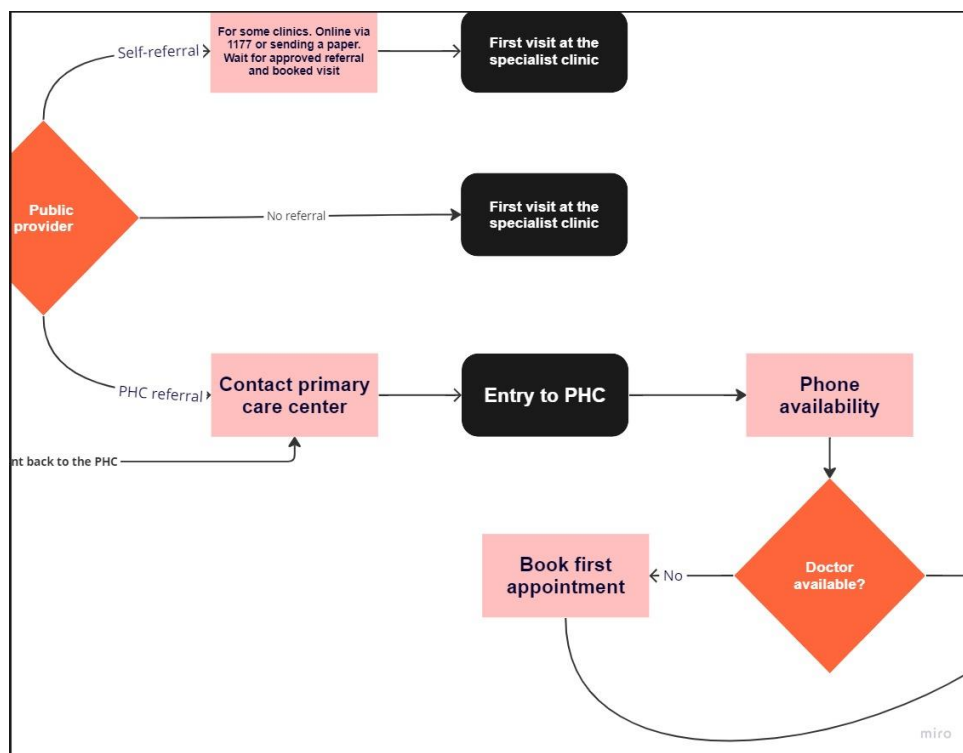


FIGURE 7, SEEKING CARE FROM A PUBLIC PROVIDER.

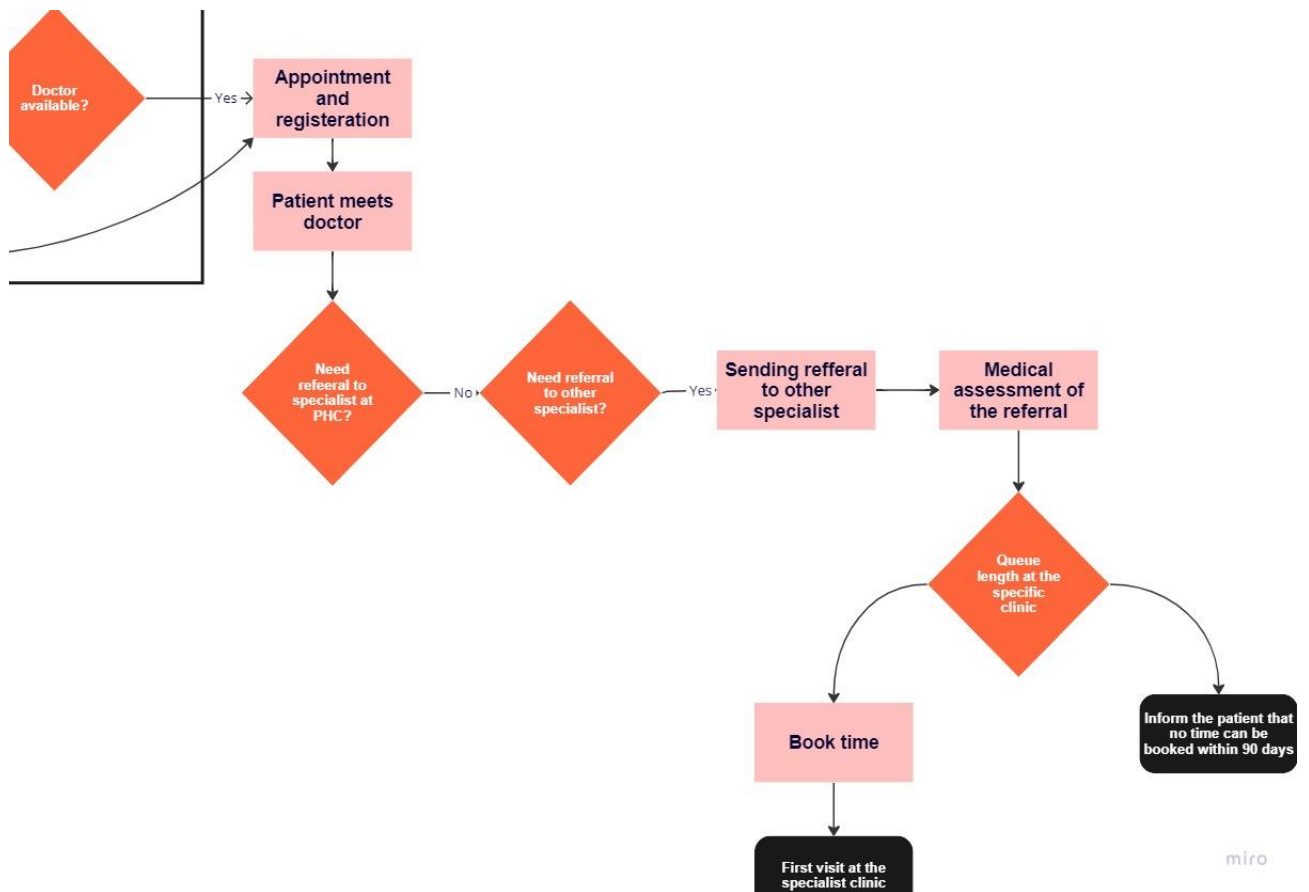


FIGURE 8, SEEKING CARE FROM A PUBLIC PROVIDER PART2.

Finally, in Figure 9, the choice of seeking care from a private provider is visualized. Where patients get almost direct access to the clinic as explained in the background.

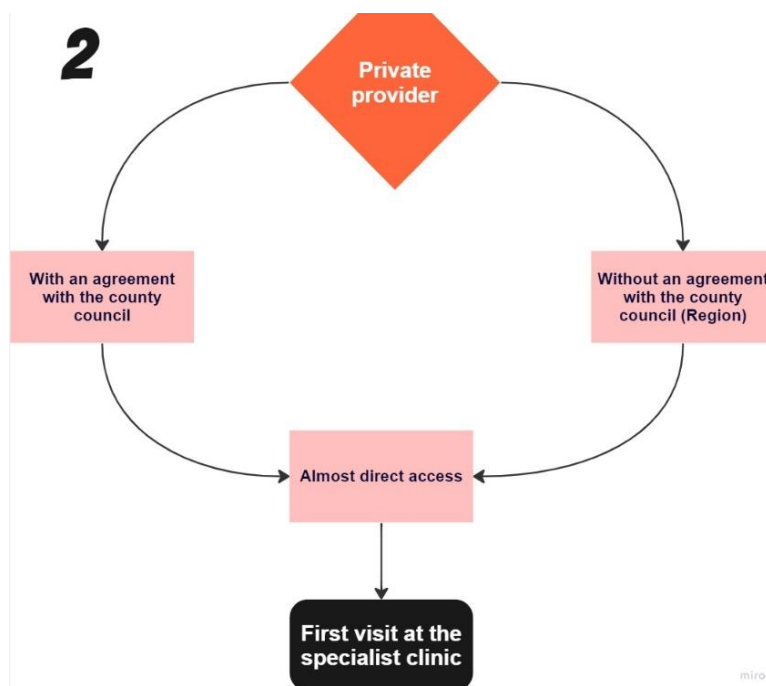


FIGURE 9, SEEKING CARE FROM A PRIVATE PROVIDER.

Moving on to the eight categories, in Figure 10, we see the categories together with their sub-elements and factors. Note that each category has a specific color. The identified sub-elements are the elements that influence:

- The waiting time to get specialized care.
- Access to specialized care.
- The care quality.

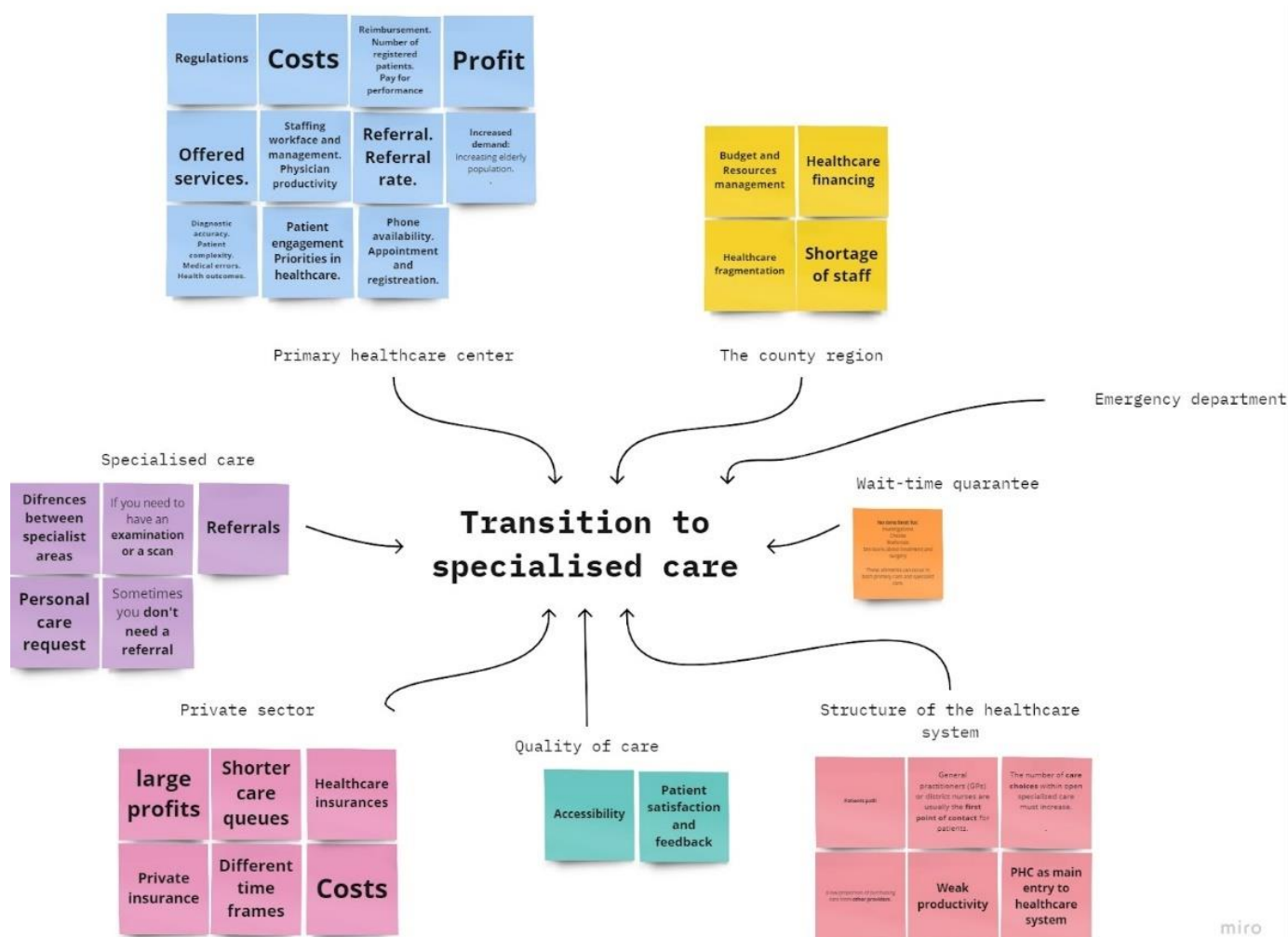


FIGURE 10, THE EIGHT CATEGORIES WITH THEIR ELEMENTS.

The eight categories and their sub-elements are further represented in table 5:

TABLE 4, THE EIGHT CATEGORIES WITH THEIR ELEMENTS.

Category	Elements
PHC	<ul style="list-style-type: none"> • Regulations • Costs • Profit • Reimbursement • Number of registered patients • Pay for performance

	<ul style="list-style-type: none"> • Offered services • Staffing workforce and management • Physician productivity • Referral and referral rate • Increased demand • Diagnostic accuracy and medical errors • Patient complexity • Patient engagement • Priorities in healthcare • Phone availability • Appointment and registration
The county region	<ul style="list-style-type: none"> • Budget and resources management • Healthcare financing • Healthcare fragmentation • Shortage of staff
Emergency department	A referral is sent to a specialist clinic when needed.
Wait-time guarantee	No time limit for specific interventions, checks, referrals, and decisions about treatment and surgery.
Structure of the healthcare system	<ul style="list-style-type: none"> • Patient's path through care • General practitioners as the first point of contact • Number of care choices within specialized care • Seeking care from other providers • Weak productivity • PHC as the main entry to the healthcare system
Quality of care	<ul style="list-style-type: none"> • Patient satisfaction and feedback • Accessibility
Private sector	<ul style="list-style-type: none"> • Large profits • Shorter queues • Healthcare insurances • Costs
Specialized care	<ul style="list-style-type: none"> • Differences between specialist areas • Referrals • The need for examinations or scans

Furthermore, in Figure 11, the elements from the eight categories with their relationships are presented in a map. The colors of the represented elements correspond to each category color in Figure 10. Each element influences the waiting time to get specialized care.

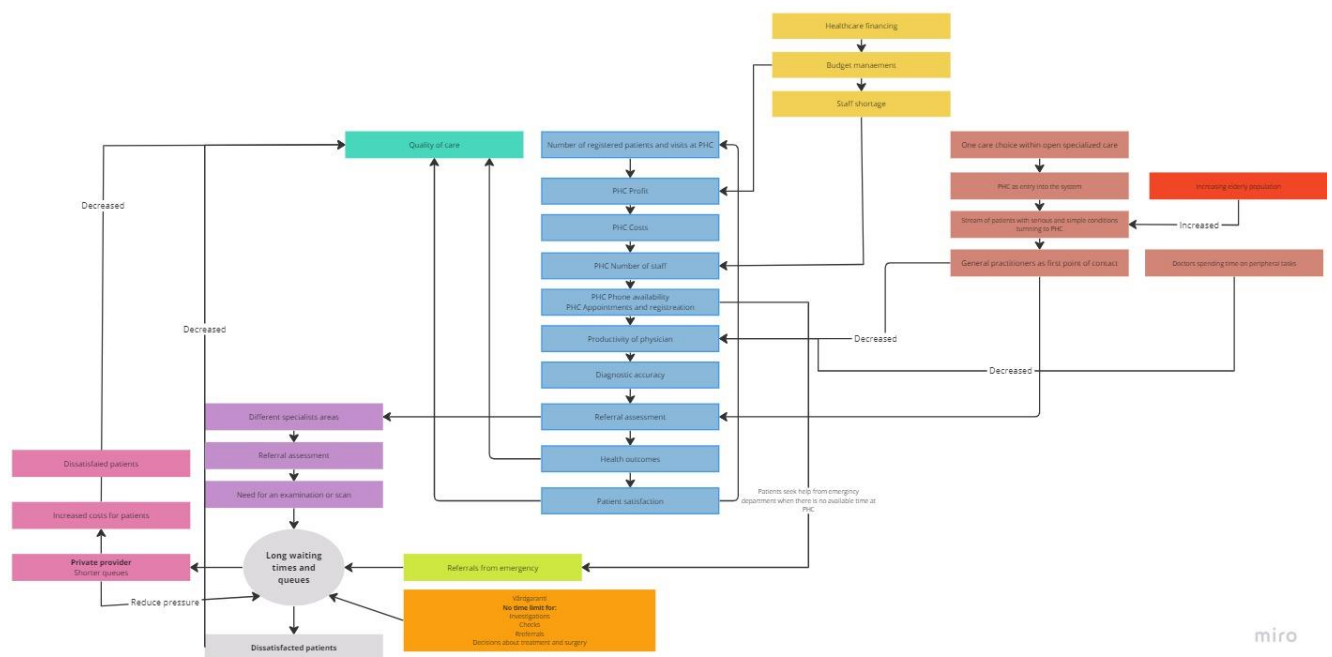


FIGURE 11, THE ELEMENTS WITH THEIR RELATIONSHIPS.

The elements of each category are linked together and influence each other. As we see in Figure 12:

- Healthcare financing affects budget management which affects staff shortage and PHC profit. Furthermore, staff shortage affects PHC number of staff.
- The number of registered patients influences PHC profit as well, which affects PHC costs and the number of staff. This affects phone availability, which affects appointments and registration.
- When there are no available times at PHC patients seek care from the emergency department.
- One care choice within specialized care and that PHC is the entry into the system creates a stream of patients with serious and simple conditions turning into PHC. This stream has also increased because of the increasing elderly population.
- General physicians are the first point of contact with patients for medical assessment of both serious and simple conditions and they have to deal with many peripheral tasks. These two factors decrease the productivity of physicians. Which affects diagnostic accuracy, referral assessment, and health outcomes.
- Health outcomes affect patient satisfaction which is directly linked to care quality.

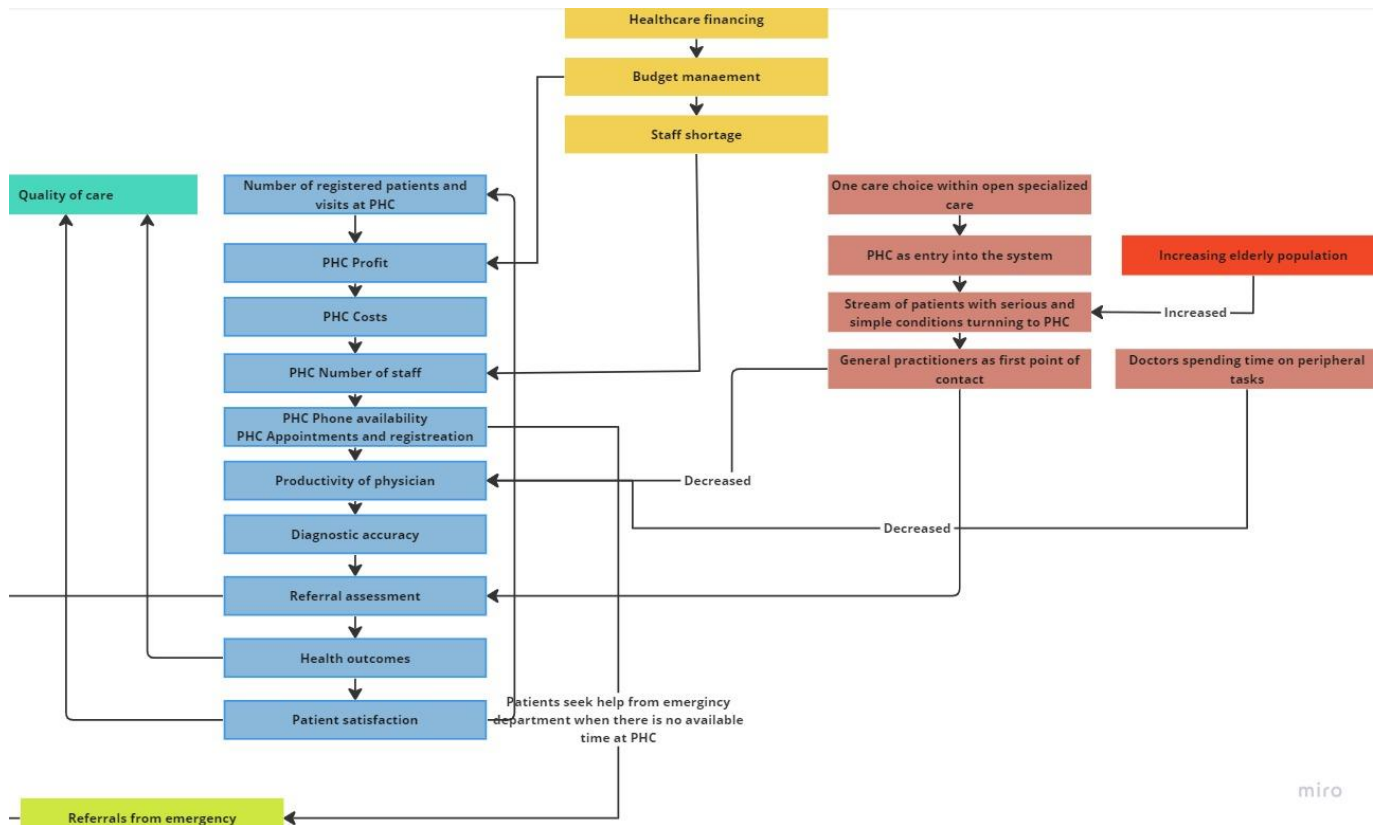


FIGURE 12, CLOSER LOOK AT SOME ELEMENTS.

Furthermore, as we see in Figure 13:

- The referral assessment time is affected by the type of specialist care.
- The need for an examination affects the waiting time.
- The time guarantee, and that some patients leave the public queue and seek care at a private center or at the emergency department, affect the waiting time.
- Long waiting times in the publicly funded system and the expensive care costs at private care clinics lead to dissatisfied patients which affect the care quality.

specification document to form a baseline for the game. This is to bounce back to the main objectives during the design phase. Lastly, creating the questions that are to be answered after playing the game was to make it easier for the designer to stay within the requirements and focus on the reason the game was developed and the outcome the game will deliver.

At this point, it was time to begin designing the prototypes. Each prototype was to be designed, constructed, and tested. This was done including several steps for each of the designed prototypes:

1. Design the gaming elements.
2. Choosing a game format.
3. Writing a game concept report to cover the gaming elements and the objective of the game prototype.
4. Construct the game prototype.
5. Test the game prototype during a game session.

The previous first 3 steps were done through an iterative process. Progress was made through a series of repetitive iterations. This is because completing the steps in one linear sequence was not possible. For example, choosing a game format was not possible to do in one single step. Designing the game elements was done at the same time while thinking of an appropriate game format and writing the concept report. However, the last 2 steps were done in a linear sequence. The following paragraphs describe all the design decisions made for each of the prototypes including the roles, scenarios, rules, and resources. In addition, the construction of each prototype is explained as well.

Prototype 1

The first step was to study the stakeholder's table (Table 4) and relationships (Figure 3). Reading and analyzing the interests, responsibilities, resources, and conflicts in the table was an essential part of the decision-making process. Then, based on the highlighted objectives in and of the game, and the selected system components, a choice of the game players was possible to make. Each of the mentioned stakeholders in the table was analyzed to determine whether the stakeholder is to be included in the game or not and what role the stakeholder is assigned. Thus, the chosen stakeholders were the most important stakeholders in relation to the objectives for which the game is developed. There were 3 different types of roles to determine:

- ❖ **Played roles:** The played roles (by the participants) were chosen based on the questions to be asked during debriefing. Because during the debriefing the performance of the participants who have a played role in the game will be discussed and evaluated.
- ❖ **Pseudo roles:** These roles were chosen based on the stakeholders who are important for running the game but are not subject for evaluation during the debriefing. The facilitator can take care of these roles. However, there were no pseudo roles in the first prototype.
- ❖ **Simulated roles:** These roles were chosen based on the roles that are not played but are important for the course of the game. The roles were chosen to occur as cards that represent the role/stakeholder.

The resources in the game were chosen based on the need of each simulated or played role in the game. The dynamics of the game were to be regulated by introducing events and scenarios. The scenarios were chosen by determining the responsibilities (in table 4) for each of the played roles in the game. This is to figure out what actions and events were to be introduced in the game. In addition, events were chosen by identifying aspects that the participants needed to pay attention to. There were 2 different types of events to determine:

- ❖ **Planned events:** These events were to direct the game in a predetermined direction and introduce complexity to the game. They were chosen based on the time and content of the event. It was planned exactly at which moment these events will be introduced.
- ❖ **Random events:** These were the events that will add the fun factor to the game. The moment when these events occur is predetermined but what the event is, is randomized. The participants will get one random event and follow the instructions to deal with depending on which event that happened.

Finally, the rules of the game were set. The rules were to be set based on how the behavior of the participants must be directed, the interactions between participants must be regulated, and the freedom of action must be restricted for each of the participants.

Hence, after the design of the first prototype was completed, the prototype was to be constructed. As the game prototype was paper based, the design of the game materials was done using Miro. Then the game materials were printed, the game board was drawn by hand, and lastly the concept report was completely written. In Figures 14, 15, and 16, we see the designed game materials for the first prototype.

The game material

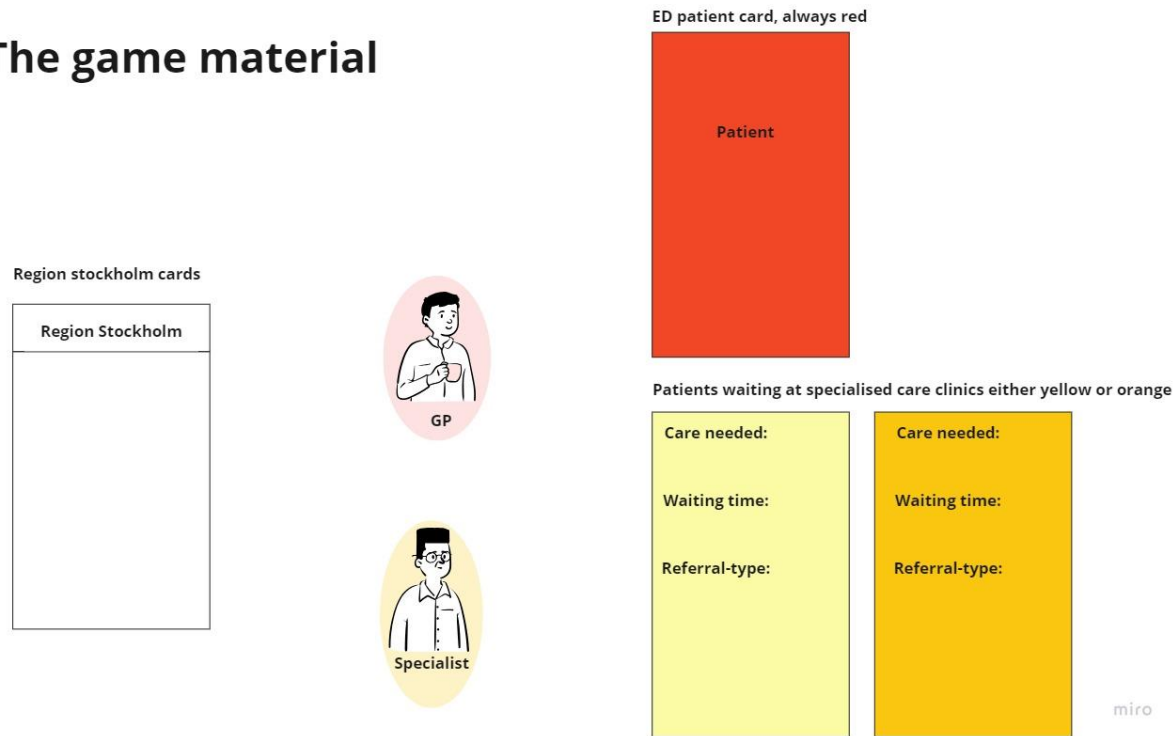


FIGURE 14, GAME MATERIALS FOR THE FIRST PROTOTYPE.

In Figure 14, we see the designed “Region cards”, and patient cards including the red emergency department cards and patients who need specialized care cards (yellow and orange). We also see the designed tokens that represent a general physician and a specialist. The red color refers to a patient who needs urgent care. While the yellow refers to a patient who needs specialized care but is in a stable condition and can wait. Lasty, the orange color refers to a patient who needs specialized care, but the medical condition is getting worse the more the patient waits.

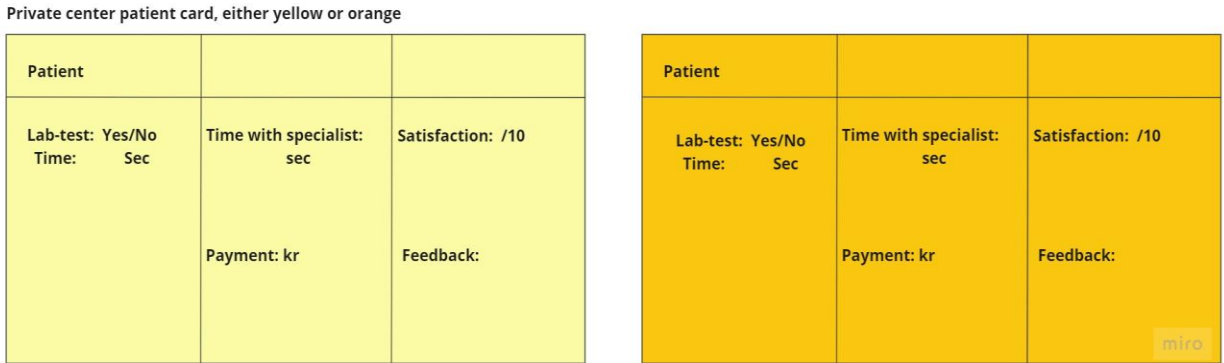


FIGURE 15, GAME MATERIALS FOR PROTOTYPE 1.

In Figure 15, we see the private center patient cards colored yellow or orange. The same color coding as for the previous cards is applied to these cards as well. The cards are to be twisted so that each card will have 3 different faces. The faces of each card are to be filled with information as it is specified in Appendix II.

PHC patients cards

Patient				
Lab-test: Yes/No Time: Sec	Time with GPS: sec	Satisfaction: /10		
	Payment: kr	Feedback:		
			I got my primary care! place me with you :)	

Patient				what happens now
Lab-test: Yes/No Time: Sec	Time with GPS: sec	Satisfaction: /10		
	Payment: kr	Feedback:		
			I !	

For the yellow and orange cards the patient: is referred, will go to ED, will go to private center

Patient				what happens now
Lab-test: Yes/No Time: Sec	Time with GPS: sec	Satisfaction: /10		
	Payment: kr	Feedback:		
			I !	

FIGURE 16, GAME MATERIALS FOR PROTOTYPE 1, PART 3.

In Figure 16, we see the primary healthcare center patient cards with three colors. The same color coding is applied here as well. In addition, the green color refers to a patient who needs primary care. The cards are to be twisted so that green cards will have 4 different faces. While yellow and orange cards will have 5 different faces. The faces of each card are to be filled with information as it is specified in Appendix II.

A game session was conducted to test the first prototype of the game to determine if the game works as it should. The game session consisted of three steps:

1. The facilitator introduces the game.
2. The game is tested and played.
3. Debriefing.

The facilitator starts by introducing the game, rules, players, and a short background to the real-life problem. The debriefing step was designed by preparing the questions to be asked by the facilitator to the participants after playing the game. The goal of the debriefing was to make the game's objectives manifest. Thus, the following questions were created:

- ❖ What are the connections between the experience you had while playing the game and the experience in real life situations?
- ❖ Can you reflect on what happens when patients are transferred to specialized care clinics?
- ❖ Can you discuss what is causing long waiting times and queues to access specialized care?

Thus, during the first game session, the game was introduced, tested, and discussed. Moreover, during the debriefing part of the first session, notes were taken by the facilitator to improve the game and develop the second prototype.

Prototype 2

The second prototype was designed based on the discussions and debriefing from the first game session of the first prototype. Moving from the first prototype to the second prototype was done by checking all the observations and notes taken in the first game session one by one. In addition, the system analysis outcomes and the game objectives were revised in detail. This is to enable the best modification and design of the second prototype. The second prototype's roles, resources, events, and rules were designed using the same principles as for the first prototype. However, the focus was on the outcomes of the first game session to ensure that the new prototype is a better version of the first one. Furthermore, the game materials were changed, and this was designed using Miro. In Figures 17, 18, 19, 20 and 21 we see the designed game materials for the second prototype.

Patient cards

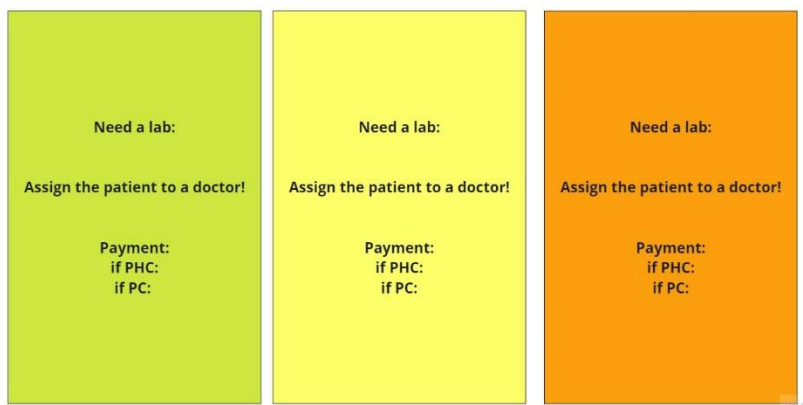


FIGURE 17, GAME MATERIALS FOR PROTOTYPE 2, PART 1.

In Figure 17, we see the patient cards. The same color coding used for the first prototype applies here as well. In addition, we see that each card provides information (to be written by hand) about whether the patient needs a lab or not and the payment.

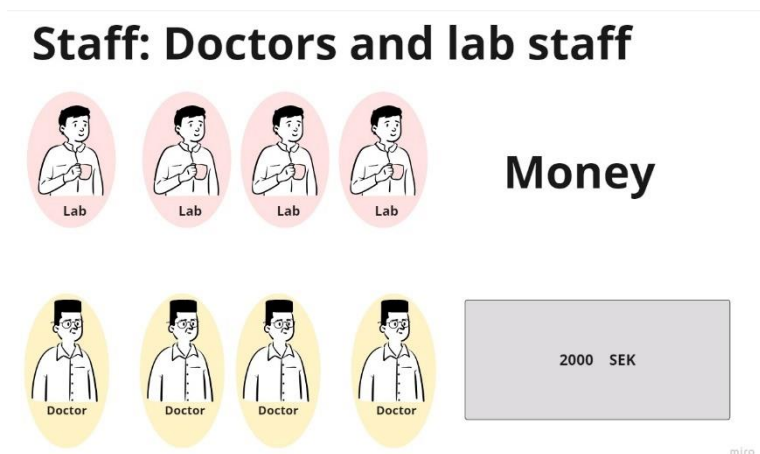


FIGURE 18, GAME MATERIALS FOR PROTOTYPE 2, PART 2.

In Figure 18, we see tokens that represent lab staff and doctors and the money. In Figure 19, we see “Stockholm Region” cards that are to be used by the facilitator as it is described in Appendix III.

Stockholm Region Cards: 6

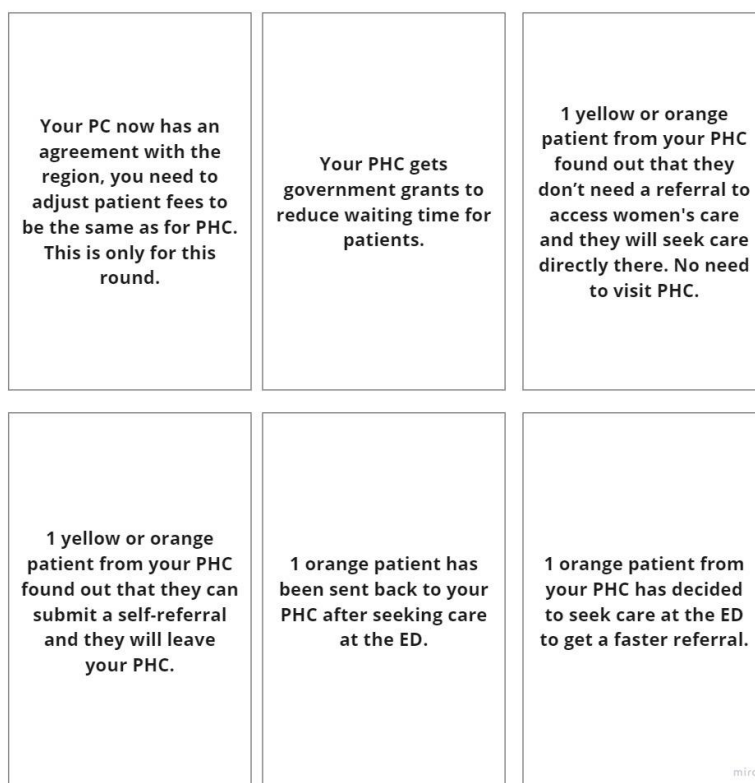


FIGURE 19, GAME MATERIALS FOR PROTOTYPE 2, PART 3.

In Figures 20 and 21, we see some pink “Chance” and blue “Power” cards that are to be used by the players as it is described in Appendix III.

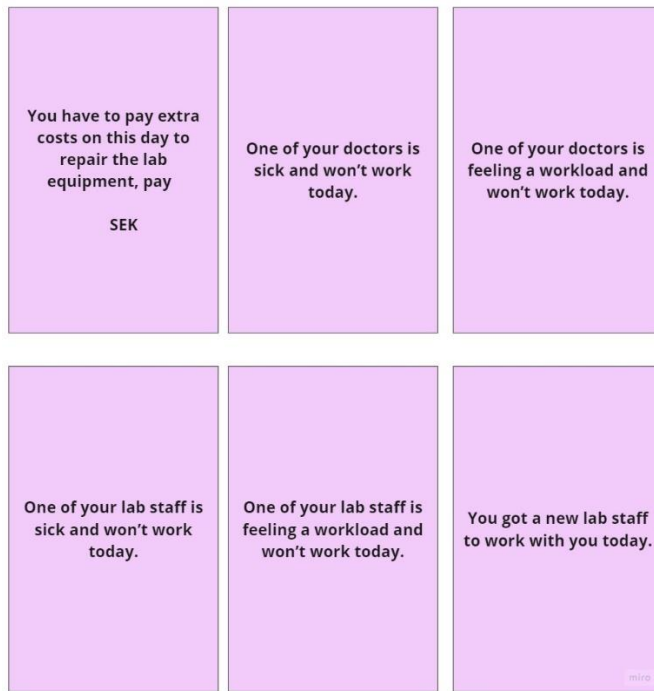


FIGURE 20, GAME MATERIALS FOR PROTOTYPE 2, PART 4.

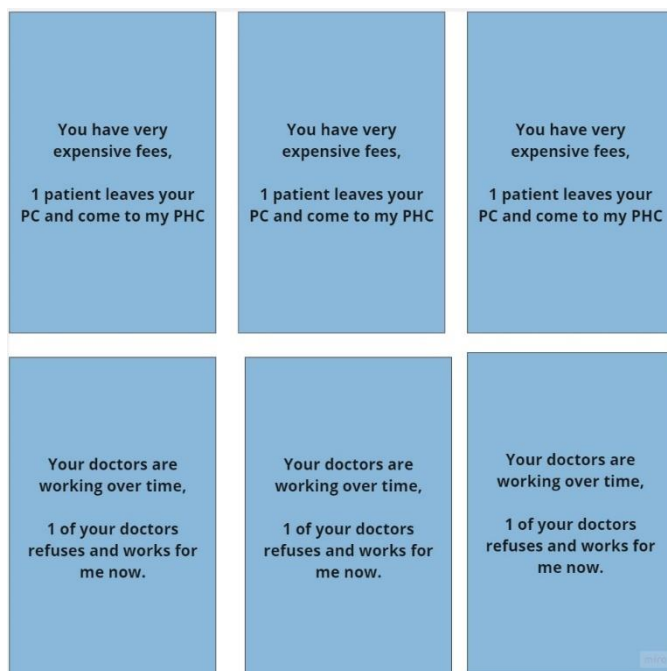


FIGURE 21, GAME MATERIALS FOR PROTOTYPE 2, PART 5.

A new report of the game concept was written as well. The second prototype was tested and discussed during another game session. The second game session was designed with the same steps and same debriefing questions as for the first session. Thus, during the second game session, the game was introduced, tested, and discussed. Notes were taken by the facilitator to improve the game and develop the third prototype.

Prototype 3

Based on the discussions from the first and second game sessions, the third prototype of the game was developed. Again, the same principles were used to design the game roles, rules, events, and resources. The design of the third prototype was done using all the outcomes of the first and second prototypes together with the system analysis outcomes and game objectives. Thus, a new prototype was designed, and a new game concept report was written. Finally, the prototype was tested and discussed during the third game session. The third game session was also designed using the same method as for the previous game sessions.

Furthermore, the game materials were changed, and this was done using Miro. In the third prototype the following game materials were used:

- ❖ The same tokens that represent general physicians and specialists as in the first prototype (for reference see Figure 14).
- ❖ 3 kinds of patient cards as we see in Figure 22. Each card provides details about the patient complaint and the potential need for a lab test.
- ❖ Power cards as for the second's prototype blue cards (Figure 21) were to be used by the players. This is as described in Appendix IV.



FIGURE 22, GAME MATERIALS FOR PROTOTYPE 3.

In Figure 22, we see the green card which refers to a patient who needs primary care. We also see two cards that refer to a patient who either needs to get access to the psychiatry specialized clinic or to the ears-nose-throat specialized clinic.

Prototype 4

Finally, the final prototype of the game was accomplished as an outcome of all the held game sessions, discussions, and debriefing of the previously designed prototypes. In addition, a detailed revision of the game specifications and system analysis results was done to obtain the best possible results. Using the same principles to design the roles, rules, events, and resources in the game as for the previously designed prototypes. However, as the third prototype was considered almost done, the focus was on highlighting the role of the “patient” in the final prototype. Thus, the revision of the system analysis was performed concentrating on the responsibilities and interests of the stakeholder “patient” (for reference, see table 4). The goal was to increase the role of the patients and make the players think more about the patient in the game. Furthermore, a new concept report was written, and the final prototype was discussed and tested during the last game session. Which was held in the same way as for the previously held sessions.

The game materials were changed using Miro. The following materials were designed:

- ❖ The same tokens that represent general physicians, and specialists as in the first and third prototypes were used in the final prototype (for reference see Figure 14).
- ❖ The same money used as in Figure 18.
- ❖ 3 kinds of patient cards as we see in Figure 23. Each card provides details about the patient complaint and which provider the patient is seeking.



FIGURE 23, THE FINAL VERSION OF PATIENT CARDS.

In Figure 23, we see the three kinds of patients; the green patient card represents a patient who needs primary care and will always be seeking the PHC. The two orange cards represent patients who need specialized care. The patients can either seek the public hospital clinics or private clinics depending on the wish of the patient. The patient who won't wait more will be seeking a private provider, while the patient who won't pay more will be seeking the public provider. All details are provided in the final prototype of the game in Appendix V.

Prototypes Summary

Prototype 1

The first prototype marked the initial implementation of all obtained results of the system analysis and game design. The focus was on designing a serious game that works as a research tool to answer the research question stated in the thesis. Thus, this prototype reflected the early stages of applying all learnings and the knowledge gained about designing about serious game design.

Prototype 2

The focus in the second prototype was on improving and refining the mechanics. The primary focus was on eliminating the bias in the game. Thus, the first prototype was to be improved by making sure that the game is not biased. Building on insights from the first prototype, the goal was to obtain a well balanced and impartial game. Furthermore, the players' actions were to be changed to reduce the complexity in the game.

Prototype 3

The third prototype aimed at striking a balance between the complexity and the enjoyment factor of the game. Thus, the gameplay experience was to be refined. An important aspect was also to shift the focus of the game towards providing insights into the problem rather than proposing solutions.

Prototype 4

The more game prototypes are designed, and more game sessions are held the more advanced the prototype becomes. As the game mechanics almost worked as it should in the third prototype and considering the timeline of the thesis, the last prototype aimed to address the remaining aspects, mainly in answering the research question. Focusing on the patient perspectives in the game and ensuring alignment with the research goals. After testing the fourth prototype during the game session, it was considered sufficient to stop at. This is considering the satisfaction achieved of both the game mechanics and goals.

3.3 Validation and Evaluation

3.3.1 Validation

The developed prototypes of the game were designed based on real-world data and evidence. This is to make the validation of the game design grounded in real-world information and to ensure that the designed prototypes have an alignment between

the real-life situations to be simulated by the game and the game mechanisms. To do this, several decisions in the game prototypes were to be made including:

- Number of patients.
- Patients' main complaint.
- Patient fees.
- Number of general physicians and specialists.
- Scoring and eventual calculations.

Thus, an analysis of real-world data was conducted to collect both quantitative and qualitative data to use in the prototypes. This was done as a part of the literature review step and involved consultations with experts about the type of data to collect.

Decisions regarding the number of patients, patient fees and main complaints simulated in the game were derived from collecting and analyzing real-life data and statistics available at different Swedish websites (as mentioned in section 3.1.2) including SKR, The National Board of Health and Welfare, and the "Care in Numbers" websites. The collected data included information about:

- Number of waiting patients for their first visit at a primary healthcare center and a specialized care clinic (all specializations) in Stockholm.
- Number of visits to a doctor at a primary healthcare center and a specialized care clinic (all specializations) in Stockholm.
- Patients' fees for a visit at a primary healthcare center and a specialized care clinic (publicly funded and private clinics).

In addition, decisions regarding the number of general physicians and specialists were also derived from collecting real-life data and statistics. These data were available at "The National Board of Health and Welfare" website and included information about:

- Number of doctors working at a primary healthcare center in Stockholm.
- Number of specialized doctors working at a specialized care clinic (public and private) in Stockholm.

After gathering all the data relevant for the game prototypes, the data were to be incorporated to the game. This was done through fitting the real-world data to the game materials, rules, and principles. Thus, the same patient fees as in real-life were used in the game. When it comes to the number of patients and doctors in the game, the "Arithmetic mean" was calculated to decide on that. Lastly, to decide which patients' complaint to include in the game, an analyse was done to decide based on the objective of the game and the available real-life data. Thus, the most suitable complaints were included in the game.

Scoring was different for each of the 4 developed prototypes. However, scoring was to be connected to the objective of the game. Therefore, scoring in most cases was about how many patients who need specialized care are referred or treated. Detailed information about the scoring of each prototype can be found in Appendix II, III, IV, and V.

3.3.2 Evaluation

To assess the effectiveness of each of the game prototypes, an iterative evaluation process was conducted. As described in the previous section (3.1.3), each developed prototype was tested and discussed during the corresponding game session. Game sessions were used to gather feedback and notes for each of the developed prototypes. Then, the feedback and notes were used to create the next new prototype and so on. The sessions' discussions covered different aspects including:

- Participants' impressions and expectations.
- The success of the game in terms of the stated objectives' achievement.
- The usability of the prototype.
- The prototypes' entertainment and engagement elements.
- The designed game materials.

The outcomes of each game session served as the foundation for analyzing the weaknesses and strengths of the developed prototype and designing a new prototype. Giving valuable insights and reflecting on both issues of healthcare systems and serious game design. Thus, the iterative evaluation process facilitated the refinement of the prototypes' development based on experts' feedback. This led to a continues evaluation process and accomplishing the last prototype of the game.

Chapter 4

Results

4.1 Literature Review

The search from different databases returned many records. To use the most relevant among all, the identified literature is filtered. First the literature is screened by title to reduce the number of remaining records. Then literature is screened further by abstract. In this way, several documents will be remained to be assessed in full text. The documents are of different kinds including books, reviews, articles, research papers, laws, and institutions report. Lastly, the literature is analyzed using theme analysis where the central themes are examined to uncover the purpose of the text. The text is read to get a comprehensive understanding and identify the themes. Then, notes are taken to draw conclusions.

Thus, the literature review has led to many returned records for each search. Using screening and eligibility (filtering) has led to inclusion of several documents for each search. The results for this are specified in table 3 as follow:

TABLE 5, THE RESULTS OF THE LITERATURE REVIEW.

Search topic	Returned records	Remained records after exclusion by title or abstract	Included studies
Participatory design approaches for healthcare	150	16	5
Serious games and healthcare	294	10	4
Waiting times and queues and Sweden	371	22	18
Specialized care and Sweden	137	26	6
Primary healthcare and Sweden	428	32	14
The Swedish healthcare system	79	15	8

This has led to 55 detected and included documents in total. The included studies/documents are classified as follows:

- 20 Research papers
- 19 Laws
- 12 Institutions report
- 3 Books

- 1 Review article

4.2 Game Design

4.2.1 Game Design and Construction

As said, 3 prototypes of the game were developed before the final version (prototype 4) was created. Appendix II provides the game concept report of the first prototype. The game board and components for the first prototype are presented in Figure 24.

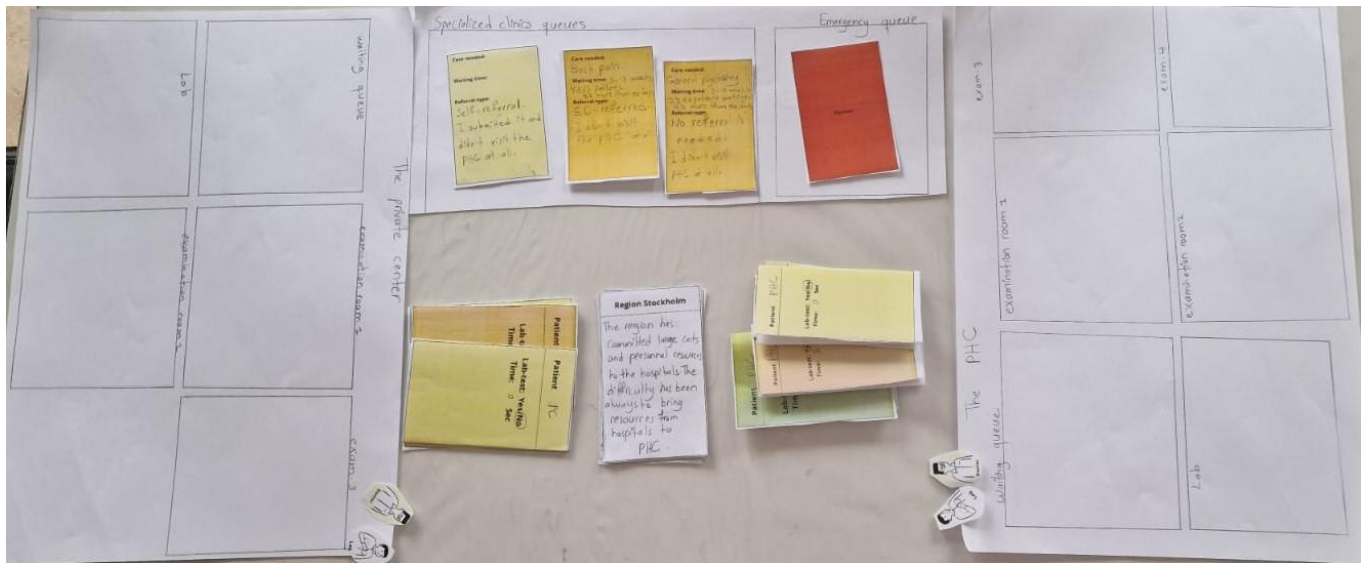


FIGURE 24, PROTOTYPE 1 OF THE GAME.

In Figure 24, we see how the game look like and the components including:

- Doctors and lab staff for each player (PHC and private center administrators)
- The emergency department queue with red patient cards.
- The specialized clinics queues with three patient cards.
- The PHC with lab room, waiting queue, and examination rooms.
- The private center with lab room, waiting queue, and examination rooms.
- The region Stockholm cards, which are the white cards.
- The patient cards pile for the PHC.
- The patient cards pile for the private center.

Appendix III provides the game concept report of the second prototype. The game board and components for the second prototype are further represented in Figure 25.

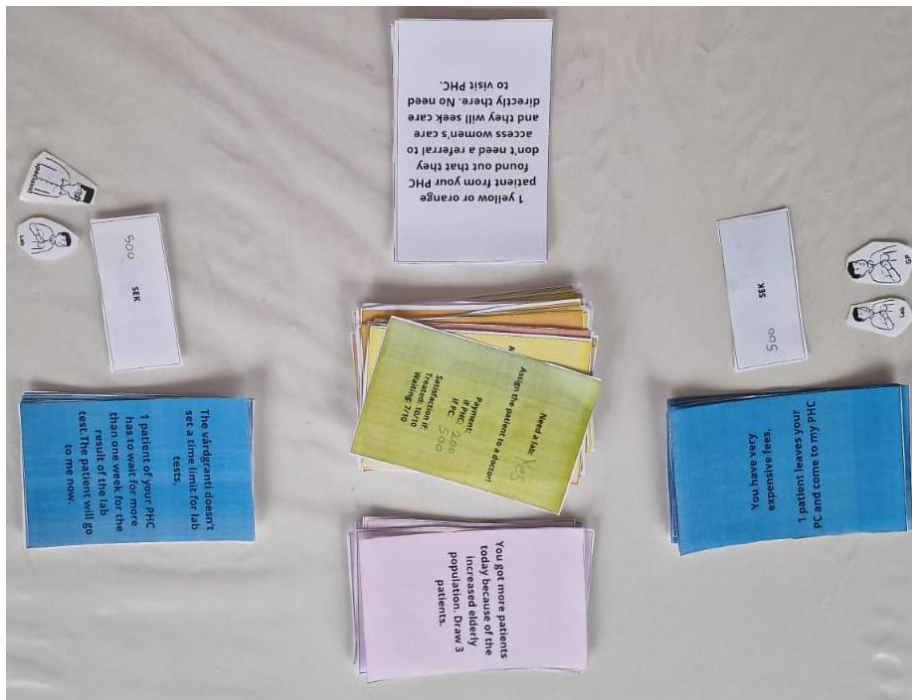


FIGURE 25, PROTOTYPE 2 OF THE GAME.

In Figure 25, we see how the game look like and the components:

- Region cards which are the white cards.
- Chance cards which are the pink cards.
- Patient cards which are placed in the middle and have green, yellow, and orange colors.
- Attract patient cards which are blue and divided between the players (PHC and private center administrators).
- Money, doctors, and lab staff for each player.

Appendix IV provides the game concept report of the third prototype. The game components are further represented in Figure 26.

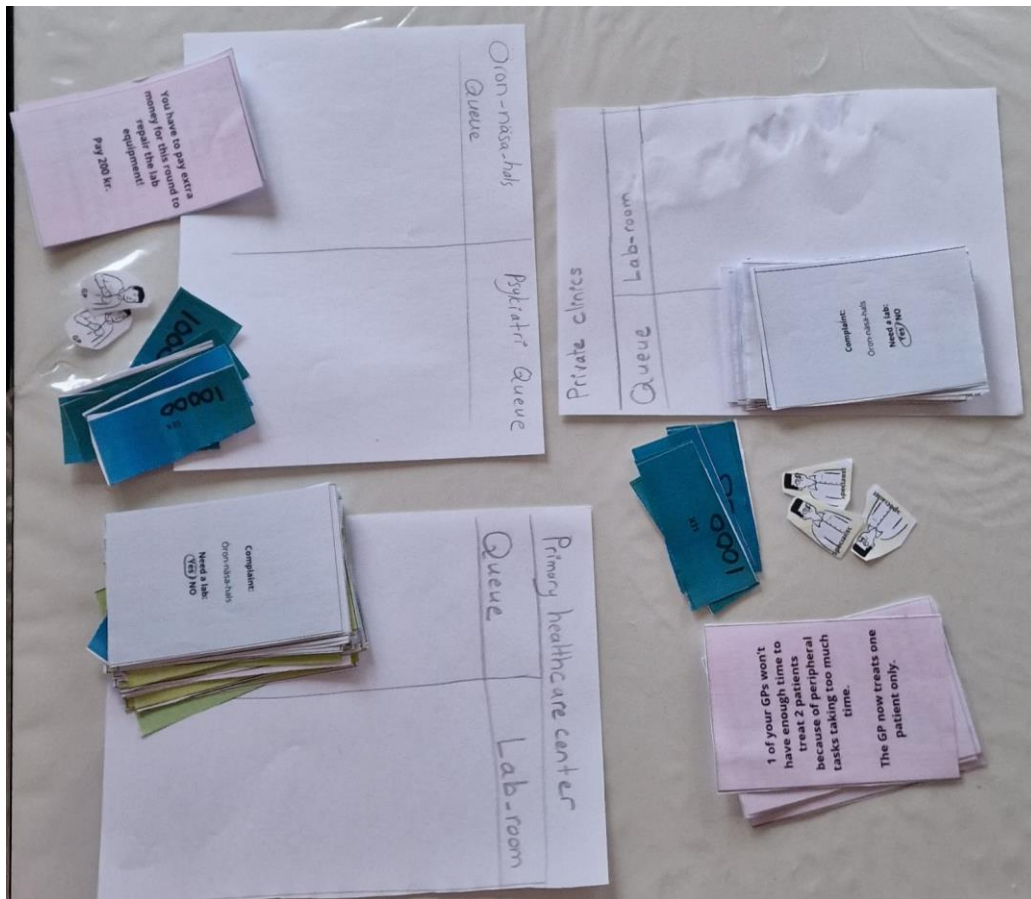


FIGURE 26, GAME BOARD AND COMPONENTS FOR PROTOTYPE 3.

In Figure 26, we see how the game looks like and the components including:

- The queues and lab rooms for the primary healthcare center and the private clinics.
- The money for each player.
- The specialists and general physicians for each player.
- The patients in the queue for each player.
- The “Attract patients” cards for each player.

Appendix V provides the game concept report of the final prototype. The game components are further represented in Figures 27, 28 and 29.

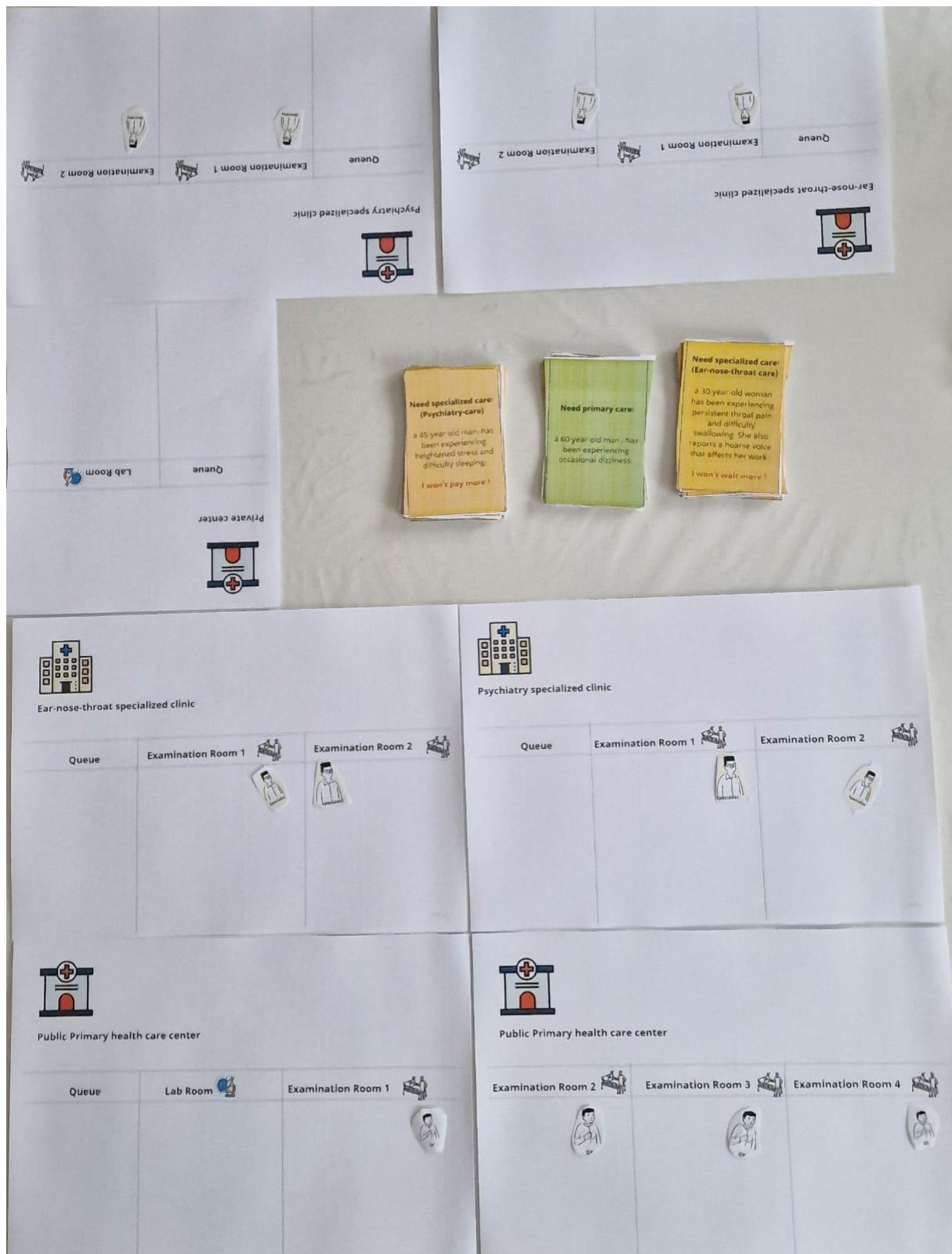


FIGURE 27, THE GAME BOARD OF THE FINAL PROTOTYPE.

In Figure 27, we see how the game board for the final prototype looks like.

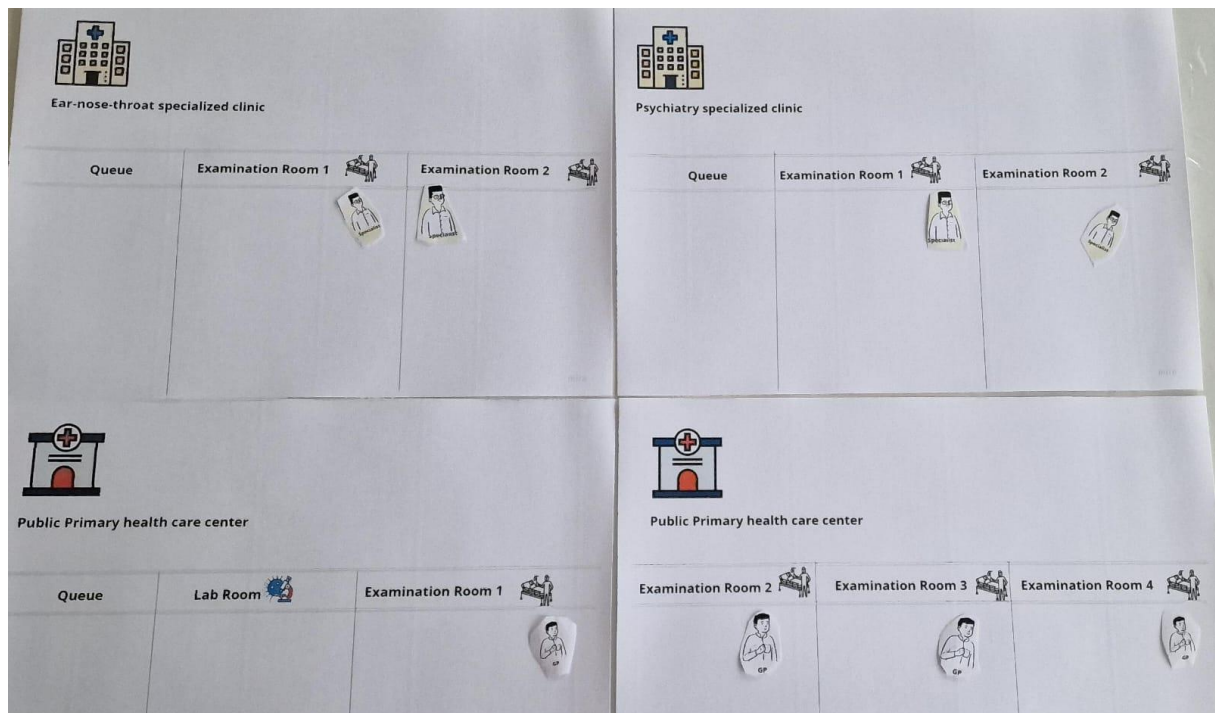


FIGURE 28, THE GAME COMPONENTS OF THE FINAL PROTOTYPE, PART 1.

In Figure 28 we see the following game components:

- ❖ The public facility consists of a PHC (with queue, lab room and examination rooms) and 2 specialized clinics in a public hospital (with queue and examination rooms).
- ❖ The specialists and general physicians working at each facility.



FIGURE 29, THE GAME COMPONENTS OF THE FINAL PROTOTYPE, PART 2.

In Figure 29 we see the following game components:

- ❖ The private facility includes the center’s lab room, queue and 2 specialized clinics with examination rooms and queues.
- ❖ The 3 patients’ queues as it was shown in Figure 23.
- ❖ The specialists working at the clinics.

In addition, all patient cards and the game board are available in Appendix VI.

4.2.2 Game Sessions

As stated before, for each of the developed prototypes a game session was held to test and discuss each of the designed game prototypes. The following table provides information about the feedback and notes obtained during each of the sessions.

TABLE 6, FEEDBACK AND NOTES FOR EACH OF THE SESSIONS.

	Session 1	Session 2	Session 3	Session 4
What worked	<ul style="list-style-type: none"> ❖ The game materials designing was sufficient. ❖ The events that introduce policies’ changes were sufficient. 	<ul style="list-style-type: none"> ❖ The designer can’t in advance know how the game will go. ❖ The game materials were sufficiently designed. ❖ The events provided by the “Region cards” were interesting. 	<ul style="list-style-type: none"> ❖ The steps required to play the game were good enough. ❖ The balance between complexity and fun is obtained. 	<ul style="list-style-type: none"> ❖ The game is no longer a comparative game. ❖ The patient role was sufficiently highlighted in the game. ❖ The game materials were sufficiently designed. ❖ The players can make decisions about the patient treatment.
What didn’t work	<ul style="list-style-type: none"> ❖ The ability to track the scoring by players during the game. ❖ Allowing all players to understand everything that 	<ul style="list-style-type: none"> ❖ Reduce the things the player does. ❖ What is causing delay to the referral is still not shown in the game. 	<ul style="list-style-type: none"> ❖ The game seems to be a comparative game. ❖ The players were aiming to survive, which makes the game a 	<ul style="list-style-type: none"> ❖ The patients’ feedback to the care provider is not included in the game.

	<p>is going on in the game.</p> <ul style="list-style-type: none"> ❖ Everything written on a card or shown in any way in the game must be understood by the players. ❖ The game must answer the research question which states the reason the game was developed from the beginning. ❖ All players must have the same chance to win/lose. ❖ The game must be balanced regarding complexity and fun. ❖ The facilitator should do as few tasks as possible. ❖ The conflict between players in the game must be shown. 	<ul style="list-style-type: none"> ❖ The game must highlight that needing a lab test is increasing the waiting time. ❖ The patient pile can be divided into several piles. ❖ There are unnecessary steps in game play, which make the game complicated. 	<p>survival game.</p> <ul style="list-style-type: none"> ❖ The focus of the players was on hiring doctors and winning money rather than the research question of the game. ❖ The patient's perspective is not shown in the game. ❖ Let the players make decisions regarding the treatment of patients. 	
Observations during the session	<ul style="list-style-type: none"> ❖ The losing reasons in the game must be based on the reason in real-life. For example, did the player lose because of staff 	<ul style="list-style-type: none"> ❖ The game should give insight to the problem rather than giving solutions. ❖ The facilitator can control 	<ul style="list-style-type: none"> ❖ The less the facilitator talks during debriefing indicates that the game is good enough. ❖ If there is a problem, it 	<ul style="list-style-type: none"> ❖ The more game sessions are held the better the prototype becomes. ❖ The prototype can be further developed as

	<p>shortages, systematic structure, etc.</p> <ul style="list-style-type: none"> ❖ Scoring is what I am tracking. For example, players' responsibilities and resources. ❖ Focus on the interest of each player. For example, patient fees (money), number of patients and doctors, etc. ❖ The designer must not be biased at all in any way while designing the game prototype. ❖ Simple rules lead to complex strategies. 	<p>events when the players are getting bored.</p> <ul style="list-style-type: none"> ❖ For the patient it is a trade-off between time and money. ❖ The need to go back to the objectives of the game and the stakeholders' table while designing the prototype. ❖ Use the players as the simulation. 	<p>will show up in the game automatically.</p> <ul style="list-style-type: none"> ❖ Show in an obvious way if the game is a research game or educational game. 	<p>there are always eventual improvements that can be made after the discussion in a game session.</p>
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Chapter 5

Discussion

In this chapter, the results and limitations of the thesis will be discussed.

5.1 Access to Specialized Care

To analyze the transition of patients to specialized care and inspect how this affects the accessibility to specialized care services in Sweden, a system analysis was performed. The system analysis was a part of the game design as said before. It was done as described previously using several methods but mainly a literature review. The obtained results are summarized in terms of the patient flow diagram (figure 5), the map of “Transition to specialized care” (figure 10), and the map of “Long waiting times and queues” (figure 11).

The flow diagram shows the process of accessing specialized care through different ways. The diagram suggests that the longest way is seeking care through getting a referral from a public PHC. This is because of the long process to get a referral from the PHC, including waiting for a first visit at the PHC. The diagram also suggests that when no referral is needed to access a specialized clinic the process is much shorter. This is because the patient in this case directly contacts the clinic and books a visit.

The maps of transition to specialized care and long waiting times and queues show all the factors that affect access to specialized care. These factors are classified under different categories as it is explained in the methodology section 3.1.2. There it is shown that all these factors affect the accessibility to specialized care services. This is including the structure of the Swedish healthcare system, mainly that the PHC is the entrance to the system and the need for a referral to access most of the publicly funded specialized clinics. It is also shown that the long queues are leading to dissatisfied patients and thus a decreased quality of care. On the other hand, the private providers are reducing the pressure on the publicly funded system by offering shorter waiting times for patients and thus leading to shorter queues but at high costs for patients.

Lastly, the aspect of the PHC being the foundation of the system hierarchy and an entrance to the system had been found to cause:

- **Overcrowding at the emergency department:** Patients who seek care at the emergency department to get a referral are causing overcrowding in the department, which leads to longer waiting times for patients who need urgent care at the department. In addition, the patients are not always referred to a specialized clinic, patients can also be sent back to the PHC.
- **A stream of patients with both simple and serious conditions seeking care at the PHC:** Which causes longer waiting times for patients (to get a visit at the PHC) and stressful work environment for GPs who treats the patients with simple conditions and refer the patients with serious conditions.

- **Patient transition to specialized care is affected:** PHC is acting as a gate keeper which causes longer waiting times for the patients to get a first visit at the specialized clinic they need to visit and additional costs. This is because patients in this case are visiting the PHC only to be referred.

5.2 Analysis of the Game Sessions

In this thesis, a serious game prototype was designed to be used as a research-tool to analyze patients' transition to specialized care and understand why there are long waiting times for the first booked visit at a specialized care clinic. All the performed steps of the thesis beginning from the literature review and ending with the last session of the fourth game prototype, led to valuable findings and learnings.

Gathering appropriate data and information through the literature review phase was the first outcome. After this, the prototypes were designed and tested with experts through an iterative process. Designing each of the prototypes, playing it with experts and discussing the weaknesses and strengths formed very important steps to obtain an answer to the research question "Why the delay is happening when patients need specialized care". These steps started off with all the gathered information about the Swedish healthcare system including laws, facts, statistical data, stakeholders' interests, and relationships. Moving to the design process of the prototypes where was to be modeled in the game, and the game was to be used as a research tool. Then, testing the prototypes were tested with game sessions. This approach formed a unique way of analyzing the problem and provided a significant understanding of the complex nature of the problem and served as an analytical framework to the research question.

The game sessions with experts were valuable to gather learnings regarding both the stated research question and the prototype design process. This is through observing and studying the experts' strategies when testing the game. The experts' feedback was then used to learn about developing serious games and enhance each of the developed prototypes. The following sections discuss the learnings gained under the sessions, and modifications done for each of the prototypes:

Session 1

During the first session, it was observed that the participants (players) needed more staff to deal with all the patients in the game. Which illustrates that there is a staff shortage in terms of general physicians in the game and therefore even in real-life. Because the number of doctors and patients in the game is simulated to represent the real-life situation. Thus, increasing the number of doctors in the game will lead to additional patients' visits and therefore the patients' queue will be shorter leading to

decreased waiting times for a visit at the PHC. Resulting in a reduced waiting time to get a referral. This is applied also to the discussed real-life situation. It was also learned that if a patient needs a lab the waiting time to get a referral is increased depending on the time the patient spends waiting for the results of the lab and to meet the general physician again for assessment to be referred to a specialized clinic. In addition, it was learnt that peripheral tasks are taking too much time of the doctors' time. Therefore, decreasing the required tasks of the doctors will increase the number of available patients' visits at the PHC.

The first prototype was to be modified by enabling the tracking of scoring by players throughout the game. In addition, the players' chance for winning/losing was to be modified to be equal for all the players. Lastly, conflicts between players were to be added to the prototype. The modification led to a new game with the same roles (players) as of the first prototype.

Session 2

During the second session, it was observed that patients' transition to specialized care consisted of two phases. The first one is getting a referral to a specialized care clinic (pre-access). While the second one is waiting for the first booked visit after being referred to a specialized clinic (post-access). Which generates two kinds of reasons why there are a delay to access specialized care in Sweden. Basically, the pre-access reasons and the post-access reasons. Which makes the waiting time the patient spends to access specialized care calculated as the time to get a referral from the PHC added to the time to the first booked visit at the specialized clinic. This results in a long waiting time and process to access specialized care. In the following figure we see a representation of the post- and pre-access phases.

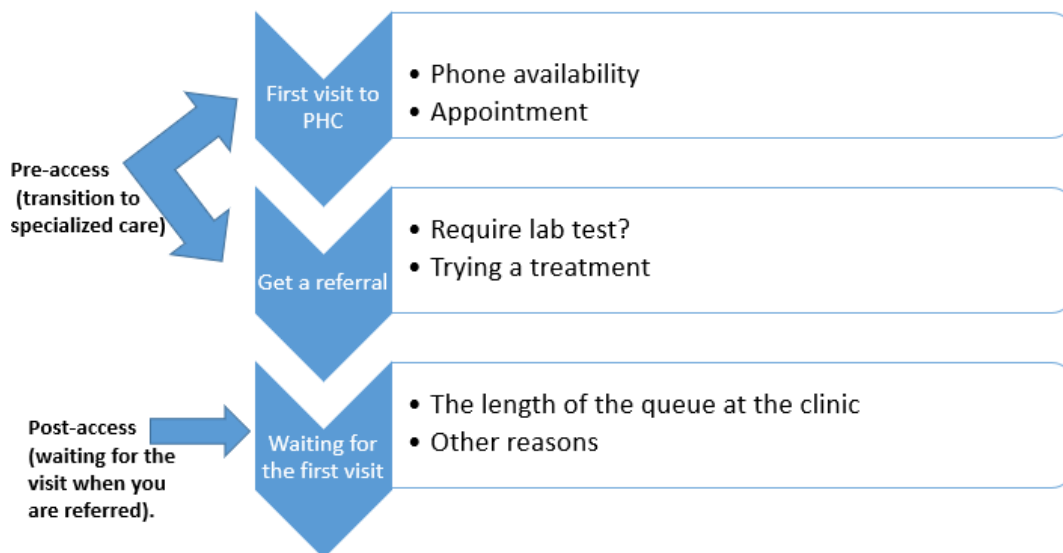


FIGURE 30, PRE- AND POST-ACCESS PHASES.

As it is illustrated in Figure 30, the patient waits for the first visit at the PHC, this waiting time can vary depending on several factors such as PHC phone availability, the number of general physicians working at the PHC and available appointments at the PHC, then waits for an eventual lab-test result, then waits for the medical assessment set by the general physician to get a referral and eventually waits for the booked visit which may be booked months after the referral is sent. This depends on the length of the queue at the specialized clinic and other reasons such as specialists' shortage.

The second prototype was to be modified by reducing the steps required of the players to run the game and simplifying the game mechanisms. In addition, the patient pile was to be divided into several piles instead of 1 pile for all the players. The second prototype did not totally answer the research question and did not show the post-access phase. Thus, the prototype was to be modified to show both the post- and pre-access phases and answer the research question. Moreover, the prototype did not include any facilities (PHC and specialized care clinics), therefore the facilities were to be added to the third prototype.

Session 3

During the third session, it was observed that the PHC is the foundation of the Swedish healthcare system and a gatekeeper for patients who need specialized care. This is because a referral is needed to access specialized care clinics and there are no specialized clinics outside the hospitals. Which creates a stream of patients with simple and serious conditions, all seeking care at the PHC. Then the task of a general physician working at a PHC becomes to classify these patients to either

being treated at the PHC or referred to a specialized clinic. In addition, for some medical conditions, a specific treatment will sometimes be tried out but won't work and then the patient will be referred. Which lead to further increased waiting time to get a referral and a booked visit to the specialized clinic.

The need for a referral to access most specialized clinics increases the patients' queue waiting for a first visit at a specialized clinic and thus the waiting time. This is observed by introducing 2 kinds of patients who need specialized care in the game prototype, psychiatry, and ears-nose-throat patients. While ears-nose-throat patients need a referral to access the clinic, psychiatry patients can book their first visit at the clinic without needing a referral and without visiting the PHC before at all. This applies for some other specialized clinics such as orthopedics and women-care clinics. Real-life data regarding the length of the queues and the estimated waiting times for a first visit to these clinics, were compared to clinics that require a referral. It is concluded that the referral process and need obviously increase the waiting times and queues. This is also concluded while observing how the patients are treated in the game. In the following figure we see the queues for each of the 3 mentioned clinics in Stockholm.

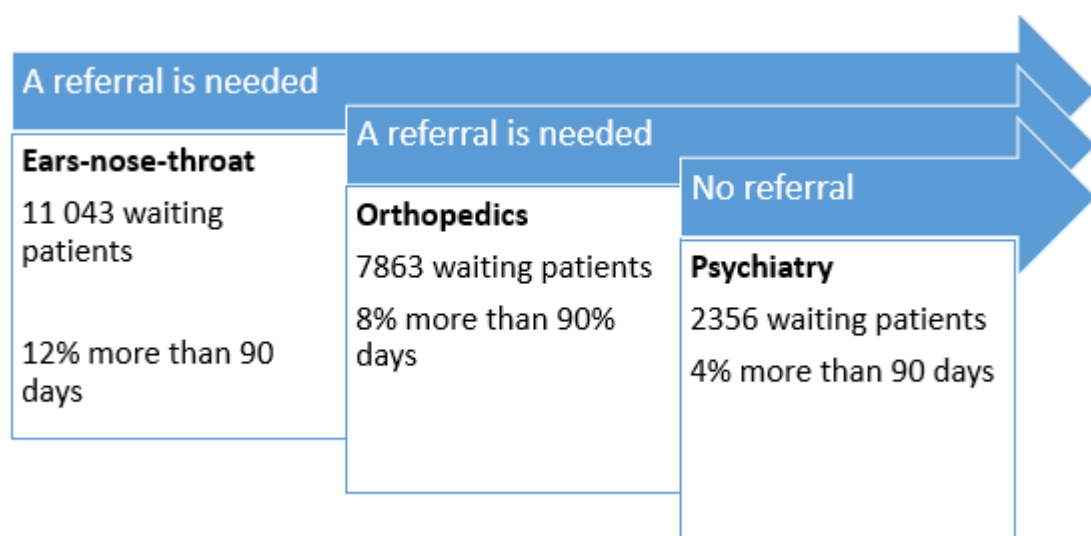


FIGURE 31, PATIENTS' QUEUES AT 3 DIFFERENT SPECIALIZED CARE CLINICS IN STOCKHOLM.

As we see in Figure 31, the ears-nose-throat clinic (where a referral is needed) has the highest number of waiting patients for a first visit at the clinic. With 12% of patients waiting even more than the max period the care guarantee law states. While the orthopedics and psychiatry clinics (no referral needed) have fewer waiting patients. This also applies to other specialized care clinics than included in the game. The data was obtained from Sweden's Municipalities and Regions (SKR) website [53].

The third prototype was to be modified by including the patients' perspective and highlighting the patients' role in the game. The aims the players had in the game were to be changed to inspect the transition of patients to specialized care. The players were focusing on making more money to hire more doctors. This is not the objective of the game; therefore, this was to be changed. The third prototype was to be modified to show the post-access phase as well.

Session 4

The final session was held to discuss the final prototype without the intention of implementing any further changes or modifications to the last prototype. During the last session, it was observed that no matter how many prototypes are developed, there will always be potential improvements and a chance for developing an enhanced version of the game prototype. Thus, the designer will need to do an iterative process of modifying the prototype and holding a game session. Each game session will lead to invaluable results to enhance and update the prototype. The power of a game session lies in the discussion and debriefing parts.

During the session, the game is tested and discussed to collect experts' feedback and experience. When the game is tested, the participants' behavior, player diversity, player engagement levels and emotional dynamics of game play are observed. These factors serve as the foundation for further developing the prototype and implementing modifications. During the debriefing, the participants in the game (players) are asked by the facilitator to answer pre-stated questions. The answer to these questions will reflect the success of the game. Debriefing is a crucial element in serious game design because it serves as the bridge that connects the real-life problem and the experience in the game. Which provides an opportunity to discuss the learnings gained by playing the game. In addition, debriefing allows the players to reflect on their actions and decisions while playing the game.

5.2 From the first prototype to the final one

The journey of developing the final prototype began from the very first step of designing the first one. All performed steps contributed in one way or another in developing the final prototype. The first prototype served as the foundation where core mechanics and objectives of the game were sketched. The initial understanding of the real-life problem including the transition of patients to specialized clinics and the reasons for long waiting queues, was implemented as a raw outcome of the system analysis phase. The first prototype had a basic functionality compared to the final version which emerged with increased game mechanical complexity while balancing the complexity of the game with the fun factor. The final version provided a

more comprehensive tool to address the learning outcomes and experience in the game compared to the first one. The user engagement in the final prototype was improved using the observations of what captured participant interest while testing each of the designed prototypes.

While game sessions were the key factor driving the success of the final prototype. Game sessions acted as a guide to the development of the final prototype through an iterative process of designing, discussing, and debriefing, and modifying. This process provided the opportunity to learn from observations and experts' feedback. Which led to the refinement of the final prototype moving on from the first prototype to the second and the third prototypes with valuable learnings gained after each prototype is developed and discussed.

5.3 Analysis of the Learnings

The main result is that there are two different types of reasons why there are long waiting times to access specialized care (first visit) in Sweden:

1. Pre-access (transition to specialized care, get a referral)
2. Post-access (waiting for the visit when you are referred).

Patients face different obstacles that cause long waiting times. First, the primary healthcare centers serve as the gateway to Sweden's healthcare system. As explained before there are no specialized clinics outside the hospitals and in most cases a referral is needed from the PHC to access specialized care. For patients who need specialized care the waiting time for their first visit to the clinic will be added to the time they spend waiting for a first visit at the PHC and the process of getting a referral. Which depends on several factors such as PHC phone availability and available appointments. In addition, since the care guarantee does not set limits for lab-tests and their results, waiting for a lab-test result also increases the waiting time. Therefore, PHCs act as a gatekeeper for patients who need specialized care making them enter the PHC only to get a referral.

This also creates several consequences such as a stream of patients with simple and serious conditions accessing the PHC at the same time. Causing stressful tasks for a general physician working at a PHC because the steady stream of patients must be grazed every day, navigating between the patients suffering from serious illnesses and patients who need simpler intervention. Furthermore, ongoing staff shortages (both general physicians and specialists) and that there is too much time spent on peripheral tasks by general physicians and specialists exacerbate the problem. Because this reduces the number of visits available for patients. All these factors lead to increased waiting times and delays for patients to access specialized care in Sweden.

5.4 Sustainability and Ethical Considerations

Various aspects of sustainability and ethical considerations are imperative to be emphasized when designing a serious game that simulates issues of the healthcare system. The game developed in this thesis addresses issues within the Swedish healthcare system. Mainly, the long waiting times and queues issue and the transition of patients to specialized care. This contributes to improving care accessibility and preventing patients suffering from having to wait for a long time to get the care they need. In this context, sustainability is a guiding principle. It ensures that the game contributes to the enduring resilience and efficiency of the healthcare system and not only addressing immediate issues.

Furthermore, ensuring that the serious game contributes to evolving healthcare policy changes is an essential aspect for its long-term utility. Sustainability for this point is related to the impact of the game as a research-tool for analyzing the waiting times and transition of patients, aligning with Sustainable Development Goal 3: Good Health and Well-being [2]. This optimization contributes to promoting good and equal access to healthcare while taking the welfare state model's structure into account at the same time. If these goals are achieved, a healthy population with equal value citizens is obtained. Which results in a system that is sustainable both socially and economically.

In addition, the design of the game respects the precise nature of the healthcare systems and its related issues. This is achieved by accurately representing real-life experiences and avoiding any possibility of potential misrepresentation. The game is based on real-life problem, striking a balance between gathering valuable insights and upholding the ethical responsibility to accurately represent the complex Swedish healthcare system. This contributes to the serious game success of addressing the identified problem with credibility.

5.5 Further Research

To enhance the system analysis results, interviews with stakeholders of the Swedish healthcare can be conducted. In this way, the obtained maps, table, and flow diagram can be discussed with the stakeholders. The discussion may lead to valuable modifications based on real-life experience of the stakeholders.

To make good use of the designed game prototype, it can be used to explore decision-making related to factors that influence specialized care accessibility and length of waiting times to the first visit. For this purpose, the game can be played with healthcare professionals and experts. The results and gained learnings after playing the game can be analysed and documented to make it available for decision-makers.

This will improve access to specialized care within the Swedish healthcare system and give suggestions to reduce the care queues and waiting times.

To further develop the designed game prototype, it can be transformed to a digital version. This will advance the analysis and enhance the interactivity and accessibility of the stakeholders. With a digital version, the user experience and engagement will be improved. This will also turn the game into a dynamic tool that allows for the incorporation of real-time data and instant feedback. In addition, accommodating other components in the game such as patient demographics and different kinds of specialized care clinics would be of interest and develop the game.

Furthermore, it is desirable to hold additional game sessions with healthcare system stakeholders from other cities in Sweden. This will provide further feedback and experiences from different stakeholders' perspectives to revise the game and analyze the results and findings brought back to real-life.

Chapter 6

Conclusions

The thesis aim was to design a serious game prototype which models the process of access to specialized care within the Swedish healthcare system. The prototype was to be used as a research tool to learn about why the transition of patients to specialized care, the first visit at a specialized clinic, is taking a long time. A system analysis was performed to analyze the Swedish healthcare system and use the outcomes to design the serious game prototype. A general representation of the Swedish healthcare system was created in terms of a game frame. The game frame includes stakeholders of the Swedish healthcare system, laws, and parameters. Four prototypes were developed of the game. The final prototype was accomplished through an iterative evaluation process of the previous prototypes. This is by holding game sessions for each of the designed prototypes. During each session the prototype was tested and discussed, notes, observations, and feedback were obtained to develop an enhanced version. To answer the research question stated in the thesis, performing the system analysis, designing the prototypes, and testing them, each formed a very important and unique step. Different reasons for long waiting times and queues were inspected such as the need for a referral to access most of the specialized care, staff shortages and time spent on peripheral tasks by specialists and general physicians.

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Appendix I

Gaming Simulation Development Specifications for:

Patient access to specialized care within the Swedish healthcare system

. Problem background

1.1. What is a problem (or opportunity) that is driving the need for taking an action?

Sweden is a welfare state that has a decentralized healthcare system with an objective of providing equal and high-quality care for all patients. The first point of entry into the Swedish healthcare system is the primary healthcare center where every patient is listed at a center.

However, several challenges and problems associated with access to specialized care are faced such as long waiting times and queues. There is need to investigate what causes the long waiting times and explore how to reduce them.

1.2. What are the key business issues that must be addressed or resolved?

Accessibility to specialized care in Sweden.

1.3. What are the boundaries (the scope) of the problem environment? How deep into the organization and how far into the business environment?

The model encompasses the Swedish healthcare delivery system with the primary healthcare center as a point of departure as it is the first point of contact between the patient and healthcare system.

The primary healthcare center acts as a gatekeeper to access specialized care which is usually more expensive and less in number. Thus, the scope will include systems and processes that influence the transition of patients to specialized care.

Problem inner environment:

1. Healthcare system components:
 - Primary healthcare center
 - Specialized care
 - Private sector
 - Emergency care
2. Healthcare processes:
 - Patient flow
 - Appointment scheduling and registration
 - Referral

Problem external environment:

1. Economical aspects
2. Resources management
3. Challenges and problems
4. Healthcare regulations

1.4. Why is the Simulation seen as an appropriate approach to address this problem (or opportunity)?

The healthcare system is a social complex system that includes many components and stakeholders. It has nonlinear interactions and unpredictable results. This makes the problem a complex real-life situation. By simulating the real-life situation into a serious game, a safe environment for exploration will be provided. The model will be simplified, which means that not all elements distinguished in the real-life situation will be presented in the

model. The represented elements will be the most important and pivotal elements. The represented elements in the model will not be represented as complex and detailed as they are in the real-life situation as well.

The simulation game will enable investigating solutions to long waiting times to access specialized care and translating the learnings and experience gained by playing the game back to the real life.

2. Purpose

2.1. What is the primary purpose behind the Simulation? Is it to help improve decision quality about the future or help deliver effective human performance?

2.2. What are the main objectives to be achieved? Is it envisioning, exploration, testing, solution search, negotiation, policy decision, awareness, motivation, commitment, communication, knowledge building, skill building?

2.3. Are there any specific objectives to be achieved and what are they?

2.4. What is the value proposition of the Simulation?

Educational

The objectives of the game:

Educational in the context of primary healthcare in Sweden to learn:

- What is causing long waiting times and specialized care queues?
- How to improve patient access and transition to specialized care?

The objectives in the game:

Give patient access to specialized care and reduce the waiting time.

To be discussed

1. Learn players' attitudes towards operation and constraints.
2. Learn what players list as advantages and disadvantages for the Swedish model.
3. Use the knowledge gained after playing the game and the debriefing sessions to document feedback to decision makers.

3. Model of reality

3.1. Which model of reality will be the basis for development of the Simulation? Is it the present (existing) reality, future (desired) reality, or transition from the existing to desired reality?

The game will be designed and developed based on the present existing reality. The reality is the current Swedish healthcare system.

3.2. How is that model of reality to be treated during the run of the Simulation? Is it to be seen by participants as the only reality, or as a framework for development of alternative realities?

To be discussed

3.3. How will the main elements of reality which is being simulated be brought into the Simulation? Is it by designers during the development process, by participants prior to the run, or by participants during the run?

By the designer during the development process.

3.4. What will be the abstraction level of the Simulation? Is it to be at the high level (simulation of basic concepts), medium level (simulation of key relationships), or at the low level (simulation of actual processes)?

To be discussed

3.5. Will the Simulation present the reality from a holistic point of view or from a segmented point of view?

To be discussed

3.6. How many different business scenarios should be played out during the Simulation? What should their level of detail be and when should they be developed (prior or during the Simulation)?

3.7. Are there any specific solutions or messages to be communicated to participants? If yes, what are they and how should they be communicated (implicitly or explicitly)?

The participants will learn and gain experience when playing the game and the objective is that the player comes back to real-life with new conclusions and learnings about how to reduce waiting times.

4. Participants

4.1. Who will the participants be (roles and responsibilities within the organization) and what is their expected (or desired) number?

The stakeholders:

1. Patients
2. Healthcare professionals (nurses, doctors, specialists)
3. Healthcare administrators
4. Healthcare regulatory bodies:
 - a. 21 regional bodies are responsible for financing and delivering health services to residents.
 - b. 290 municipalities are responsible for long-term, elderly and disabled care.
 - c. The Health and Social Care Inspectorate (IVO)
 - d. The National Board of Health and Welfare (Socialstyrelsen)
5. Healthcare policy and decision-making bodies:
 - a. The Swedish Association of Local Authorities and Regions (SALAR)
 - b. The Swedish Agency for Health and Care Services Analysis
 - c. The Swedish eHealth Agency
6. Government health department :
 - a. The ministry of health and social affairs (responsible for overall health care policy and regulation and sets budgets for government agencies and grants to regions)
7. Referral receiver at specialized care clinic.
8. Private healthcare provider

4.2. How are the participants to be organized during the Simulation? Will they be part of teams (homogeneous or heterogeneous) or will they be acting as individuals?

Individuals

4.3. What level of freedom should participants have during the Simulation? Should the options and choices be prescribed as part of the simulation or should the participants develop their own?

The options and choices will be prescribed as part of the simulation

4.4. Are the same participants expected to participate more than once, and if yes, how many times?

No

4.5. What will the primary motivation for taking part in Simulation be? Will the participation be mandatory or voluntary?

Voluntary. The primary motivation for human actors could be addressing issues related to Swedish healthcare system problems and challenges.

5. Design issues

5.1. What type will the Simulation be? Is it to be IT based, IT supported, or non-IT based or supported?

IT supported or non-IT supported. First a paper prototype will be developed to test play and make improvements. When the designer is satisfied with the paper prototype a digital prototype will be developed using excel or another option.

5.2. What will the delivery mode of the Simulation be? Is it to be delivered to individuals or groups? If groups, what is the minimum number of participants required for a successful run? What is the maximum number of participants Simulation should be able to accommodate at one time?

To be discussed

5.3. What will the duration of the Simulation be? How many hours over how many days? Is duration to be fixed or flexible (dependent on the learning potential of participants)?

Fixed. The game will have a decided ending criteria to be decided when designing the game. Winning and losing criteria will be decided also, winning criteria could be based on achieving a balance between different objectives such as reduced waiting time and patient satisfaction, etc.

5.4. Which time horizon is to be simulated during the Simulation? Is it 'real time' (a day in a life) or 'compressed time' (how many days, weeks, months or years)?

To be discussed

5.5. What is the tempo of the run? Is it to be fast paced or not? What is the level of time pressure and stress that can be placed on participants?

To be discussed

5.6. What will the style of the Simulation be? Is it to be based on group dynamic processes, intellectual processes, resource flows, or information flows?

To be discussed

5.7. How should the activities during the Simulation be organized? Will they be in sequence or iterative, and will they be fixed or flexible?

To be discussed

5.8. What performance indicators or criteria will be used to measure the success of participants during the Simulation?

(to be discussed)

- Good quality of care
- Patient satisfaction
- Short waiting times and queues
- Resource management and financial sustainability

5.9. Is the information generated during the Simulation to be used after the run, and if yes, for what purpose?

Yes, to study and evaluate results from all individuals and translate that back into real life

5.10. Are there any requirements on portability (played in one place or different places), reproducibility (one time use or multiple use), or design (specific materials or graphic imagery)?

The game will be portable. Multiple use.
(to be discussed)

6. Facilitation issues

6.1. What is the context in which the Simulation is to take place? Is it a part of a larger initiative, and if yes, which one and how does it fit into it?

To be discussed

6.2. Are there any Simulation related activities that will have to take place before or after the Simulation run itself, and what are they?

Yes, debriefing the simulation game. The participants will be invited to discuss and analyze the experience and learnings gained from the game and experience from real life.

6.3. Who will be the facilitators, will they require some specific skills or knowledge, and how will they be trained?

Najla

7. Development process issues

7.1. Who is the client person taking the ownership over the success of the Simulation?

7.2. Who is the client person (or group) responsible for evaluating the success of the Simulation?

Game experts and system designers experts for what concerns the game.

For the run, the players can be a feedback source of evaluation.

7.3. What are the success criteria against which the development process as well as implementation of the Simulation will be measured?

Possibility to open discussions regarding the current system issues.

7.4. What is the desired time schedule for development of the Simulation? Is there a specific date for which the first run should be ready?

The first paper prototype is to be ready for test play by week 42-43.

7.5. What are the financial means available for development and implementation of the Simulation?

7.6. Who owns the copyright of the final product?

Najla

Appendix II

Prototype 1

Objectives in the game:

- Give patients access to specialised care. Treat as many patients as possible for this day. To get no left patients.

After playing the game, the player must be able to answer:

- What is causing long waiting times to get specialised care? How to reduce this time?
- How to improve patient access and transition to specialised care?
- The patient path to access specialised care.

Game Scenario:

Thousands of patients in Sweden are waiting to get their first visit at a specialized care clinic. In July 2023, Stockholm it was reported that 63 381 patients were waiting for their first visit at a specialised care clinic (for all types of specialised care). 13% of these patients were waiting for more than 90 days.

You are a PHC care administrator sent by the government to work for one day at a PHC in Stockholm and investigate the problem. Your task is to document your findings after the day ends and come up with suggestions to the government to enhance access to specialised care. You will deal with administrative tasks to reduce the waiting time for patients and to make sure that the cost effectiveness is applied; patients don't need to buy private insurance to access specialised care. You will measure quality through patient satisfaction to find out if high quality care is obtained.

You are a private healthcare centre administrator sent by the government to work for one day at a private care centre in Stockholm and compete with the public provider to attract patients to your centre by offering shorter waiting times. Your goal is to maintain profitability.

The game ends when: Number of patients for that day ends.

Players:

- Care administrator at PHC
- Care administrator at a private healthcare centre. Note that the private centre in the game doesn't have an agreement with the Region.

Ending criteria: A Day is completed: no more patients come (no more patient cards are left).

Play time: To be calculated after playing the prototype for the first time.

Materials Required:

- Game board to represent:
 - PHC: Queue, lab-room, and examination rooms.
 - Private centre: Queue, lab room and examination rooms.
 - ED queue.

Specialised care clinics queue.

- Cards to represent patients and Region Stockholm.
- Tokens/cards to represent GPs and specialists.
- 2 Timers to calculate time.
- Dice.

Game Play:

The game will simulate a working day in July 2023 (last statistics available for this month). Real data and information will be provided to connect the game to reality. The game is played by turn and consists of rounds; each round consists of two steps. The rounds are to be repeated until there are no more patient cards (the game ends).

The two steps for each round are:

1. The facilitator distributes resources to the players:

- The care administrator:

Resources: GPs.

The number of GPs changes randomly at each round to provide events where GPs experience workload and to show that there is staff shortage. This is to be said by the facilitator to the player when handing over the GPs. The number varies between 3-5 GPs.

- The private provider:

Resources: Specialists in 4 different areas. One specialist for each type.

The player then casts a dice and draws cards called "Region Stockholm" according to the number that appears. (this is by turn, player one plays then it is player 2 turn)

The goal of these cards is to provide the player with information about the Swedish healthcare system and the background of the problem (long waiting times). (learning outcomes of the game)

The cards include information about financing, cost control: patient fees, contracts with private providers, regulatory guidelines and policies, care guarantee information, referral assessment, statistics about queues, etc.

2. The patients start to come: (this is by turn, player one plays then it is player 2 turn)

The player casts the dice and draws patients according to the number shown. The player puts the patients in the queue, then the facilitator sets a timer (one minute) and the player starts dealing with the patients until the time ends. The PHC administrator sets the patient in the PHC queue, and the private provider sets the patient in the private centre queue. The round ends when the two players have played, and a new round is started. There will be cards left (in the PHC and private centre queues) after each round ends because the player

won't have enough time to deal with all drawn patient cards. These cards will represent the left/waiting patients.

The player must deal with patients through:

1. Lab-tests
2. Assigning GPs\specialists and examination
3. Payment
4. Patient feedback and satisfaction
5. What happens with the patient next.

Scoring and analysing:

Analysing: (to be discussed during debriefing)

1. **Profit** for PHC and private centre: The PHC also is financed by taxes? This is only to illustrate that the private provider makes a large profit and that patients must pay more when they seek care at a private centre.
2. **Patient feedback:** will be used to deliver some learning outcomes in the game and will include:
 - No open specialised clinics outside the hospitals.
 - Care guarantee doesn't set a time limit for referral, examinations, and lab-test.
 - GPs as the first point of contact doesn't always work: Patients feel that GPs set a wrong diagnosis. Not always right to decide if a patient needs referral or not.
 - Time spent with GPs: peripheral tasks are taking too much time.
 - Long waiting time for first visit at PHC
 - No assigned doctor, meets different doctors.
 - Wasting time at PHC instead of going directly to specialized clinic.
3. The patients at the ED who need urgent care and are waiting longer because of patients trying to get referral from the ED.
4. The patients in the specialised care queue by the type of referral (cards were there before the beginning of the game):
 - No referral needed
 - Self referral
 - Referred by ED without visiting PHC first

Scoring:

1. The number of patients **treated**.
At the end of the game the **private centre patients are:**
 - **Treated & left:** the treated patients will be set with the player and the left will be in the private centre queue. This includes:
 - Orange and yellow private centre patient cards
 - Orange and yellow PHC patients' cards (When patients decide to visit the private centre after being at the PHC)

The PHC patients are:

- **Treated:**
 - Those with the player: Green patient cards (treated by PHC, patients who need primary care).
 - Those referred by PHC and are in the specialised care queue: Orange and yellow PHC patient cards.
- **Left:**
 - Those in the PHC queue: Green, orange, and yellow PHC patient cards.
 - Those who chose to seek care either at ED or at the private centre after visiting the PHC first: Orange and yellow patient cards.

2. **Patient satisfaction** for the private centre and the PHC, face 3 of each card will show a number that represents patient satisfaction. This will be used to measure quality for the private provider and the PHC. Patients are dissatisfied when:

- The waiting time is long.
- They pay more than they should (at a private centre).
- They get wrong diagnose

Appendix III

Prototype 2

Objectives in the game:

- Collective goals: Treat all the patients in the pile and have money to hire staff and pay costs.
- Individual goals:
PHC: Number of treated and waiting patients. Patient satisfaction.
PC: Make more money (profit) because you don't get money from the region. Shorter waiting times.

After playing the game, the player must be able to answer:

- What is causing long waiting times to get specialized care? How to reduce this time?
- How to improve patient access and transition to specialized care?

Game Scenario:

PowerPoint presentation or a video: introduce the game, background to the real-life problem, etc. The game will simulate a working day in July 2023. Real data and information will be provided to connect the game to reality.

Thousands of patients in Sweden are waiting to get their first visit at a specialized care clinic. In July 2023, Stockholm it was reported that 63 381 patients were waiting for their first visit at a specialised care clinic (for all types of specialised care). 13% of these patients were waiting for more than 90 days.

You are a PHC care administrator sent by the government to work for one day at a PHC in Stockholm and investigate the problem. Your task is to document your findings after the day ends and come up with suggestions to the government to enhance access to specialised care. You will deal with administrative tasks to reduce the waiting time for patients and to make sure that the cost effectiveness is applied; patients don't need to buy private insurance to access specialised care. You will measure quality through patient satisfaction to find out if high quality care is obtained.

You are a private healthcare centre administrator sent by the government to work for one day at a private care centre in Stockholm and compete with the public provider to attract patients to your centre by offering shorter waiting times. Your goal is to maintain profitability.

The game ends when: Number of patients for that day ends.

Players:

- Care administrator at PHC
- Care administrator at a private healthcare centre. Note that the private centre in the game originally doesn't have an agreement with the Region.

Ending criteria: A day is completed: no more patients come (no more patient cards are left).

Play time: To be calculated after playing the prototype for the first time.

Materials required:

- Cards to represent patients, chance, power and Region Stockholm.
- Tokens to represent staff
- Money
- Dice

Game Play

The game consists of rounds (at least 6 rounds must be played), each round represents a working day. Doctors and lab staff in the game are hired per working day (round). There will be 5 doctors and 4 lab staff available to hire at each round. Each player chooses how many doctors and lab staff he wants to hire and how much he will pay. The staff choose to work at the provider who pays them a higher salary. The player will get money from his treated patients in each round.

At the beginning of the game, before the start of the first round:

- PC and PHC are given 500 Sek, from the Region and an insurance company.
- Each player is given equal doctors and lab staff.
- Each player is given 6 attract patient cards, each card can be used once in a round.

Before each round starts:

1. The players have to hire staff.
2. The PHC is given 300 Sek for each treated patient from the previous round. The money is given by the Region to represent the tax funded system. This will also show that the number of registered patients at the PHC affects the budget.

Then the round starts:

1. The first player draws a chance card, the second player draws a chance card, The chance cards introduce events where players can lose or get patients, money, and staff.
2. The first player casts dice and draws patient cards, the second player casts dice and draws patient cards. Each patient card tells if the patient needs a lab, how much the patient will pay and the patient satisfaction and has a specific colour; green means the patient needs primary care, yellow means the patient needs specialized care and the situation is stable, orange means the patient needs specialized care and the situation is getting worse the more the patient waits.
3. Then the facilitator draws a region card, region cards introduce events like government grants and region cost control.
4. The players use their attract patient cards, they choose freely which card to use. The attract patient cards give players an opportunity to attract the other player's doctors or patients.
5. Each player treats his patients. The main rule is:
 - 1 doctor treats 1 patient.
 - 1 lab staff does a test for 1 patient.

In this way, the player won't be able to treat all the patients he draws. This will result in treated patients and waiting patients for each player at each round.

After the round ends, the player identifies how many patients he treated and which colour they had, takes money from the treated patients, and identifies the quality grade given by each treated and waiting patient he got in the round. The quality given by patients will be higher for the treated patients and lower for the waiting patients, higher for the green patient and lower for the yellow and orange patient. The player in this way can track the quality. Then the doctors and lab staff are taken back to be hired again for the next round. Then a new round is started until there are no more patient cards left.

Scoring

The player who has more points wins. Points are given by treated patients: the green patient gives one point; the yellow patient gives 2 points, and the orange gives three points.

The quality is to be calculated for each player as the mean value of patient satisfaction. For each untreated patient the satisfaction is provided as:

Green: 7, Yellow: 6, Orange: 5

For each treated patient:

Green: 10, yellow: 9, orange: 8

Appendix IV

Prototype 3

No of players: 2 – 4. Players can form teams of 2. They will play the role of a Private Care facility or a Public Health Care facility in the Stockholm area.

No of facilitators: 1

Materials required:

- A game board which represents a queues and lab rooms
- A set of patient cards with information on patient complaints
- Tokens to represent GPs and Specialists
- Tokens to represent currency
- Pens, paper for making notes.
- A facilitator guide to help the facilitator score and move patients around.

Patient Card:

1. Chief complaint
2. The optional need for the lab.

Attract patients' cards given for PHC:

- Your centre is accused of making a large profit of patients. 1 patient leaves you.
- Your centre now has an agreement with the region, you need to adjust patient fees to be the same as for me (200 Sek for each patient). This is only for this round.
- I am offering rational and affordable costs for patients. You have expensive fees, 1 patient of yours leaves you. The patient is willing to wait but won't pay more.
- You must pay extra money for this round to repair the lab equipment, pay 200 Sek.

Attract patients' cards for PC:

- I am offering shorter waiting times for patients. 1 patient who needs a referral from your patients will leave you and come to my centre. The patient is willing to pay but won't wait more.
- For some situations wrong diagnoses are provided when the patient isn't diagnosed by a specialist! 1 patient from yours has decided to seek care at my centre because he thinks he got wrong diagnoses from your GP and didn't get a referral when he really needed it.
- 1 of your GPs won't have enough time to treat 2 patients because of peripheral tasks taking too much time. The GP now treats one patient only.
- 1 of your GPs is feeling a workload and stressful environment and won't work today. They also think they are badly paid.

Rules:

- The compensation to PC and PHC for treatment: PHC patients: 200 Sek, PC patients: 500 Sek.

- Available to hire: Unlimited.
- Cost of hiring: 1000 Sek.
- Starting money: Each player has 10 000 Sek.
- Number of patients in the game: for each round PHC gets 15 patients and PC gets 10 patients.

Initial setup:

Each player is given an initial amount of money (10 000 Sek) and 4 attract patients' cards.

Game play:

The game is played in rounds. Each round has 4 steps.

1. Each player hires GPs and specialists with their money.
2. In the first step the facilitator places the patients in the queue for each player. (10) Patients (cards) are placed in the queue by the facilitator to indicate patient arrival.
3. The players try to treat the patients. They assign doctors and move patients to the lab room.
4. The players use their "attract patient cards".
5. The players classify their patients: treated and waiting and return the doctors.
6. In the third step the facilitator moves the treated patients, the waiting patients to their positions. Awards the money to the players. And documents how many patients are treated and waiting for PC and PHC for the round.
7. A new round is started.

The game is played until a player (PC) runs out of money or there are no left patients in the set.

The PHC can ask the Region for money when needed but the PC can't.

Treatment procedure:

Each GP treats 2 patients, each specialist treats 2 patients.

Each patient who is assigned a doctor will be counted as "treated".

Each patient who has no assigned doctor will be counted as "waiting".

The patient that requires the lab must spend one round in the lab. And will be treated in the next round.

Scoring:

The player who has higher points wins.

- Each treated patient +2
- Each waiting patient -1

Which gives a score out of 40 patients.

For PHC: 5 psychiatry and 35 ear-nose-throat.

For PC: 20 psychiatry and 20 ear-nose-throat.

Appendix V

Final Prototype

1. Scenario:

You will play the role of the stakeholders of the Swedish healthcare system consisting of:

- Facility 1: A public PHC and a public hospital with 2 specialized clinics
- Facility 2: A private centre with 2 specialized clinics.

There are 100 patients in total to be treated in 4 days represented by 4 rounds in the game. You both aim to treat all the patients in the queues to win the game! You will play 4 rounds; your goal is to have no waiting patients or as few as less waiting patients in your facilities.

Patient distribution:

The patients are mixed between patients who are willing to pay more at the private centre and patients who are not willing to pay more and would rather wait more. There are 3 kinds of patients in the game:

1. Patients who need primary care and seek care at the PHC.
2. Patients who need psychiatry specialized care and seek care at either the private or public facility.
3. Patients who need ear-nose-throat specialized care and seek care at either the private or public facility.

2. Scoring:

Collective win/lose

At the end of the game if the number of waiting patients exceeds 10 the players lose the game.

The player who has more waiting patients left at his facility at the end of the game will be the reason for losing!

3. Players:

- A private facility that consists of 2 specialized clinics.
- A public facility that consists of a PHC and 2 specialized clinics.

4. Initial set up:

- The primary healthcare centre will have 4 GPs from the beginning of the game and will be able to hire up to 6 GPs (when the player makes money throughout the rounds).
- The hospital specialized clinics will have 1 specialist each and will be able to hire 1 more specialist for each clinic.

- The private centre specialized clinics will have 1 specialist each and will be able to hire 1 more specialist for each clinic.
- Each player will have a “**Doctor-guidance**” that helps the player to decide if the patient need a lab or a referral... (if the player make a wrong diagnose the facilitator resend the patient again)
- Money and payment: PHC payment 200 Sek, public hospital: 400 Sek, Private clinic: 1000 Sek
- Hire additional GP cost: 1000 Sek, additional specialist cost: 2000 Sek.
- There are 3 patient queues, primary, psychiatry and ear-nose-throat.

5. **Game play:** For each round:

1. The players deal with the patients from the previous round (waiting and lab patients)
2. The players discuss and decide on the strategy of drawing patients for the round. (the players must draw 25 patients at each round)
3. The players draw “Patient cards”.
4. The players treat their patients.
5. The facilitator awards money from the treated patients. The players hire additional doctors if they want.
6. A new round is started.

Procedures:

- **Patient division:** You are free to choose the best way and strategy to draw patients (The kind of patients drawn at each round).
The players must draw the first card of each queue (can't draw whatever card in the queue)
- **Patient treatment:**
 - You will read the patient complaint and figure out if the patient needs a lab-test. You can get help by reading the “Doctor-manual”. The patient that requires the lab must spend one round in the lab.
 - Waiting patients at the queue and lab-patients are treated at the next round and prioritized.
 - The patient is first assigned a doctor and then sent to the lab and then assigned a doctor again either to be treated or referred.
 - Each patient spends one round at the examination room for treatment of referral.
 - After the rounds, any patient that exits from the consultation is considered treated. Any patient that exits from the lab, is reintroduced in the respective queue, and considered waiting.

Appendix VI

<p>Need primary care:</p> <p>a 45-year man has been experiencing persistent fatigue and unexplained weight loss.</p>	<p>Need primary care:</p> <p>a 38-year-old woman, has been dealing with recurrent headaches and dizziness.</p>	<p>Need primary care:</p> <p>A 30-year-old individual has reported frequent episodes of dizziness and nausea.</p>
<p>Need primary care:</p> <p>a 50-year-old man, has concerns about his cholesterol levels and overall cardiovascular health.</p>	<p>Need primary care:</p> <p>a 55-year-old man has a family history of diabetes and is interested in preventive care.</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 32-year-old man, has concerns about persistent postnasal drip and throat irritation.</p> <p>I won't pay more !</p>

<p>Need primary care:</p> <p>a 48-year-old man is experiencing occasional digestive discomfort.</p>	<p>Need primary care:</p> <p>a 60-year-old man , has been experiencing occasional dizziness.</p>	<p>Need primary care:</p> <p>a 30-year-old man, is interested in a routine primary care visit to discuss managing occasional anxiety and maintaining a healthy work-life balance.</p>
<p>Need specialized care: (Ear-nose-throat care)</p> <p>A 50-year-old man with chronic throat pain and difficulty swallowing, necessitating a throat swab for culture and sensitivity.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>A 28-year-old woman with nasal polyps, requiring allergy testing to identify triggers and prevent recurrence.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>count (CBC) and throat swab to determine appropriate treatment.</p> <p>I won't pay more !</p>

<p>Need primary care:</p> <p>a 50-year-old woman, is seeking primary care to discuss occasional joint pain and receive advice on maintaining joint health.</p>	<p>Need primary care:</p> <p>a 45-year-old man, has been experiencing stress-related sleep disturbances and wants to discuss strategies for managing work-related stress.</p>	<p>Need primary care:</p> <p>a 35-year-old woman, has been experiencing occasional headaches and wants to discuss these symptoms during a routine primary care check-up.</p>
<p>Need primary care:</p> <p>a 55-year-old retiree, is looking for a general health check-up to discuss age-related concerns and occasional sleep disruptions.</p>	<p>Need primary care:</p> <p>a 28-year-old woman, is seeking primary care to address occasional digestive discomfort and establish a baseline for her health.</p>	<p>Need primary care:</p> <p>a 40-year-old nurse, has been feeling fatigued lately and would like to explore potential reasons for her low energy levels.</p>

<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 30-year-old man, has concerns about persistent snoring and occasional sleep disturbances.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 48-year-old woman has been experiencing occasional ear pain and drainage.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 32-year-old man, has concerns about persistent postnasal drip and throat irritation.</p> <p>I won't pay more !</p>
<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 38-year-old woman has been dealing with occasional dizziness.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 55-year-old woman, has concerns about hearing loss and occasional ear ringing.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 25-year-old man, has been experiencing occasional nosebleeds and nasal congestion.</p> <p>I won't pay more !</p>

<p>Need primary care:</p> <p>a 35-year-old man, is due for a routine primary care check-up.</p>	<p>Need primary care:</p> <p>a 40-year-old nurse, is interested in discussing her overall well-being and receiving advice on stress management.</p>	<p>Need primary care:</p> <p>a 28-year-old woman is seeking care to establish a baseline for her health.</p>
<p>Need primary care:</p> <p>a 45-year-old man is interested in a routine primary care visit to discuss maintaining a healthy diet and managing work-related stress.</p>	<p>Need primary care:</p> <p>a 50-year-old man is seeking care to discuss age-appropriate screenings and general health advice.</p>	<p>Need primary care:</p> <p>a 55-year-old retiree, is looking for a general health check-up to ensure he is maintaining a healthy lifestyle in his retirement.</p>

<p>Need specialized care: (Psychiatry-care)</p> <p>a 25-year-old man, has been experiencing excessive worry or fear.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Psychiatry-care)</p> <p>a 30-year-old man, has been experiencing periods of depressive symptoms.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Psychiatry-care)</p> <p>a 23-year-old man, has been experiencing flashbacks of nightmares of traumatic events.</p> <p>I won't pay more !</p>
<p>Need specialized care: (Psychiatry-care)</p> <p>a 32-year-old man, has been experiencing disorganized thinking and speech and impaired cognitive function.</p> <p>I won't pay more !</p>		

<p>Need specialized care: (Psychiatry-care)</p> <p>a 35-year-old man, has been experiencing persistent anxiety and occasional panic attacks.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Psychiatry-care)</p> <p>a 20-year-old man, has been experiencing eating disorders and social anxiety disorder.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Psychiatry-care)</p> <p>a 40-year-old man, has been dealing with persistent feelings of sadness and changes in appetite.</p> <p>I won't pay more !</p>
<p>Need specialized care: (Psychiatry-care)</p> <p>a 28-year-old woman, has been struggling with recurrent episodes of low mood and fatigue.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Psychiatry-care)</p> <p>a 45-year-old man, has been experiencing heightened stress and difficulty sleeping.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Psychiatry-care)</p> <p>a 30-year-old man has concerns about attention difficulties and impulsivity.</p> <p>I won't pay more !</p>

<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 30-year-old man, has concerns about persistent snoring and occasional sleep disturbances.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 48-year-old woman has been experiencing occasional ear pain and drainage.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 32-year-old man, has concerns about persistent postnasal drip and throat irritation.</p> <p>I won't pay more !</p>
<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 38-year-old woman has been dealing with occasional dizziness.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 55-year-old woman, has concerns about hearing loss and occasional ear ringing.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 25-year-old man, has been experiencing occasional nosebleeds and nasal congestion.</p> <p>I won't pay more !</p>

<p>Need specialized care: (Ear-nose-throat care)</p> <p>A 42-year-old man with chronic sinusitis and postnasal drip, requiring nasal endoscopy and sinus imaging to identify underlying issues.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>A 30-year-old woman with persistent vertigo and imbalance, needing vestibular function tests to assess inner ear function.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 35-year-old woman, has been experiencing recurrent ear infections and hearing loss.</p> <p>I won't pay more !</p>
<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 40-year-old man, has been dealing with persistent throat pain and difficulty swallowing.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 28-year-old woman has been experiencing chronic nasal congestion and occasional nosebleeds.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 45-year-old man, has been dealing with persistent sinus pain and pressure.</p> <p>I won't pay more !</p>

<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 30-year-old man, has concerns about persistent snoring and occasional sleep disturbances.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 48-year-old woman has been experiencing occasional ear pain and drainage.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 32-year-old man, has concerns about persistent postnasal drip and throat irritation.</p> <p>I won't pay more !</p>
<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 38-year-old woman has been dealing with occasional dizziness.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 55-year-old woman, has concerns about hearing loss and occasional ear ringing.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 25-year-old man, has been experiencing occasional nosebleeds and nasal congestion.</p> <p>I won't pay more !</p>

<p>Need specialized care: (Ear-nose-throat care)</p> <p>A 45-year-old woman with persistent hoarseness, requiring laryngoscopy and voice assessment, and possibly a biopsy.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>A 32-year-old man with chronic snoring and fatigue, needing a sleep study (polysomnography) to assess for sleep apnea.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>A 38-year-old woman with chronic bad breath, requiring breath tests and microbial cultures to identify the cause.</p> <p>I won't pay more !</p>
<p>Need specialized care: (Ear-nose-throat care)</p> <p>A 55-year-old man with persistent cough and throat clearing, needing pulmonary function tests and chest imaging to rule out respiratory issues.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>A 48-year-old woman with sudden hearing loss, requiring audiometry and imaging (MRI or CT scan) to determine the cause.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>A 33-year-old man with chronic ear pain and drainage, needing ear canal swabs and culture to identify the specific pathogens causing infection.</p> <p>I won't pay more !</p>

<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 30-year-old man, has concerns about persistent snoring and occasional sleep disturbances.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 48-year-old woman has been experiencing occasional ear pain and drainage.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 32-year-old man, has concerns about persistent postnasal drip and throat irritation.</p> <p>I won't pay more !</p>
<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 38-year-old woman has been dealing with occasional dizziness.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 55-year-old woman, has concerns about hearing loss and occasional ear ringing.</p> <p>I won't pay more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 25-year-old man, has been experiencing occasional nosebleeds and nasal congestion.</p> <p>I won't pay more !</p>

<p>Need specialized care: (Psychiatry-care)</p> <p>A 42-year-old man, has recently been struggling with feelings of anxiety and difficulty concentrating at work.</p> <p>I won't wait more !</p>	<p>Need specialized care: (Psychiatry-care)</p> <p>a 28-year-old woman, has been experiencing recurrent episodes of low mood and loss of interest in activities she once enjoyed.</p> <p>I won't wait more !</p>	<p>Need specialized care: (Psychiatry-care)</p> <p>a 30-year-old man, has been experiencing recurrent episodes of low mood and loss of interest in activities he once enjoyed.</p> <p>I won't wait more !</p>
<p>Need specialized care: (Psychiatry-care)</p> <p>A 40-year-old woman, has recently been struggling with persistent feelings of anxiety and difficulty concentrating at work.</p> <p>I won't wait more !</p>	<p>Need specialized care: (Psychiatry-care)</p> <p>A 30-year-old woman who has been facing persistent feelings of sadness and a lack of interest in activities she used to find enjoyable.</p> <p>I won't wait more !</p>	<p>Need specialized care: (Psychiatry-care)</p> <p>a 55-year-old man, has been grappling with work-related stress and burnout. He describes a sense of emotional exhaustion and reduced professional efficacy.</p> <p>I won't wait more !</p>

<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 40-year-old man has been experiencing recurrent ear infections and mild hearing loss.</p> <p>I won't wait more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>A 38-year-old woman presenting with recurrent ear infections and a gradual onset of mild hearing loss.</p> <p>I won't wait more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 28-year-old woman, has been experiencing hoarseness and vocal fatigue.</p> <p>I won't wait more !</p>
<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 50-year-old man, has been dealing with persistent tinnitus and occasional dizziness.</p> <p>I won't wait more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 45-year-old man, has been experiencing recurrent throat clearing and a sensation of a lump in his throat.</p> <p>I won't wait more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 32-year-old woman has been dealing with occasional nosebleeds and nasal congestion.</p> <p>I won't wait more !</p>



<p>Need specialized care: (Psychiatry-care)</p> <p>A 26-year-old man reporting recurring episodes of low mood and a significant decline in interest in hobbies and social interactions.</p> <p>I won't wait more !</p>	<p>Need specialized care: (Psychiatry-care)</p> <p>A 27-year-old man expressing recurring feelings of low energy and a diminished enthusiasm for activities that once brought him pleasure.</p> <p>I won't wait more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 30-year-old woman has been experiencing persistent throat pain and difficulty swallowing. She also reports a hoarse voice that affects her work.</p> <p>I won't wait more !</p>
<p>Need specialized care: (Psychiatry-care)</p> <p>A 31-year-old woman describing repeated episodes of low mood and a decreased interest in socializing and engaging in her usual pastimes.</p> <p>I won't wait more !</p>	<p>Need specialized care: (Psychiatry-care)</p> <p>A 28-year-old man reporting persistent feelings of sadness and a decline in enthusiasm for activities he used to be passionate about.</p> <p>I won't wait more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 28-year-old man has been dealing with persistent snoring and daytime fatigue.</p> <p>I won't wait more !</p>

<p>Need specialized care: (Ear-nose-throat care)</p> <p>A 39-year-old woman facing frequent ear infections and noticing a gradual, mild decrease in her hearing acuity.</p> <p>I won't wait more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>A 41-year-old man dealing with recurrent ear infections and mild hearing loss that has been progressively worsening.</p> <p>I won't wait more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>A 37-year-old woman with a history of repetitive ear infections and a recent development of mild hearing impairment</p> <p>I won't wait more !</p>
<p>Need specialized care: (Ear-nose-throat care)</p> <p>A 40-year-old man expressing concerns about recurring ear infections and experiencing a slight decline in his ability to hear.</p> <p>I won't wait more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>A 43-year-old woman who has been grappling with persistent ear infections and has noticed a mild, gradual loss of hearing.</p> <p>I won't wait more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>a 20-year-old woman has been dealing with occasional nosebleeds and nasal congestion.</p> <p>I won't wait more !</p>

<p>Need specialized care: (Ear-nose-throat care)</p> <p>A 39-year-old man presenting with recurrent ear infections and a subtle, ongoing issue of mild hearing loss.</p> <p>I won't wait more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>A 41-year-old woman experiencing repeated episodes of ear infections and a gradual onset of mild hearing impairment.</p> <p>I won't wait more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>A 38-year-old man reporting persistent ear infections and a mild decline in his ability to hear over the past few months.</p> <p>I won't wait more !</p>
<p>Need specialized care: (Ear-nose-throat care)</p> <p>A 42-year-old woman with a history of recurrent ear infections and a recent development of mild hearing loss.</p> <p>I won't wait more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>A 40-year-old man dealing with frequent ear infections and a noticeable, yet mild, decrease in his hearing capabilities.</p> <p>I won't wait more !</p>	<p>Need specialized care: (Ear-nose-throat care)</p> <p>A 37-year-old woman expressing concerns about repetitive ear infections and experiencing a gradual onset of mild hearing impairment.</p> <p>I won't wait more !</p>





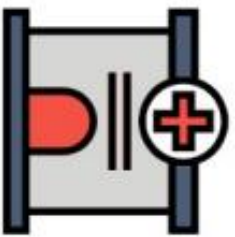
Ear-nose-throat specialized clinic

Queue	Examination Room 1 	Examination Room 2 





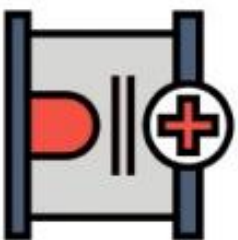
Psychiatry specialized clinic

Queue	Examination Room 1 	Examination Room 2 





Psychiatry specialized clinic

Queue	Examination Room 1 	Examination Room 2 



Ear-nose-throat specialized clinic

Queue	Examination Room 1	Examination Room 2
		



Private center



Queue

Lab Room







Public Primary health care center

Queue	Lab Room 	Examination Room 1 



Public Primary health care center

Examination Room 2 	Examination Room 3 	Examination Room 4 