

CHALMERS



Service Design in Public Healthcare Improvements of an Emergency Waiting Room

Master of Science Thesis [Industrial Design Engineering, PPU X05]

EMMA LAURENTZ
PATRICIA RAWECKA

Department of Industrial Design Engineering
Division of Design & Human Factors
CHALMERS UNIVERSITY OF TECHNOLOGY
Göteborg, Sweden, 2010

ABSTRACT

This report is based on a project carried out at Karolinska University Hospital in Solna, Sweden. The goal of the project was to improve the functionality of the emergency waiting room through application of service design.

Two of the most important things at an emergency ward are that staff can do their work efficiently, and that patients feel they are being taken care of. That is not always the case in emergency waiting rooms, which are often very stressful for both staff and visitors.

Several problem areas were discovered by carrying out on-site observations, focus group interviews, and handing out questionnaires. The flow and behaviour of visitors appeared to be unfavourable to the triage system, and employees were constantly being interrupted with questions asked by visitors, which most frequently regarded waiting time. The research also highlighted poor communication of information and instructions to visitors, which made them feel confused, kept in the dark and omitted. The failing system caused confusion, misunderstandings, intrusion on patient confidentiality, poor user experience, and negative influence on work carried out by staff.

Literature on health care environment repeatedly suggest that patient experience influence health outcomes. Healthcare environments offer great opportunities for improvement through service design, which stresses that detailed understanding of user experience and behaviour offer most valuable insights. The project outcome was a tested new solution, and a guideline document with both case specific and general recommendations. The new solution was a combination of both new and re-used elements. It proved to contribute to a better flow by motivating visitors to take time to actually read the signs. Less crowding of people occurred in critical areas of the room, and also the patient confidentiality improved. Thanks to a new screen displaying estimated waiting time patients also had an increased feeling of control while waiting. Through thorough user centered data collection and journey mapping the project lead to pin pointing and displaying how service design can improve such an environment as an emergency waiting room. The result also indicates how the service design approach would be favourable if applied on the entire patient's journey, through out the whole health care system.

TABLE OF CONTENTS

ABSTRACT	1
PREFACE	9
1. INTRODUCTION	11
1.1 PROJECT SCOPE	11
1.2 PURPOSE	11
1.3 OBJECTIVES	11
1.4 RESEARCH QUESTION	12
1.5 DELIMITATIONS	12
1.6 OUTCOME.....	12
2. BACKGROUND	12
2.1 HEALTH CARE POLITICS	14
2.2 KAROLINSKA UNIVERSITY HOSPITAL	14
2.3 EMERGENCY WAITING ROOM	14
2.4 PILOT STUDY	14
3 THEORETICAL FRAMEWORK	14
3.1 SUPPORTIVE HEALTHCARE ENVIRONMENT	15
3.2 DESIGN APPROACH - CONTEXTUAL DESIGN	16
3.3 SERVICE DESIGN	16
3.4 INFORMATION DESIGN	17
4 METHODS	17
4.1 MEASUREMENT DATA	17
4.2 DATA COLLECTION METHODS	18
4.2.1 Observation	20
4.2.2 Focus group	21
4.2.3 Interviews	22
4.2.4 Flow pattern	23

4.2.5 Action rate	24
4.2.6 Questionnaires	24
4.3 ANALYSIS METHODS	26
4.3.1 KJ-analysis	26
4.3.2 Function analysis.....	27
4.3.3 Persona and scenarios.....	27
4.3.4 Costumer journey mapping - the user's journey	28
4.4 IDEA GENERATING METHODS.....	28
4.4.1 Brainstorming	28
4.4.2 Mock-up	29
4.5 EVALUATION METHODS	30
4.5.1 Prototype.....	30
5 OUTCOME OF THE DATA COLLECTION.....	30
5.1 OBSERVATION STORY	33
5.2 PERSONA AND SCENARIOS	33
5.3 KAROLINSKA IDENTITY AND CORE VALUES	34
5.3.1 Waiting room identity and core values	36
5.3.2 Patient experience	38
5.4 PATIENT'S JOURNEY	38
5.5 FUNCTION ANALYSIS	38
5.5.1 Issues in focus	38
6 DESIGN PROCESS	38
6.1 FLOW.....	39
6.1.1 Idea generation	39
6.1.2 Development	41
6.2 ATTRIBUTES	41
6.2.1 Information module	43
6.2.1.2 Idea generation	43
6.2.1.3 Development.....	44

6.2.2 Ticket dispenser	45
6.2.2.1 Idea generation	45
6.2.2.2 Development.....	45
6.2.3 Confidentiality screen	46
6.2.3.1 Idea generation	46
6.2.3.2 Development.....	46
6.3 VISUAL APPEARANCE	47
6.3.1 Graphic guidelines	47
6.3.1.1 Idea generation	47
6.3.1.2 Development	47
7 FINAL CONCEPT	49
7.1 SIGNAGE	49
7.2 ATTRIBUTES	49
7.3 SERVICE DESIGN COMPONENTS	51
7.3.1 Service product design	51
7.3.2 Service facility design	51
7.3.3 Service operations process design	52
7.3.4 Customer service processes design	52
7.4 INFORMATION DESIGN	52
8. PROTOTYPE BUILDING AND TESTING	55
8.1 ATTRIBUTES	55
8.1.1 Information module	55
8.1.2 Prints and signs	55
8.1.3 Ticket dispenser	55
8.1.4 Waiting hours screen	55
8.2 TEST ITERATION 1	56
8.3 RESULT AND INSIGHTS FOR FINAL TESTING	57
9. RESULT	58
9.1 THE NEW WAITING ROOM	58

9.2 GUIDELINES	62
10 DISCUSSION	65
10.1 THEORY	65
10.2 DATA COLLECTION	65
10.3 PROCESS.....	66
10.4 RESULT.....	67
11. CONCLUSION	69
12. REFERENCES	72
13. APPENDIX	76

PREFACE

This thesis work has been done at Karolinska University Hospital in Solna, on behalf of Transformator Design Group AB, a service design company in Stockholm, during spring of 2010.

We would like to especially thank the following persons:

Li Wikström at Chalmers University of Technology, our examiner and report viewer.

Gustav Gullberg at Transformator Design Group AB for being our supervisor, guiding and supporting our work as well as facilitating the contact with Karolinska University Hospital.

Maria Karlsson, head of nurses at the emergency unit at Karolinska University Hospital in Solna, for being supportive in our work and facilitating the field work.

Stockholm, August 2010

Patricia Rawecka & Emma Laurentz

1 INTRODUCTION

1.1 PROJECT SCOPE

Transformator is a consultant bureau specialized in service design and design strategy. The company was founded in Stockholm 1998 and has currently seven employees plus a number of freelancing consultants. Transformator works with both service oriented as well as producing companies; they have several big clients in mainly insurance, banking and industrial production. (Transformator, 2010). In 2009 Transformator initiated a pilot study which revealed an opportunity for service design to make great improvements in health care institutions. It identified several problem areas in flow of communication and people. For instance the information system is working poorly, which does not only affect the experience of it as a workplace and waiting room, but also preventing its efficiency. Patients seek information that is not provided or is not visible enough, which leads to patients turning their questions to both nurses and administration at the desk. The queue systems for triage, payment and doctor, confuse patients, which leads to behaviours that lower emergency ward efficiency and experience.

The pilot study resulted in a hypothesis of how the waiting room could be improved by certain changes. It indicates general problem areas and finalized as rough graphic solutions.

To move forward, and get from theory to practise, a further investigation and a development of a solution from the identified problem areas is required. The pilot study aimed to identify problem areas that would show the need of a service design project. The next step is to demonstrate improvements by implementing tested concepts.

1.2 PURPOSE

The aim with this project is primary to increase the level of satisfaction for the patients who, by own means, visit the emergency room at Karolinska University Hospital in Solna. This will be done by development and investigation on following areas;

- The flow of communication in the waiting room
- The flow of people (patients, relatives, taxi drivers, police)
- The environment in the waiting room
- The quality of information
- The work environment for the staff

1.3 OBJECTIVES

The project concerns several stakeholders that will take part of the result. The objectives of the project are therefore individually determined for each of these stakeholders.

The objectives for each stakeholder

Patients

Patients will go through the waiting room system smoothly without hindering or preventing its efficiency. By getting a good general impression of the waiting room by and feeling informed, in control and confident, patient satisfaction will increase.

Other visitors

Other visitors; such as relatives, taxi drivers, police officers, will be informed how to proceed in the emergency waiting room and therefore outline doubt or errors that lead to confusion or disorder in the room.

Desk staff (Nurses and administration)

The work situation will consist of less interruptive questions from the patients, which will lead to better focus on their work. In total their patience and energy will last longer, gained by increased control over their work environment.

Karolinska University Hospital

By increasing the level of satisfaction among the patients, the hospital will be able to show the effect of applying service design. For future investments in waiting rooms and other possible areas at hospitals, the result of this project will work as guidelines with tested concepts for which investments are worth doing. The improved experience will also increase the reputation of the emergency ward for patients as well as employees.

Transformator

The outcome of the project will work as case study of how service design successfully can be implemented in health care. Transformator will use this as a reference and inspiration to more health care projects in the future.

1.4 RESEARCH QUESTION

The research questions from which the project proceed are: can re-design of the waiting room..

- ...enhance the patients' experience of control, comfort, confidence?
- ...improve the flow pattern of people in the waiting room?
- ...increase the patients' total experience in the waiting room?
- ...increase the communication of information to the patients?
- ...improve the work environment for the nurses?
- ...show enough positive results to motivate investments in remaking of waiting rooms at other units?

In other words; can service design improve an emergency waiting room?

1.5 DELIMITATIONS

This project was performed in co-operation with the service design company Transformator and was carried out at the emergency waiting room at Karolinska University Hospital in Solna. The term emergency waiting room refers to the area within the entrance/exit to the outdoors and the entrance/exit to the emergency room. The project concerned the people who by own means come to the emergency waiting room, which means the term "user" will refer to patients, relatives, taxi drivers, etc. The project concerned the time interval from stepping in to the waiting room to the moment when being picked up by a nurse to meet with a doctor and receive medical care. The project was defined as to improve the flow of communication, flow of people and to increase the user experience. The project did not aim to directly change the workflow or organisational matters for the staff working in the emergency room. The result of the project is presented as guidelines on how to improve the emergency waiting room at Karolinska, and as physical prototype(s) in the waiting room. The prototype(s) and guidelines are, although tested at Karolinska, not be bound to be applicable exclusively at Karolinska and may be used in order to make improvements at similar sights.

Based on feasibility for this project, parts of the theoretical framework was considered in the design phase, whilst the rest followed under recommendations and guidelines but was still be listed due to their importance and relative feasibility regarding the hospital's future building.

1.6 OUTCOME

The outcome aims to be a prototype as well as recommendations and guidelines for needed improvements at the emergency waiting room. The guidelines will be based on analysis of tested concepts and solutions carried out in the emergency waiting room during the project. Some guidelines will be applicable in emergency waiting rooms in general, not solemnly at Karolinska University Hospital.

2 BACKGROUND

2.1 HEALTH CARE POLITICS

In Sweden there are three democratic levels. On national level there is the parliament and government, on regional level the county councils, and on local level the municipality. The county councils and regions have a shared responsibility for certain tasks in the municipality, with emphasis on health care and regional development. They are controlled by politicians elected by voters in each specific county. The representative assembly is the highest decision-making organ on regional level and can also be called the government of the county council and region. The assembly puts together budget, tax and health care prices (Sveriges Kommuner och Landsting, 2010).

2.2 KAROLINSKA UNIVERSITY HOSPITAL

Karolinska University Hospital is one of the premier health care facilities in Scandinavia. It is a public service hospital, which means its activity is not directly affected by market forces. The desire for having more satisfied patients is therefore not a question of competitiveness. Karolinska's strategy is based on many different aspects and not the less on political decisions. Politicians and the county council put high pressure on the hospital to work hard on improving the user satisfaction. On the website the hospital express that they believe patient care, research, and education, must all play equally strong roles in their effort to extend and enhance people's lives. Their vision is to "be recognized worldwide as a premier teaching hospital, leading the way in health science and care" (Karolinska University Hospital, 2010). Their ambition is to continuously communicate an accurate image of their activities and aspirations for the future.



2.3 EMERGENCY WAITING ROOM

Karolinska University Hospital has two health care facilities in the Stockholm region: one in Solna and the other in Huddinge. In this report Karolinska University Hospital will refer to the facility in Solna, which is the one this project concerns. The hospital facility has two emergency wards. The Astrid Lindgren hospital takes care of children under 15 years old, whilst all other patients for adults there are the delivery emergency and the adult emergency. The waiting room for the adult emergency facilitates patients coming in to all of the different units at the emergency. The emergency ward houses units like Neurology, Medicine, Surgery, Infection, Orthopaedics, Oncology, Ears-Nose-Throat, and Gynaecology. The waiting room is, to many people, the first touch point with the hospital. This is where a nurse in the triage does the first evaluation of the patients' condition and decides about a suitable priority. This is also where the patients possibly spend several hours waiting for medical care, where

they have time to think, get impressions, and form an opinion about the hospital. The waiting room serves as a preparation area before receiving care. It is of high significance that the system in the waiting room works as smoothly as possible. Patients need to be taken care of and correctly evaluated by the nurse. The functionality and the experience of the waiting room have also shown to affect the patients and the following doctors visit. The patients' experience of the health care chain can strongly be coloured by the first impressions from the waiting room. In some cases a great amount of time gets dedicated to express frustration instead of apprise symptoms, when finally meeting the doctor. The waiting room is therefore an important space where the bar is put for what patients expect of the hospital visit.

2.4 PILOT STUDY

During 2009 Transformator carried out a pilot study in the emergency waiting room at Karolinska University Hospital. The reason for this was an attempt from Karolinska to find out how the emergency waiting room could contribute to a higher efficiency and patient satisfaction. Transformator performed the pilot study to demonstrate how service design can improve the waiting room with relatively small means.

Transformator divided the pilot in to three main areas; flow, information and experience. Each of these areas included research, problem decomposition and identification of several hot spots where effective changes can be done. According to Transformator, the most important findings and solutions for each and every of the main areas are:

Flow

Problem

- The patients do not understand or follow the queue system
- Patients do not understand the difference between nurse and cashier
- The patients disturb the nurses with question, without taking a queue number first

Experience

Problem

- The waiting room is messy and do not communicate a clean environment
- The information and interior in the room leaves a cluttered impression
- The confused flow gives an impression of low efficiency and structure

Information

Problem

- The printed information lack of priority and do not reach the patients
- The visual appearance lack both graphic and qualitative consistency.
- There is no information about current waiting hours

The pilot study result identified several problem areas. However, because of a restricted budget the project could not be further investigated and finalize into a physical solution and therefore stayed as recommendations for further development.

3 THEORETICAL FRAMEWORK

There is a lot of research literature on health care environment and how it influences patients experience and health outcomes. Roger S. Ulrich, professor at Texas A & M University's College of Architecture, has developed a theory of supportive design sums up what main issues need to be considered in order to create successful health care facilities. Healthcare environments offer great opportunities for improvement through service design. By emphasizing the importance of the users, the Service design framework can be considered to support a User centred design approach. A detailed understanding of users experience and behaviour is seen as the most valuable insights. The deep understanding is achieved by encouraging team members to actively engage with the end-users through out the whole development process. Since this project considers a lot of communication related issues, information design will play a great role in the service development.

3.1 SUPPORTIVE HEALTHCARE ENVIRONMENT

The design quality of health care environments has proved to have a positive effect on medical outcomes and care quality. Roger S. Ulrich (1991, 1992, 1999, 2000a, 2000b) has developed a Theory of Supportive Design. It is a collection of applicable guidelines for creating successful healthcare facilities, based on a large amount of research studies in health-related fields such as health psychology, environmental psychology, behavioural medicine, and other (Ulrich, 1991, 1999, 2000). Hospital design has traditionally had a pathogenic approach suggesting healthcare facilities to be constructed to reduce the risk of infection or disease exposure, with a focus on functional

platforms for new medical technology. The result have been healthcare environments that are often perceived as stressful, institutional and substantively impair care quality (Ulrich, 1991, 1992). The shift to the new perspective in medicine emphasises the psychological and social needs of patients, without excluding the consideration of diseases exposure and functional efficiency. Studies at John Hopkins Medical School (Rubin, Owens & Golden, 1998 see Ulrich 2000b) showed that 80% of the studies presented positive connections between the characteristics of the environment and the health outcome. Roger S. Ulrich (1991) propose three general guidelines for creating supportive healthcare environments:

- Foster control, including privacy
- Promote social support
- Provide access to nature and other positive distractions

Control is people's real or perceived feeling of being able to influence their situation (Gatchel, Braum, & Krantz, 1989) There are many studies showing that patients who feel they have some kind of control over their situation, cope better with stress and have better health than those who do not (Ulrich, 1999). Hospital staff losing control due to the combination of work overload and demanding responsibilities is also an important problem (Teikari, 1995).

Roger S. Ulrich's general guidelines for creating supportive healthcare environments are supported by many studies showing environmental factors have a significant influence on patients' health outcomes. There is a lot of research literature on factors contributing to good healthcare environment. Such factors are social support (Shumaker & Czajkowski

1994), access to food, telephones and rest rooms (Shumaker & Pequegnat 1989; Ulrich 1999). Light and colours also have a high influence on a patient's well-being and health care outcomes (Arnell & Delvin, 2002). There is a lot of literature on how positive distractions have a capacity to improve mood and effectively promote restoration from stress (Ulrich 1991, 1999, 2000b). Positive distractions can be the experience of or even view of nature, like trees, flowers, water, sky, etc (Ulrich, 1999; Ulrich 1991; Keep, James & Inman 1980; Parker & Hodge 1976; Verderber 1986) Also employees perform better with a view of nature (Leather et al. 1997). Also other factors in the interior have proven to have a great impact on the health care experience and outcome. Factors like noise (Hilton 1985; Bayo, Garcia & Garcia 1995; Hosking & Haggard 1999), and flooring material (Ulrich 2000b; Wilmott 1986; Harris 2000 see Ulrich 2000c). Sources of patient stress are perceived lack of control, lack of privacy, noise and crowding (Shumaker & Pequegnat 1989; Ulrich 1999). Privacy and control is achieved when patient can adjust settings in his or her own space according to their own needs (Shumaker & Reizenstein, 1982).

3.2 DESIGN APPROACH - CONTEXTUAL DESIGN

Contextual design is a user centred design approach that makes user data constitute the base criteria for deciding what a system should do and be structured (Beyer & Holtzblatt, 1998). The extension of collected user data prevents team members in the project group to argue about what they think the users would like (Beyer & Holtzblatt, 1998). The approach believes that a detailed understanding of users experience and mindset gives greater insight than information through market research reports. A user-centred design approach advocates that developers actively engage with the end-users, from the earliest stages all the way through out the product or service development process (Design council 2010). Studies have shown that development projects with more links (techniques that allow users and developers to exchange information) are much more likely to be successful than those projects with less links (Keil & Carmel, 1995). Most development projects do have exchange of information between the developers

and the users, but way too often that is only in latter stages to evaluate already developed concepts. In contextual design it is not only important to engage with users from the beginning, but also critical to do that in the context in which users interact with the product or service (Design council 2010). The main purpose of the design research is to inspire and to focus the design team rather than to gather quantitative data. Although, the latter is helpful for making measurable evaluations at the later stages of testing usability. Less successful projects do not only generally lack enough links but also the number of direct links. A non-direct link is a technique where information is exchanged through intermediaries, which can intentionally or unintentionally filter and distort information (Keil & Carmel, 1995). When the project moves on from research to the creative phase where ideas and concepts are developed, user-centred designers continue to gather input from users, by either actively engaging them in the process or by having them to evaluate ideas, mock-ups and at last prototypes. The huge variety of available links can both be considered as a challenge and a possibility. The possibility is that it easy to get information from customers, whilst the challenge is to choose what techniques to use (Keil & Carmel, 1995). The important thing is that an active direct interaction is restored. Development teams are often physically and culturally distant from the people they are designing for. The team members can along the project grow close to their ideas and technologies to the extent that "their expectations don't match those of the everyday end-users" (Design council 2010). User-centred design and ergonomics overlap each other since they are both stressing the human perspective.

3.3 SERVICE DESIGN

Service design can be defined in many different ways. SVID (SVID 2010) which is a Swedish organisation working with increasing the design conscience, uses following definition:

"Designing a service concept, its structure and especially the parts [touch points] that users perceive. The aim is to reflect the service's purpose, function and profile in the design, as well as making it easy and attractive for the target group to use".

Common for most definitions of service design is that they emphasize the importance of the users. It is clear that service design addresses the functionality and form of services from the perspective of the users.

The efficiency and patient experience of the emergency ward waiting room was not optimal due to failing touch points of the system. The waiting room is a space containing touch points of a virtual system the patients travel through, that lacks provision of control, confidence and motivation. Every touch point should provide the user with control, confidence and information about current situation and what happens next. The user should also get motivated to follow the system. Service design can with great user insight create this kind of system without the need of large investments. This project aims to create a tested solution that to furthest extent uses the current elements and environment, but also cheap external elements, that would work as a base foundation for an investment in a more exclusive version. This works great with the fact that the budgets of Swedish health care are tight, and proof of a solutions positive impact might be crucial for any investment as such.

According to Rohit Ramaswamy, scientist and author of Design Management of Service processes, service design is composed of following four components; Service product design, Service facility design, Service operations process design and Customer Service process design. The first one, Service product design, is built up by physical attributes of a service. This can be the bed you sleep in when staying at a hotel, or the seat you sit in while travelling by train. The second component Service facility design refers to the design of the physical layout of the facility in which the service is delivered. This can be the quality of light in the room or the rate of tidiness. Service operations process design refers to the activity and steps that are needed in order to deliver and maintain the service. The last component Customer service processes design refers to the interaction between the user and the service provider. According to (Ramaswamy, 1996) services are not always new creations and solutions but re-designs of current solutions. The need for redesign is a combination of a service needing to adapt to external changes and that not enough thought is put to systematically design the service.

3.4 INFORMATION DESIGN

Saul Carliner, professor in educational technology at Concordia University in Montreal and specializing in the design of learning and communication materials for the workplace, have created a three-part framework for information design (Figure 3.1 Information design). (Carliner, 2000) brings up that it is not enough for communicators to simply write a message and present it to the users, but must first predict their goals, moods, and motivations, and adapt the message and its presentation thereafter. The frame work supports User-centred design, since development work of information and communication, can only be successful if it closely involves consumers and users. The model approaches information on three levels, and Carliner bases in on the three levels that theorists in education and instructional design consider when designing courses (Dick & Carey 1990 in Carliner 2000).

Physical Level – helping users find information

Good physical design let users find information of interest easily. Physical design elements are only cosmetic if they are not considered part of a larger framework. There are several issues in producing good physical design, including page and screen design (placement of information on a page or screen so that users can easily locate it), layout (placement of information), white space, graphic devices (that can call users' attention to key elements of information), and basic technical writing and editing. The last refers to the preparation of text so that it conforms to the agreed style. Information designers must also consider information overload, which in some solutions require the physical design to communicate through visual rather than words. (Carliner, 2000).

Cognitive Level – helping users understand information

This level is also called the intellectual level, since it considers what happens after the user finds the information. It helps them understand it and make it possible to use. At this level the focus is mainly to identify the users' performance goals and to prepare a solution that address them, which means provide

the users with right information at the right time. To deal with information overload at a cognitive level, structuring information and removing less essential information can help. An other consideration for this level is to reuse or modularize information.

Affective Level – motivating users to perform

The affective level focuses on the emotional impact. When the users have found the information, understood it, it is not for certain that they will then automatically perform thereafter. First of all the information needs to catch the users’ attention. They need to feel compelled to read it. After have attracted the users to read about the information, the next step is to motivate them to use it. The choice of language is then important, as well as considering cross-cultural communication

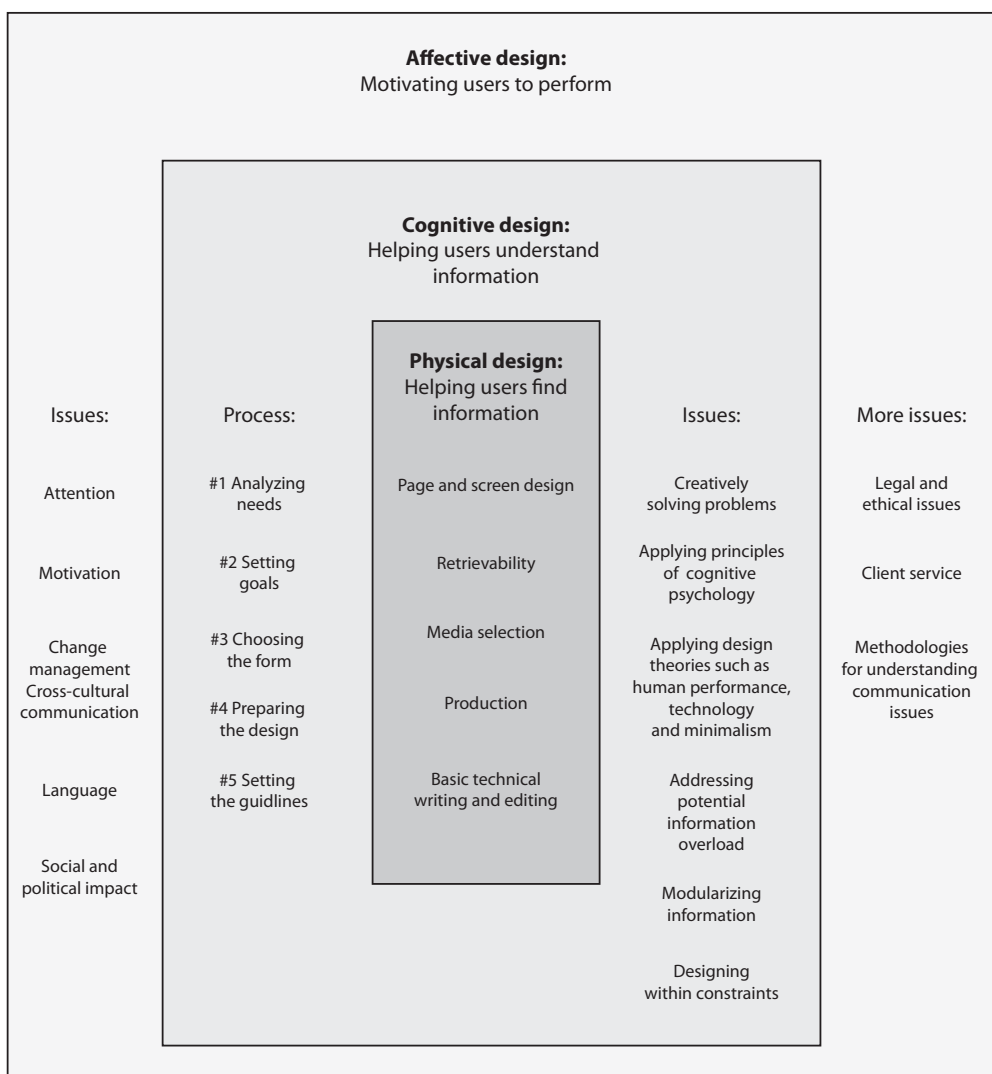


Figure 3.1
Physical, cognitive, and affective - A three-part model of design for technical communication products, by Carliner (2000).

4 METHODS

Several methods were used to collect data, analyse data, to generate ideas and evaluate. The following chapter describes these methods and how they were implemented. During the data collection several factors were measured in order to find hot spots in problem areas. The same factors were measured after the new concept had been implemented, to have a statistical comparison.

4.1 MEASUREMENT DATA

Measurement data is the result of a context or product bound observation where quantitative data can be obtained. The predefined data is used to compare a performance before and after an implementation of change. Theory connected to measuring data is profound and complex. Measurement data is affected by many variables, such as by desired outcome, chosen samples, method of measurement, choice of analysis method etc. However there are mainly two issues to consider when defining measurement data; the level of measurement and reliability (Research Methods, 2006).

Level of measurement is based on how the collected data will be interpreted. It consists of four levels; nominal, ordinal, interval and ratio, which all relate to data in different ways. Depending on what is interesting for the case each level highlights different relationships between the data being compared. Interval makes distance between numbers meaningful and therefore averages can be calculated. Ratio always has an absolute zero as a reference to measure before and after. In nominal values is just a label on alternatives to summarize a data collection. The ordinal data is ranked from less to more; but also here the distance between the attributes is not specified which

means that average is not determinable (Research Methods, 2006). Reliability basically measures the quality of the measurement, which usually is defined as repeatability of the data. This means the extent of which the data is repeated if the measurement is conducted multiple times. Moreover, the term reliability includes different types of reliability, theories on human error, measurement error and validity. If the measurement is set up to measure attitudes, the reliability error is strongly connected to which words are used and how the interviewees perceive these words. E.g. by rating a level of perceived safety there is also an additional aspect of what signifies safety to this person.

Implementation

To define desirable data in this project the different stakeholders were analysed. The client, Karolinska University Hospital, has interest in achieving higher efficiency in the waiting room and increasing the client satisfaction. The measurement data were therefore defined based on the result of our observations, problem areas identified in the pilot study, and the client objective.

Flow

Flow is in this chapter referred to as the pattern of movement in the waiting room. There is a predefined correct way to proceed, and any mistakes have consequences. The flow is therefore observed in a flow chart and measured in frequency of errors. Total time before completing the steps does not have high significance in this matter, since the users are of such different shape and condition.

Information

To measure whether or not a person has noticed, read or understood information is rather difficult. However the consequence of not receiving or understanding the information is to either act incorrect, or follow what other people do without knowing why. In the waiting room there are several important levels of information. The first level is for guidance, the second level is information about the present situation, and third level for a general perspective. Through the focus group with staff and the pilot study it became clear that the consequence of not knowing how to act (guidance) or what is happening at the moment (present situation) is that patients approach the desk to ask. The rate of questions to the nurse or administration desk, without taking a queue number, is therefore a measurement data for information.

Experience

To increase the client satisfaction part three of the measurement data is to measure the experience of the visit. In order not to consider the actual meeting with a doctor the measurement needs to be done before receiving care. The experience is affected by a number of variables and the specific characteristics of the individual. For example expectations, experience from before, medical condition, culture, age, gender, etc. affect the total experience for each patient. Interval levels were used in questionnaires to measure experience and satisfaction, also to get averages and comparable figures. The experience part was first of all conducted to find hot spots for future development; the satisfaction part is concluded to find out how the overall impression would change before and after.

4.2 DATA COLLECTION METHODS

Anyone can end up in the emergency ward. That means the users of the emergency waiting room can be all kinds of people, with all kinds of injuries and health related problems. Users in the waiting room are not only patients, but also relatives, visitors and staff. Because the healthcare environment is unique due to the wide variety of users, many kinds of both qualitative and quantitative data collection method

were used to be sure to cover all perspectives. The qualitative methods that were used are: Observation, Interviews and Focus Group. When the qualitative data from the different methods indicated the same tendencies, some of the quantitative methods were used to dig deeper. Other quantitative methods were used to complement parts of the qualitative result. These being Action rate, Questionnaires and Flow pattern. The data collection sessions at the waiting room on Karolinska were always conducted on Monday afternoons between 12-6 (sometimes 12-8) PM, since that is their most busiest day of the week. The reference for all of the methods described is The good research guide (Denscombe 2007).

4.2.1 Observation

The method

Observation is a data collection method used to watch a certain contextual behaviour in either a natural setting, where actions take place naturally, or in a simulated environment such as a laboratory or studio. It offers a perspective on research where the data does not rely on what people say they do, but what they actually do. There are essentially two kinds of observation methods, the systematic observation and the participant research. The systematic research is most commonly used in purpose of collecting quantitative data and is used for statistical analysis. The participant research produces qualitative data in order to understand a process or behaviour. These two methods can be executed either as a closed or an open operation, meaning that the observer either reveal its identity as a researcher or stay anonymous.

As in other research methods there are factors that have an impact on the result of the data collection. The issue of perception regards both systematic and participant observation, as it is dependant of how the researcher perceives a situation. For example memory, familiarity, and associability, differ between individuals and can lead to different results from the same observation.

Implementation

The observational studies were executed as a participant observation and it was performed in a natural setting, i.e. the waiting room. The patients were not informed about the observation, however it was not either secret in any way. During the sessions approximately 150-200 people were observed in the waiting room each day and in total there were six sessions.

This observation was in particular performed to highlight the patient's behaviour. First of all to understand why people act in certain ways and to understand why the flow works like it does. It also showed what happens between the touch points. Where do people look when they arrive, what do they say, why and where do they hesitate, what positions in the room do they choose, are there medical conditions that affect their behaviour etc. The aim of the observation was also to register what might have an affect on the atmosphere in the room and how it changes during the day. This observation was executed by taking notes, highlighting on a map of the room and writing down observed scenarios (Appendix A). The purpose was in first hand to understand behaviour in order to better solve the problem. Also, to perform a similar session in the end and possibly to discover changes or new behaviours.

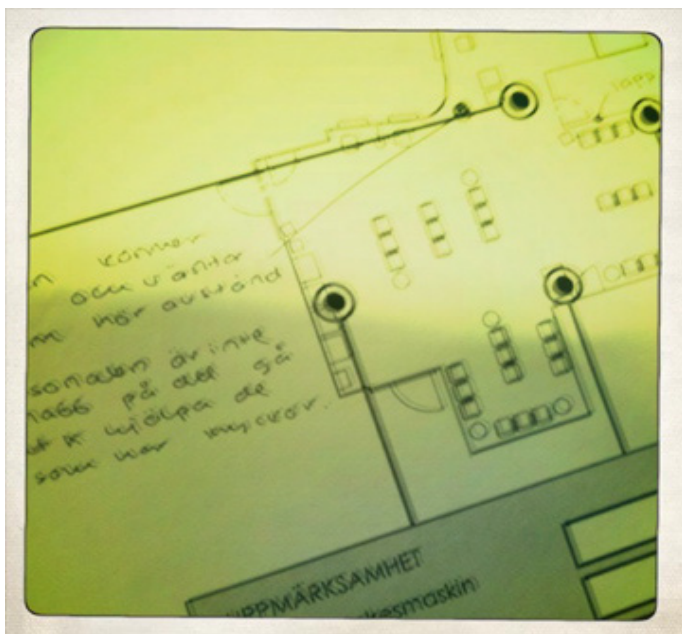


Figure 4.1 The chart filled out at the observation sessions.

4.2.2 Focus group

The method

A focus group is a group session arranged and held by a moderator. The purpose is to explore and evoke attitudes, ideas and feelings about a certain topic. It is often used to understand underlying motives of opinions, to identify levels of agreement in the group, and to check what affect different stimuli has; e.g. pictures, products, smells, sound etc.

The session can be held from 1-2 hours and ideally the group consist of 4-9 people, depending on the size of the project and topic. The role of the moderator is to facilitate the interaction in the group. A crucial part for the success of the focus group is to keep the discussion open but controlled within the barriers of the topic. The moderator is therefore responsible for motivating all of the participants to be involved in the discussion, maintaining a good atmosphere without any abuse or insulting, to keep the discussion on track and to provide the group with stimuli to trigger the discussion. However, it is important for the moderator to stay neutral to responds and not to imply wrong or rights.

The group can be of different constellation depending on the project. However, it is important that the participants are familiar with the topic at the same level. The session is recorded by a microphone and/or video recorder and taking notes. It is also useful to have one person from the research team, besides the moderator, to solely observe and take notes during the session.

Implementation

The focus group was mainly held to gain insights from the emergency waiting room staff. The group consisted of two nurses and two administration ladies who were selected by the head of nurses. The session took place in a conference room, at Karolinska University Hospital, during one hour. The approach was to discuss the waiting room and the patients' behaviour from a staff point of view. Two focus group sessions were conducted. The first one was performed in the beginning of the project, to gather data and insights about the current situation. The purpose of this session was, apart from

gathering data, to include and inform the staff in the project to make it more appreciated. The structure was to first inform about the project, then to let the participants talk about their own professional role and after that to start the discussion. It was also structured to allow the staff to ventilate their own ideas and thoughts. The second session was held in the end of the project in order to evaluate an implemented solution. It was structured as an open discussion, by going through the effects of the solutions and changes that had been done in the waiting room. The session was also recorded on a voice recorder approved by the participants.

4.2.3 Interviews

The method

Interviews are used in research when collected data needs to provide insight and understanding for the subject of matter. The interview includes a set of assumptions about a certain situation, which the questions are based on. It is important to distinct an interview from a casual conversation, also to be aware of what approach an interviewer needs to follow. The interview can not be done by secret recording and there should be an open, mutual agreement on why the interview is executed. It is important to know that the interviewees' word can be treated as 'for the record' and also that the researcher is in charge of controlling the agenda of the interview but not the character of the answers.

It is suitable to use interview as data collection method when the researcher wants to collect information on more complex matters and when there is a need to gain insight on people's feelings, attitudes, expectations and opinions. Interviews can also be used when the subject of matter is particularly sensitive or complicated which may require further explanation from the researcher. Time and costs are variables that determine the extent of the interview data collection. When deciding how many interviews to execute the time aspect is of great importance; time to prepare the interview, to perform the interview and to process the data needs to be taken under consideration.

Also, most importantly, the researcher needs to be certain of the use for the data that will be collected.

Semi-structured interview

The choice of which type of interview to use is selected by the purpose. A semi-structured interview is used when the interviewer has a clear agenda for the interview but still is interested for the interviewee to elaborate his or her answers. The interviewer can by probing gain deeper insight in emotions, attitudes, experiences and opinions about the topic. It is, as in all data collection methods, important to structure the interview right. The length, the time and place, the context and order of questions affect the outcome of the interview. It is important to chose a time and place which will not have an affect on the interviewee, e.g. time pressure, loud environments, environments when other people hear the interview etc. Also the sequence of questions is important. If the first question is too complex the interviewee could feel stress for not understanding, it is also important that the early questions should not colour the answers of the following questions.

Implementation

Interviews were conducted with patients in the waiting room, while they were waiting to be received by the doctor. Considering the interviewees' sensitive situation, the place of the interview can hardly be called comfortable. Because the lack of options, the waiting room was approved to work as work field for the interviews. The sample group did well reflect the composition of the population in the waiting room in terms of nationality, gender and age. The patients were approached and asked for permission to ask a few questions not related to their health state (Appendix B). The interviews were semi-structured, with a couple of key questions to ask about and discuss. The first questions were basic, like approximate age and if they had heard of Vårdguiden. The questions that followed concerned their expectations and impression of the waiting room, than regarding the information and finally how they understood the procedure of the waiting room system. Because of the delicate situation, respect was taken to the length of the interviews. They lasted for about 5-10 minutes and the probing was executed delicately.

4.2.4 Flow pattern

The method

Using a service or product users have several choices of what they can do and how to act. These actions can be either “right” or “wrong”, regarding of the purpose of the system. Observing and plotting a pattern of the flow can be very helpful to identify which parts of a system fail and generate “wrong” actions by the users. Whole systems or just parts of them can be observed. All possible actions a user can do within the sequence are listed on a piece of paper in a circle. It is important to know what movements and actions are “right” and which are “wrong” in the system. During the time period all movements between the different actions are registered by drawing a line between them. Afterwards there will be a lot of lines drawn between the actions. The lines that go between two actions that are “right” are coloured green for instance, to indicate that it is right. The other lines go between at least one “wrong” actions and are therefore coloured red for instance, to indicate wrong. The final picture gives a very clear overview of which “right” and “wrong” actions are common, which helps finding hotspots.

Implementation

The pilot study and initial observation displayed a problem area around the ticket dispenser and nurses desk. Users did a lot of things that lowered the efficiency of the system. From the point patients enter the waiting room until it is their turn to approach the nurses’ desk, there seemed to be a lot going on. Which is why that sequence was chosen. The correct set of actions were; take ticket – wait within safe area – approach nurses’ desk when patient’s turn. Wrong actions were; being within critical area, and going straight to nurses’ desk. The critical area was that area in which patients confidentiality was regarded to be discouraged, or where people’s constant presence was counteracting the system.

This involved all people who stood by the door, queued by nurse’s desk with or without number, or generally blocked the area. The safe area was the opposite, which means that people in that area did not effect the system negatively. The flow chart is displayed in Appendix C.

4.2.5 Action rate

The method

The method is based on simple counting. After having identified a problem area, a more detailed picture can be achieved by measuring its composing parts. A problem area is often built up by many smaller fractions, like actions and choices by the users. Whole systems or just sequences of them can be looked at. All possible actions a user can do within that sequence is listed on a piece of paper. During the counting period a line is drawn for every single listed action that is made by the users. The result can be translated into a circle diagram which makes a very clear presentation of what fractions contribute most to the problem area.

Implementation

A big problem in the waiting room was that visitors approached the nurses’ desk with questions without having taken a ticket. Because the area close to the nurses desk is sensitive due to patient confidentiality, the nurses were the ones to execute the counting. They were provided with instructions and a list of subjects that patients and other visitors often ask about (Appendix D). There was space for the nurses to put up other new subjects if they occurred. It was made very clear that only those questions that were asked by people who did not take a ticket to approach the desk, were the ones to be considered. The counting was executed twice. Both times were on a Monday between 12 p.m. and 12 a.m. which covers the most busy time according to Karolinska. The average of these two testing periods was calculated, and the data was translated into a circle diagram. (figure 4.2).

4.2.6 Questionnaires

The method

Questionnaires are used to gather information using a form with listed questions, statements or pictures. The type varies depending on purpose, however the most common purpose is to collect

data for analysis. Questionnaires are suited to use when research desire larger number of answers. The questions should be designed so that the answers are translatable to facts; which leaves no room for analysis of individual answers. The most important point is that the questionnaires are written with an identical set of questions in order to get comparable results. Furthermore it is important that the questionnaire is performed in an open social climate to allow honest answers, the information also needs to be straightforward and understandable for all people (considering culture, age and eye sight).

The questionnaire is not set out to change attitudes or provide information. The questions should be designed solemnly to measure either a person's opinions towards a certain topic or to get straight facts. However it is not restricted from consisting of either both, or one or the other.

Implementation

The questionnaire (Appendix E) was designed to pin down the patients' attitudes towards the waiting room, as well as find some facts about how they proceed before deciding to go to the emergency. Since it was used to get comparable material on patients' attitudes and impression of the waiting room before and after the project, the session was performed on two different occasions: one before and after implementing the prototype. Both occasions were done on a Monday between 12p.m. and 6 p.m. but with two months apart. The questionnaire also aimed to get an idea about how people get prepared and how they find information about the health care system. This was only an important fact at the first occasion. The questionnaire was handed out in the emergency waiting room to people who were waiting to see the doctor, i.e. patients who already had registered at the nurses' desk. All waiting patients in the room during that time were asked to participate, however everyone did not wish to answer. The sample is nevertheless a mix of people in all ages, men and women, with varying medical conditions.

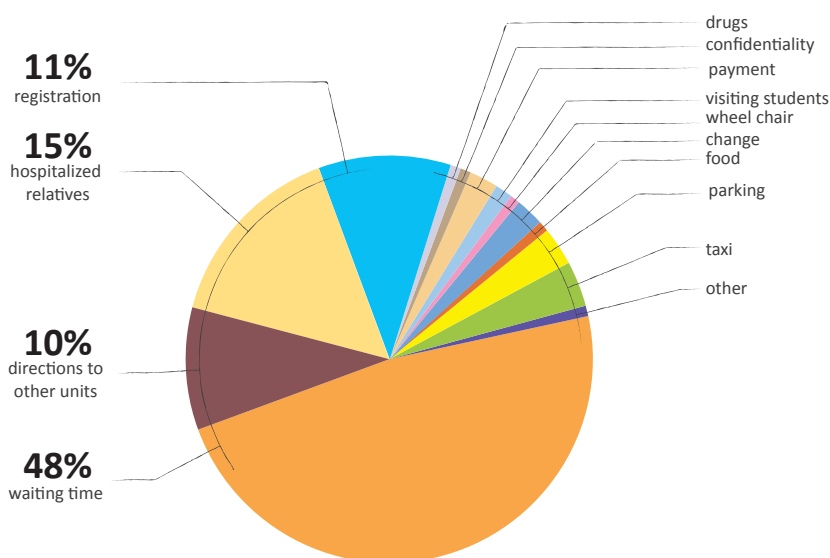


Figure 4.2 The circle diagram displays the distribution of reasons visitors disturb nurses and administration on an average Monday. The diagram only consider people approaching the desk without a number note. In other words, questions regarding the listed matters asked when sitting at the desk during triage or payment, are not considered.

4.3.2 Function analysis

The method

The meaning of a Function Analysis (FA) is to in an organized way go through collected data, to structure all possible demands and specification for the product or service to be. When conducting a FA, findings are expressed as functions instead of ideas or solutions. The point is to cover all possible aspects of a problem area before starting the creative process. Expressing findings as functions instead of solutions, allows greater flexibility since a function can be delivered through many different solutions. The outcome is one lucid and brief document based on all research findings. Correctly conducted the document ought to ensure the team and the client that everything is covered, and nothing will later emerge and affect the development process. Neglected factors can have devastating and extremely expensive consequences when later appear to have been important (Lindqvist 1994). The document can also facilitate to systematically prioritize the different, sometimes contradictive, functions. One of the most important roles of the FA is to facilitate the later evaluation of which concept is the most promising one. The FA also functions as a checklist during and after the process. It is also a great ground work for marketing, since the document brings up the most valuable sales arguments (Lindqvist 1994).

Implementation

The KJ analysis indicated many different problems that were consequences from unaddressed needs. A FA was created by thoroughly going through all collected data, as well as all the steps in the patient's journey through the system. Each function was marked depending on if it influenced the first, last, or both part of the patients' journey. They were also clustered based on similarity and due to varying importance also weighted. Each function was classified as "necessary", "desirable" and "nice to have". The necessary functions were those which were critical to either eliminate the critical problems identified during the observation or to fulfil the primary aim with this project which was to increase the level of satisfaction for the patients who, by

own means, visit the emergency room at Karolinska University Hospital in Solna. The desirable and nice-to-have functions address the secondary needs which compose the rest of the user experience. (Appendix F).

4.3.3 Persona and scenarios

The method

Personas are model users that are created in order to help understand the goals, motivations, and behaviours of the users who will use the interface (Spool 2007). A scenario is a story about a person (persona) who, in a context and in a specific situation, uses a system, with a particular goal. Alan Cooper introduced the term persona in his book *The inmates are running the asylum*. He states that designers often have a vague or opposite picture of their intended users and may base scenarios on people that are similar to themselves. He emphasises creation of fictional Personas whose goals should be the base for scenario creation. Cooper's early Personas were rough sketches of people, but since he first presented his method it has evolved to include more extensive research, like interviews or ethnography, in order to create more detailed characters. The best way to create good personas is to gather information from real users, and preferable in their context, and also other stakeholders that often interact with users. This can be done through surveys, interviews, focus groups, observation, etc. To catch attitudes and subconscious goals, it is important to stay tuned on what the user are not saying but showing, like body language and tone. To create personas out of that kind of research, the data needs to be reviewed in order to identify patterns in behaviours and attitude (Cooper 1999).

Personas can be used in many different ways; to identify features and functions to develop, to determine whether an interface meet the goals of all users, to communicate a vision for a new product or service and how it will meet the needs of the customers, to make design decisions about a solution, develop scenarios for usability testing, etc (Calabria 2004).

Personas used alone can aid design, but they can be more powerful if used to complement, not replace, a full range of quantitative and qualitative methods. They can amplify the effectiveness of other methods. Personas might help a designer focus. However, their greatest value is in providing a shared basis for communication (Pruitt & Grudin 2003).

Implementation

Based on the result from the focus group with nurses and administration staff, interviews with patients, and observations, personas and scenarios were created. They aimed to reflect the diversity when it comes to gender, age, background, health condition of the population in the waiting room. The personas were first used to make quick checks in ideas and solutions during the idea generation phase and then later to evaluate the whole concept by letting each persona go through the system in a created scenario.

4.3.4 Customer journey mapping- the user's journey

The Method

The user's journey is an important part of the Service Design methodology. It is used to map the steps throughout the service, with touch points in focus. It is through them the users come in direct contact with the service. The patient's journey is concluded to make the important steps clear and to easily identify hot spots where more effort is needed. The journey consist of X steps where each and every step declares which questions concern the patients at that point, which obstacles that might change the scenario and what options they have to chose from.

Implementation

The customer journey mapping was constructed and complemented to structure the gained data both after, and during the data collection phase. The overall research, with all of the methods mentioned, gave a lot of valuable input that needed to be put in a context. In that way the map was used as a

valuable tool to keep track and systemize of the insights that were concluded for each touch point.

4.4 IDEA GENERATING METHODS

Problem pictures are, even when nicely structured and displayed, often large and it can be hard to decide it which end to start. It is then helpful to use different idea generating methods to organize and facilitate the development of concepts.

4.4.1 Brainstorming

The method

Alex Osborn has by many been called the founder or father of brainstorming. The method was developed as a reaction to his frustration over employees lack of creativity due to what he had observed was emphasizing "judgement (i.e. evaluation of ideas) over originality" (Osborn 1957 in Mongeau & Morr 1999). According to Osborn, group members that feel anxious about presenting their ideas due to a climate where quick negative feed-back is allowed, will not achieve high level of creativity. This kind of "fear" creates mental blocks which prevents ideas to be brought up. In order to free the imagination and to avoid or break mental blocks, Osborn produced a set of rules;

- Criticism is ruled out – Adverse judgement of ideas must be withheld until later.
- "Free-wheeling" is welcomed. The wilder the idea the better. It is easier to tame down than to think up.
- Quantity is wanted – The greater the number of ideas, the more the likelihood of winners.
- Combination and improvement are sought – In addition to contributing ideas of their own, participants should suggest, how ideas of other can be turned into better ideas; or how two or more ideas could be joined into still an other idea¹.

Osborn stressed that optimal brainstorming sessions where short and friendly, with rivalry as a factor that increases the motivation to engage in mental work. It is although important the group environment is relaxed. "A relaxed mood is conducive to successful brainstorming" (Osborn 1957 in Mongeau & Morr 1999).

Implementation

By considering facts that repeatedly came up during the KJ analysis as well as using personas and scenarios, the most important and feasible functions were picked and put up on a board. Brainstorming was then conducted for each of these functions during 5-6 short sessions (about 25 minutes each). When they were all worked through the rest of the functions in the FA that had not been picked as most important, were brought up to see how well they matched with the ideas that had been created.

4.4.2 Mock-up

The method

Model building as an idea generation method can be made on different levels depending on purpose. A model is basically a simple version of the final product and it can be used as a roughly made work model or a detailed prototype to determining final concepts. Materials vary from plain white paper and foam board, to metal, clay, plastics, etc. In the idea generation phase mock-up models are usually used to either work out dimensions and shape or to try functions and solutions. The mock-up makes the product tangible and helps to discuss and trigger for new ideas within the team. Using mock-ups or prototypes is also an efficient tool when explaining ideas for clients or presenting concepts.

Implementation

Waiting room mock-up

To achieve a tangible view of the waiting room, a foam board mock-up was built. A reasonable size of the room and the interior was achieved by

choosing the scale 1:20. This mock-up was used in the idea generation phase in order to more easily move the interior around and to test solutions. When concepts were developed also signs were printed and put in the model to get an idea of size and position. Figures in plastic were used as visitors, which was very helpful in many aspects, especially to measure placement and dimensions of signs.

To give the client a better knowledge of the solution the mock-up was also used a display when presenting the different concepts.

Information module mock-up

To get an idea about dimensions of the information module and the attributes it should include, a 1:1 mock-up was made on a wall. Big sheets of paper covered the area that would be the size of the module, and coloured scotch and paper marked the areas where screens and signs could be positioned. Also printed signs were tested to evaluate font sizes. It was particularly important to try distance and angles from where the signs should be readable or noticeable from, depending on the different information levels.

Signs

To try out layout, dimensions, and placements, full size signs were printed out in different versions and mounted on cardboard. The full size signs were also helpful when it came to try out the level of perception when placed together. It made it easier to discover which sizes, fonts and colours that stood out, and which blended in. The signs that seemed most communicative brought to the emergency to get a feeling of how they fit in the context

4.5 EVALUATION METHODS

4.5.1 Prototype

Method

There are variations of how a prototype is used and for which purpose. It can either be solely representing the design of a product, but not being functional at all. It can also be a fully working model or a first trial version from the production. The standard depends on the complexity of the product or service. Even though the level of detail and function can vary; it is the interface between user and product that is relevant.

Implementation

Based on technical drawings and 3D models (Appendix G) the framework was built and installed on sight by YIT, the company that Karolinska uses for installation services (fig 4.5). The prototypes were built to represent a final product in the waiting room and constructed to last for a longer period of time than the test period. For evaluation reasons the prototypes were built in a quality good enough to represent a standard interior of the room. Also for safety reason the stability and attachment to the wall was implemented as for standard constructions. Due to economic reasons the prototypes needed to be usable for a longer period of time, and was therefore constructed without any prints. It was designed to allow repeated mounting and demounting of separate print outs, so that different constellations could be tried out.

The prototype phase is further described in chapter 8

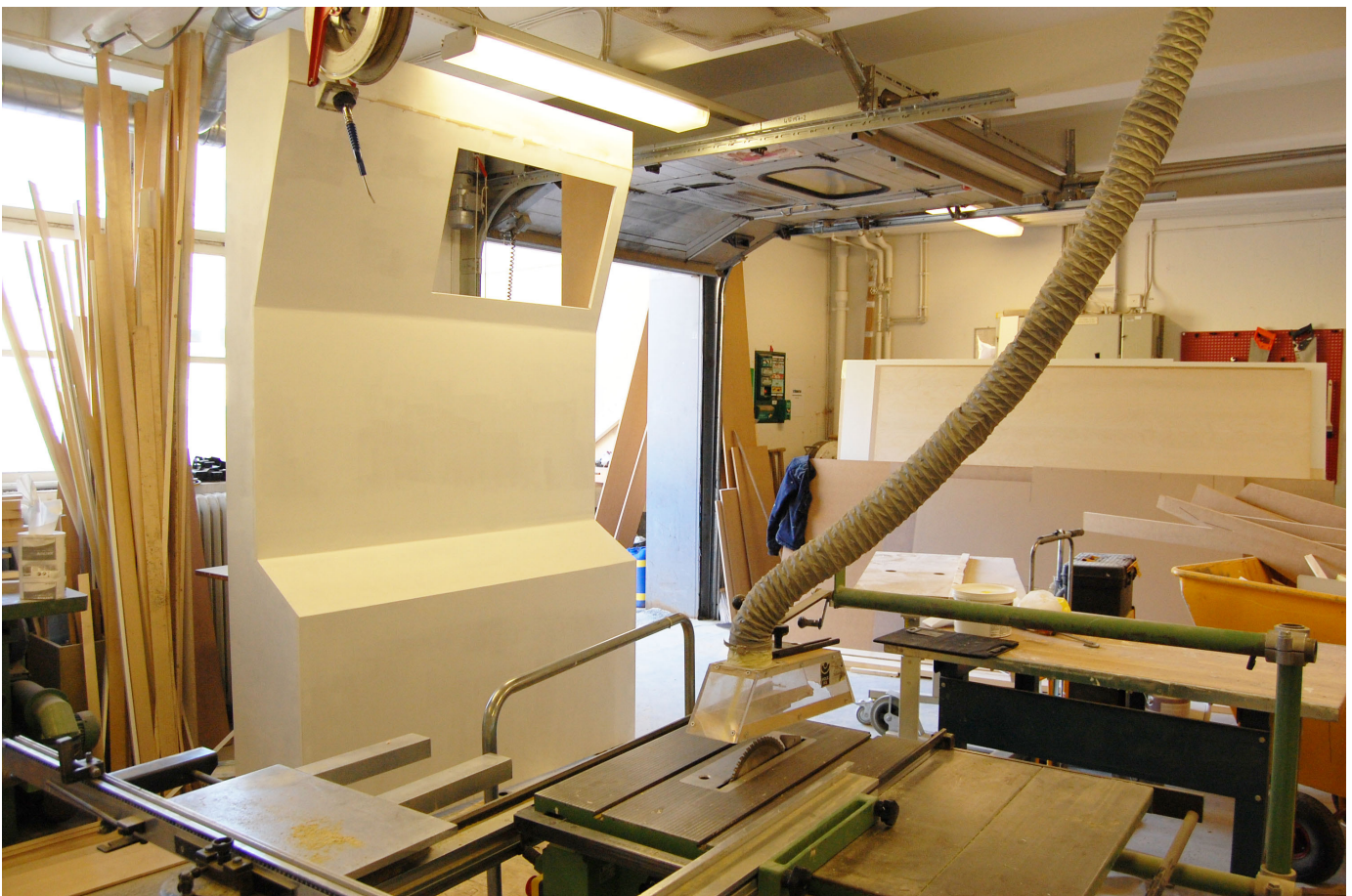


Figure 4.5 The information module at the prototype workshop at YIT.



Figure 4.4 Top row. The waiting room mock-up with its prospected interior. Bottom: The signs being tested in the mock-up and on sight.

5 OUTCOME OF DATA THE COLLECTION

5.1 OBSERVATION STORY

The observation story is based on initial observations in the waiting room. The actions described what the visitors look for in terms of guidance and information; i.e. which questions do they seek answers for. This is followed by a description of the present respond and the following reaction for each and every step in the system.

1. Arriving to the emergency

The people arriving to the emergency room by own means, meaning not in an ambulance, search for guidance on different levels. First they need to find the actual ER for adults. People arriving are mainly patients arriving in a car or walking from the bus stop, but also relatives, friends, taxi drivers, police, etc. The two questions that concern all kinds of the visitors are where is the entrance? and am I at the right place? There may also appear some practical question marks concerning parking, wheel chairs, smoking etc.



Figure 5.1 Sequences that patients at the emergency go through, from left to right.

Respond

On the way visitors passed the delivery emergency and the intake for ambulances, which indicate emergency area. The entrance to the emergency room is situated on the side of a building and not immediately connected to the main road. There is a big "Emergency Room"-sign on the roof to the entrance, which is only visible from a distance. The big sign is easy to miss and there was no clear confirmation at the entrance that it was the adult ER.

On the door to the emergency room there were several notes and signs which gave information about

- The different departments of the emergency room
- To wait outside and call a certain number if you have the New Flu
- None-Smoking area
- The door is locked at night between 22-06 and that you need to ring the bell
- How the administration and the triage work is divided.

After having entered the first door visitors were lead through an entry hall to a second door that lead into the waiting room. On the second door visitors found information about:

- The Ear, Nose and Throat department information and that referral is required
- To put on shoe covers
- The New Flu sign

The main problem was not lack of information, but the lack of priority among the signs. The information signs were a mix of hand written notes and print outs that consisted of different colours, fonts and sizes.

Reaction

People who arrived to the emergency often rushed through the doors without recognition of any notes or signs displayed on the door. In the winter time when shoe covers were needed some reacted on the chair and the box placed just before the second door. However, the most common reaction was to look at the box and then just stomp or wipe their feet on the carpet before entering the room. Because the information was not read or at all paid attention to, most visitors entered the ER still not being sure if they were at the right place and consequently unprepared for what was expected from them.

2. Entering the room and queue system

People who enter the room have different purposes for being there and therefore they behave differently; they look for and expect different things. The majority are there due to illness and know that they in some way need to register to get help. Other visitors are people who are there to visit or collect a relative, etc. No matter what purpose; they all look for an indication of how to proceed and how the system works. Am I at the right place? What do I need to do to proceed with my errand? The correct way to proceed was to enter, take a ticket and sit down until the number at the ticket was displayed. If a patient had trouble breathing or suffered from chest pain, the patients should go directly to the nurses' desk.

Respond

The first thing a visitor saw, was a wall of vending machines straight ahead, and the nurse and administration desk to the right. They might have noticed the display showing which ticket number that was currently supervised, which gave a notion of that a ticket was required. However, there was no direct information in the waiting room which gave feed back on that the room was the waiting room for all departments at the ER.

The ticket dispenser was closely placed on the right side of the entrance, and above it there was two signs, one that poorly informed about the departments and one very clear sign about chest pain priority. The ticket dispenser in itself urged to some extent to take a ticket, but it did not say who should take a ticket, only who should not. The placement of the ticket dispenser was unfavourable in other ways too. Firstly it was not at all visible to the visitors getting through to the emergency from inside the hospital (there is a second entrance to the waiting room which is used when coming from inside the hospital). Secondly it was placed right under a display showing the ticket number served at the nurses' desk at the moment. Visitors therefore missed the opportunity to get an immediate indication on how long they were going to wait. They might have got an impression they were next and therefore kept standing by the ticket dispenser, close to the nurses' desk. That led to poor patient confidentiality for the patient served at the desk at the moment.

Reaction

Most people entered, stopped and took a look around. Since the ticket dispenser was very close to the door people tended to miss it, for various reasons. Especially the visitors who were there in an errand other than their own illness ignored the ticket dispenser and went straight up to the nurses' desk. There seemed to be a lack of guidance for people who were not prepared to stand in line, i.e. people who had a question regarding relatives, parking, wheel chairs etc. Some people were stressed or in a worried state of mind which made them miss out on the ticket dispenser in their rush to get in. There might also have been someone who blocked the sight by standing right in front of the ticket dispenser. Also, people followed each other's actions. If there were people already forming a crowd in front of the desk, the people who entered after that were most likely to interpret this as a physical line and therefore not use the ticket dispenser. Naturally, there were people who followed and understood the procedure correctly. The confused reactions seemed to escalate when the number of people increased. The atmosphere was more stressed and almost aggressive on busy days, whilst on quiet days people tended to follow the system more correctly.

3. Nurses' desk and administration

When a patient's number is called they should take a seat in front of the nurses' desk and tell the nurse about their symptoms, and the nurse will register their errand. The nurses were very strict about talking to the patient and not the relative, but relatives were welcomed to join the patient at the desk. The nurse asks all required questions about personal details, symptoms, confidentiality etc. The most common question that patients had, besides the ones regarding their own symptoms, was regarding waiting time to see a doctor. How long will it take before I can see a doctor? Do the other ones in the room hear about my condition? There can also be a slight communication issue since a lot of the patients don't speak Swedish as first language or sometimes not at all. Did the nurse understand my condition? What happens now?

Respond

The nurses' desk was marked with a white printed sign "nurse" on the glass. Also, there were displays showing the ticket number just above the desk. As for the confidentiality there is a glass wall between the two nurses' desks, which makes one of the desks quite protected. However, it was the more open one that was used most frequently. The other people who waited in the room easily picked up the conversation between the nurse and the patient. After registering the patient was instructed to pay the fee at the cashier and then sit down and wait. Where paying the fee there was a sign "cashier" on the cashier's window, which was not visible unless you stood immediately in front of it. The people working behind the desk were nurses and administration staff, which means that the nurses were not allowed to do cashier errands and vice versa.

Reaction

When sitting at the desk a lot of patients leaned in through the window to avoid letting the rest of the room hear about their condition or errand.

There also seemed to be a slight confusion about the difference between nurse and administration staff, even though nurses wear hospital uniforms. Patients asked questions about symptoms or fees, regardless whom they were speaking to. Before leaving the desk patients often asked about waiting hours, which the nurses responded to from what they could see in their data system at the moment.

was done without taking a ticket from the ticket dispenser, and regardless if there was a patient sitting at the desk explaining their symptom.

4. Waiting for medical care

The patients are put in queues where they are prioritized with respect to their medical condition. The least urgent patients are placed in the waiting room, the most urgent cases are either taken in right away or after just a few minutes. The ER is divided into several departments, which all vary in activity and therefore also waiting time. Questions regarding waiting hours are the most commonly asked questions, because it concerns all visitors. Depending on which time of the day it is additional questions may occur, i.e. regarding where to buy food or regarding public transportation.

Respond

There was no information in the waiting room about waiting hours. The flow of patients and nurses coming in and out of door to the ER was the only indication of how the work at the ER was moving forward. Unless the patients asked the nurse at the desk, the patients were uninformed about the queue system and that the people waiting in the room were going to different departments and doctors. There were several vending machines in the room, but information about other food alternatives nearby the ER did not exist. Information concerning transportation consisted of a telephone and a note with phone numbers to taxi companies.

Reaction

Some patients just accepting to wait and not to know about how long they need to wait, but most patients approach the nurses' desk to ask. This

5.2 PERSONA AND SCENARIOS

The persona and scenarios developed from the data collection are presented in figure 5.2.

Unga paret

ERIK & MALIN

Malin och Erik ska till gyna-kuten för Malin har känt smärtor i magen och haft blödningar under natten. De gick till vårdcentralen på morgonen, som gav dem en remiss till gyna-kuten på Karolinska.

Malin är trött och har värk i ryggen efter natten och lutar sig mot Eriks axel. Hon är orolig att läkaren ska ge dåliga nyheter. Erik tittar på vinter-OS på Tv:n, och läser dagens Metro, igen.

Efter att en glad pensionär med lindat öra, som kom efter dem, får gå in blir Erik irriterad och går fram till tjejen i luckan. Han försöker hålla tillbaka irritationen och frågar varför pensionären fick gå före. Tjejen svarar att pensionären skulle till öron-näsa-hals-akuten och stod därför i en annan kö. Erik går tillbaka till Malin och känner sig lite förvirrad och undrar hur många av patienterna i väntrummet som står före dem i kön. Han blänger lite på den ensamma tjejen i hörnet och hoppas hon har ett annat ärende.

Äldre paret

GÖSTA, SONJA & ANNA

Sonja har följt med Gösta till akuten igen. Hon föll illa och han som redan har dåliga ben Anna, dotter till Sonja och Gösta, åkte med dem i taxin hit. Gösta föll så illa att han måste åka i rullstol hit.

Det gör ont att sitta och benet börjar damna lite. Anna var och bad skoterskorna om en pall så Göst akunda få vila med benet i en högre position. Anna är oförlig för att hon missar ännu en dag på jobbet, och hon som missade så många förra veckan när lillan var sjuk! Hon hann inte äta frukost hemma så nu ser hon sig om efter nåt ätbart. Hon får syn på matmaskinerna på den bortre väggen. Hon går fram och inser att de bara tar mynt. Hon ser sig om och då hon inte ser någon växlare går hon mot luckan. Det är en patient där, och hon hör honom beskriva på knackig engelska att han har tryck över bröstet.

Då mannen är klar hinner hon precis smita fram innan en annan patient hinner sätta sig. Hon frågar skoterskan lite fort om det inte går att växla pengar? Jo då, det kan man, maskinen är bar allte dolda i hörnet. Då hon går bort till växelmaskinen slänger Kerstin, som var nästa patient på tur, en irriterad blick efter henne.

Somaliska familjen

YUSUF, HALIMA + 3 barn

Halima är gravid och har känt smärtor under helgen. Yusuf, hennes man, har därför nu skjutsat henne till akuten. Hennes svenska är relativt svag så det känns skönt att Yusuf är med tillsammans med alla tre barn, Adan 8 år, Hussein 4 år och lilla Obah 8 månader. Yusuf förklarar för skoterskan om Halimas besvär när de sitter vid luckan. Sjuksköterskan ställer frågor och Yusuf svarar högt med sin kraftiga stämma. Det känns lite jobbigt för det känns som att hela väntrummet lyssnar.

När de satt sig ner i väntrummet tar det inte lång tid innan barnen börjar skruva på sig och lille Hussein blir grådig. Det finns ju inget att göra i väntrummet för barnen, bra tidningar för vuxna och en TV som visar SVT. Efter ett tag börjar de andra patienterna tappa tolamotet för den grådig Hussein och ger familjen irriterade blickar.

Turkiska turisterna

Deniz Bircan

Deniz Bircan är 32 år och på semester i Sverige med sina kompisar från universitetet i Istanbul. En morgon när han vaknade epå vandrarhemmet så var hans högra arm domnad och så när som på stickningar som pulserade. Han blev rädd och beställde en taxi och åkte in till akuten med sin kompis Assat. När de kommer in så förstår de först inte om de kommit rätt, men taxichauffören ger tecken åt dem att de ska gå in. De har svårt att förstå vad de ska göra för det sitter en massa lappar uppe och visserligen är några av dem på engelska men deras engelska är dålig. De gör som de andra och tar en nummerlapp och då de kommer frma till luckan uppstår ännu mer förvirring. Deniz har svårt att förklara vad som hänt och hur väldigt ont det gör. Till slut förstår Deniz att sjuksköterskan kommer fixa en tolk, men hur långt det kommer ta och vad som händer fram tills dess vet han inte.



Figure 5.2 Persona and Scenarios

5.3 KAROLINSKA IDENTITY AND CORE VALUES

The core values of Karolinska are:

- Science
- Future
- Development

These are mentioned at the website. The brand description is absent. Pinning down a brand and identity was therefore hard and fell outside the limitations of this project. Although, formulating an identity for the area covered by the project (waiting room), was needed in order to deliver a univocal message. All three core values of Karolinska refer to a total impression of the hospital, which means their individual presence might be more or less strong in different components of the hospital.

5.3.1 Waiting room identity and core values

The waiting room is an important messenger of the hospital's identity and core values. But since the project area, the waiting room, serves an important role in housing seriously sick or injured people until a doctor can receive them, there are also other very important features the room should host more than the impression of science, future and development. Referring to the theory where the importance of patients feeling control, social support and positive distractions, was brought up, the waiting room plays an essential role in providing this. Three core values were therefore formulated for the waiting room:

- Professional/competent (which is a summary of the three closely related core values of Karolinska)
- Reliable
- Trustworthy

5.3.2 Patient experience

In order to communicate these three waiting room core values to the visitors, their corresponding core experiences should be:

- Comfort
- Confidence
- Control

Through explicit and implicit features supporting each of these, the design needed to create a total experience that implied Karolinska's identity to be reliable, professional and trustworthy. In order to make the visitors experience control and confidence, the design needed to provide a univocal message that was easy to follow, a univocal and structured impression that was easy to understand and that enables visitors to quickly find what they were looking for, a system that gave feedback and eliminated the rate of errors and diffidence, provided relevant information, was user-friendly, and gave the visitors the possibility to adjust their personal space to better fit their needs in some way. The design needed to rely on elements and principles in order to deliver this experience.

The theory brings up a number of factors that highly influence the experience of the waiting room. The ones that were decided to be more or less considered in order to contribute to the patient experience further in the design phase were noise, furniture arrangement (and flexibility), adjustable personal space, access to food and drinks, privacy, crowding, (nature view).

5.4 PATIENT'S JOURNEY

The patient's journey according to the research is found in Appendix I. For each and every step question marks, obstacles and options are presented.

In order to demonstrate how the waiting room looks like and to follow the steps a map and photographs are displayed in Appendix K.

5.5 FUNCTION ANALYSIS

5.5.1 Issues in focus

There were long-term and short-term aims with the project. The main long-term aim was to prevent not acute patients to prospect healthcare at the emergency unit. Karolinska experienced that a substantial part of patients at the emergency unit were not acute, which meant expensive specialist care was misused. Vårdguiden's purpose is to inform about all kinds of care, guide people to appropriate health care and also to through their service Mina Vårdkontakter help offer people the opportunity to handle many their care related errands online. Vårdguiden was therefore an important element to integrate with the waiting room in a way that caught patients attention and motivated them to take part of the information.

The KJ analysis summed up and structured data from interviews, the focus group and the initial observations, and indicated many different problems that were the consequences from unsatisfied needs. The extensive observation gave a picture of the patient journey through the waiting room system and contributed to pin down all possible questions, obstacles and choices at every step (Appendix M)

The FA was the final document (Appendix F), that summed up all these issues and needs as functions of the future waiting room. The functions were weighted which resulted in 26 necessary functions, 14 desired functions and 9 good-to-have ones. The 26 necessary functions were reformulated into 10, and put in focus for the development process. They all had a great influence on patient comfort, control and confidence, as well as a direct effect on staff working environment and therefore also efficiency. The ten functions are as follows:

Flow

- Motivate patients to follow system
- Minimize crowding
- Provide space for wheel chair, crutches and luggage
- Provide secrecy at nurses desk

Information

- Provide feed-back
- Minimize disturbance for nurses and administration
- Provide information about translation possibilities/other languages
- Provide information about personal situation
- Facilitate information search
- Integrate Vårdguiden in the design and motivate people to explore it

6 DESIGN PROCESS

The design process started with an idea generation phase, with a strong focus on brainstorming (figure 6.1) and mock-up building. The different aspects of the problem, such as flow, attributes and appearance, were both handled separately and as a whole when ideas were generated. Components were developed and combined into concepts from which one was chosen after evaluation.

6.1 FLOW

The flow concerns the movement patterns, but also the attributes and information that influence on it.

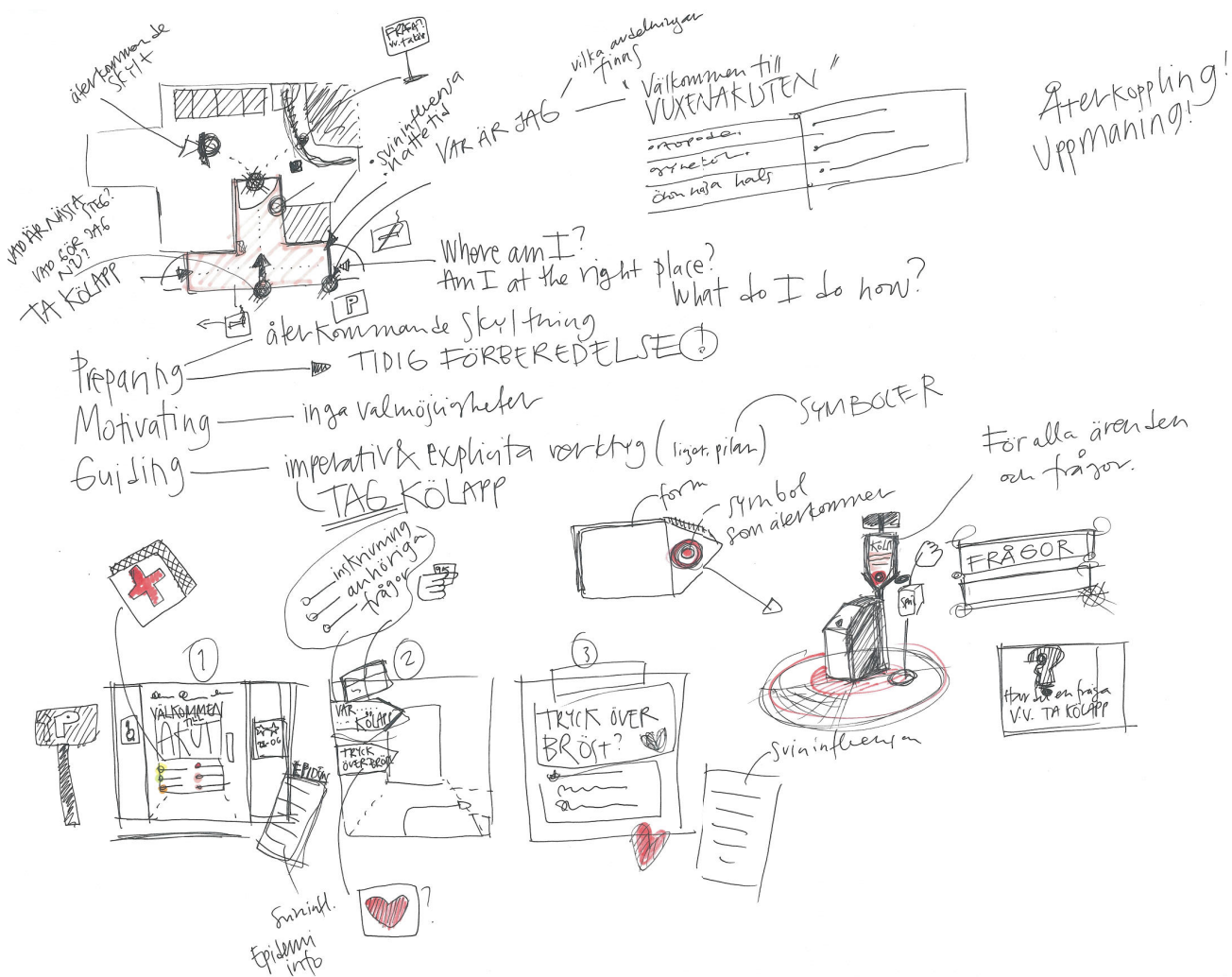


Figure 6.1 Idea generating sketch around flow, attributes and core values

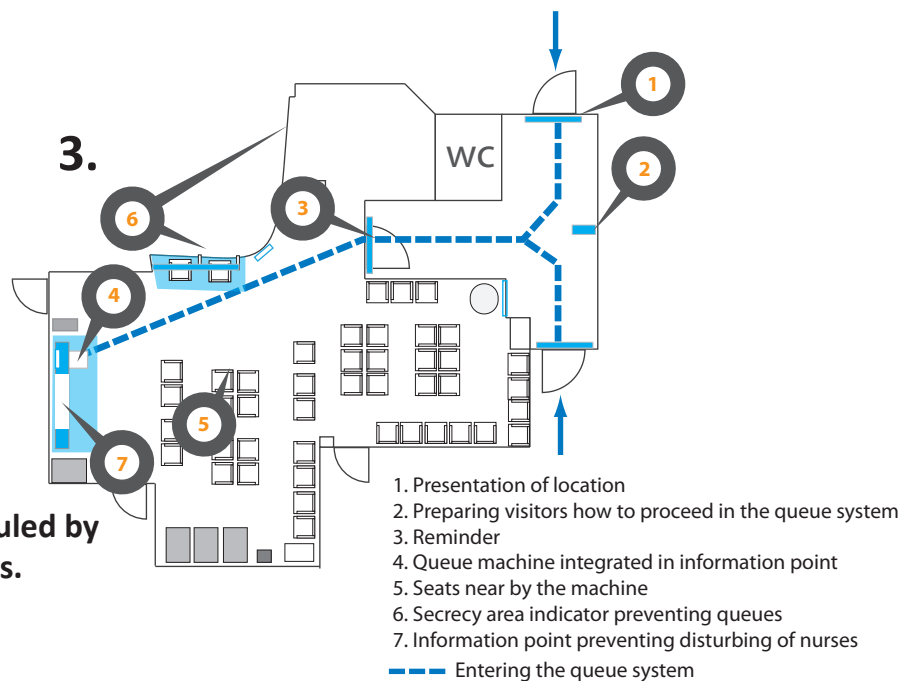
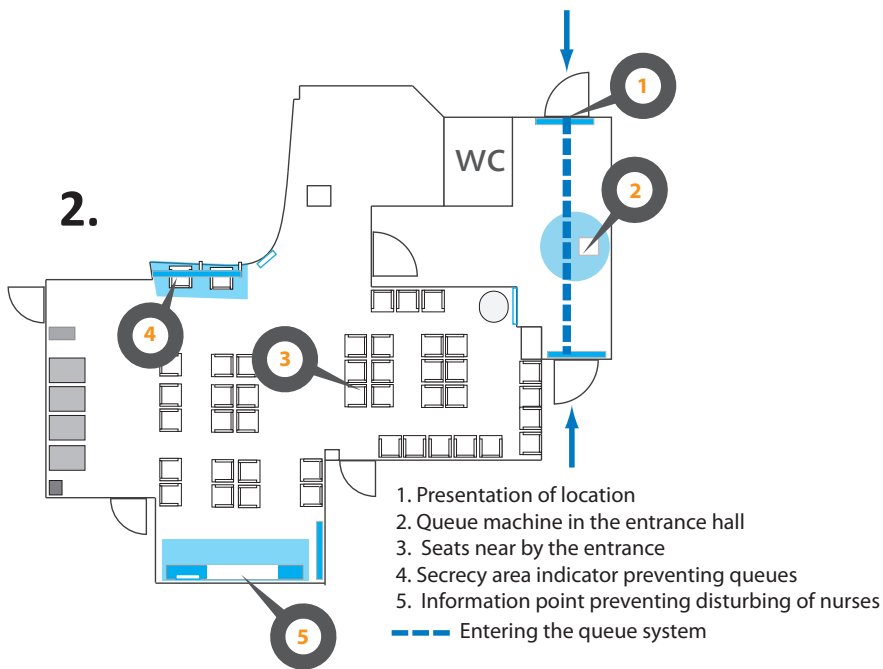
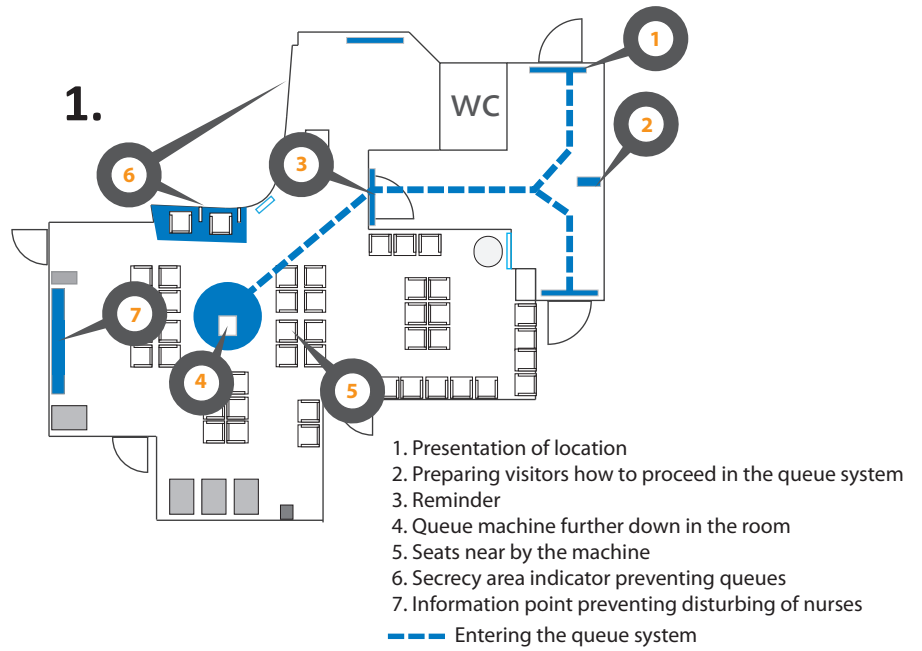


Figure 6.3 Three flow concepts ruled by placement of signs and attributes.

6.1.1 Idea generation

The idea generation took off with a brainstorming session using collected data and the FA to map the flow problem areas. Ideas regarding all touch points were analyzed and narrowed down on printed outlines of the room. Eventually the 2D map became hard to visualize and became limited as a platform to generate ideas from. Therefore a mock-up of the emergency room was consequently built to more easily generate and manage ideas. Post-its were used as signs, and interior elements such as chairs, ticket

dispenser, vending machines, and number displays, where built out of cardboard. The idea generation phase generated sketches, flow charts, mind maps and mock-up variations, which are presented in figure

6.1.2 Development

From the flow idea generation, touch points were reviewed and ideas to solve specific problems were analyzed. The ideas that would change the flow generated new openings in how the problem could be solved in terms of information and placement. By moving around the interior elements in the mock-up into different constellations, and evaluating the touch points using the pre-defined scenarios and personas, three flow concepts were finally developed.

These are grafically presented in figure 6.3.

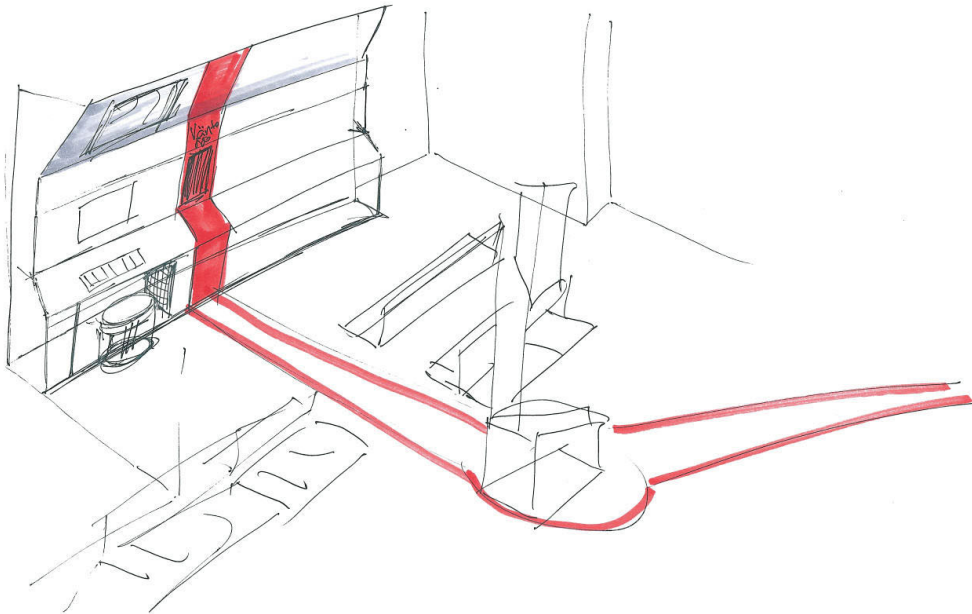


Figure 6.2 Initial sketch of the connection between ticket dispenser and the information module.

6.2 ATTRIBUTES

6.2.1 Information module

An information module would replace the scattered notes and signs in the room and form a coherent system for information.

6.2.1.2 Idea generation

The ideas developed in the flow concepts generated variations of an information system. The ideas were generated through brainstorming sessions, using both hand and computer based sketching. The different ideas started discussions on which information that was desired and which was needed, where it should be placed, and how the actual information module should look like. The idea-generating phase emphasised in particular on how an information point or module could substitute all of the current information in the room, and what it takes for it to motivate people to approach it.

6.2.1.3 Development

External stakeholders

During the development of the information module concept other stakeholders were involved. Vårdguiden was in particularly integrated since it was an important source of health care information, but also an important part of Swedish public health care. During the same period as for this project, Vårdguiden ran a pilot in the waiting room, which basically contained a TV-screen with looping information about their services.

The basic purpose of the information module was to gather the information in the room, including information from Vårdguiden, to one point. There were a lot of discussions about how the Vårdguiden services in the waiting room could be further developed, but in the end the ideas were not finalised due to lack of resources. One of the ideas was to embed a computer into the information module, from

which patients would be able to log on to Vårdguiden's website to register or check for alternative care options. Also other websites would be accessible such as the police, pharmacy, public transportation, etc.

Function

The main idea with the information module was to gather all of the information to one point in the room. The desired effect was to prevent patients approaching the nurses' desk for questions, and to inform the patients about other, maybe more suitable and even quicker, health care options other than the emergency. Therefore, a lot of the development concerned how to direct attention towards the module. It would need to be an obvious information point, which also needed to be detectable from the other side of the room. Functions of what the module would need to include and how the information could be clustered was tested in the 1:1 mock-up and evaluated. For instance the Vårdguiden TV screen needed to be placed at a height where people standing in front of it would not cover the screen. Also it had to have a certain angle to be readable from different distances (Patricias vinkelbild). The module also had to have areas where brochures and posters regarding relevant health related information. The idea of displaying waiting hours on a TV screen came up, in order to eliminate that kind of questions. The module also needed to having information about the hospital area, and needed to be placed strategically for people to detect and approach it.

Design

The framework of the information module was developed through sketching and 1:25 mock-ups to grasp proportions in relation to the room. It was also stated that the module would look the same regardless of which concept and placement that would be the final result. Clearly the shape was developed in respect to satisfy the need of the functions, such as areas for information and TV-screens. The construction was also aimed to be adjustable, if any of the sections in the module would prove to not be useful.

The shape in itself was shaped to blend in as a natural attribute in the room, but stand out as an information

point. Colours and angles were experimented with to achieve contrasts between the sections and to draw attention to the module (figure 6.4) .

n integrated ticket dispenser. The appearance was considered crucial and ideas about how attention could be drawn to the ticket dispenser were generated mostly in terms of attributes, colours and signs.

6.2.2 Ticket dispenser

6.2.2.1 Idea generation

The ticket dispenser was noted as one of the essential attributes in the waiting room. By mainly using the mock-up and visiting the emergency room, ideas were generated to improve the role of the ticket dispenser concerned both placement and appearance. To improve the status of the ticket dispenser a new position was discussed. The placement has an important influence on the flow of people coming in works and the way people act while the wait. If being moved several alternatives would be an option. Many ideas of an alternative placement suggested an integration of the dispenser into the information module, or placing it in the entrance hall. Another idea was to form a kind of welcoming station with a

6.2.2.2 Development

The ideas developed in to moving the ticket dispenser into to the centre of the room to consider an increase of the distance from the nurse’s desk, the proximity to seats, and an angle from which it would be detectable from both entrances. The new position required a new pillar to support the ticket dispenser and to hide the cords going to the roof. The purpose of the new position was to allow the flow to move further into the room, and to avoid crowding by the entrance. The dispenser was put closer to the seats, to encourage people to sit down while waiting, which would probably have an affect on the atmosphere in the room. Also a clear and visible sign would make the ticket dispenser visible from the entrances. Attributes such as marks in the floor around the dispenser and number displays, were discussed but it was uncertain if it would be feasible during the test period.

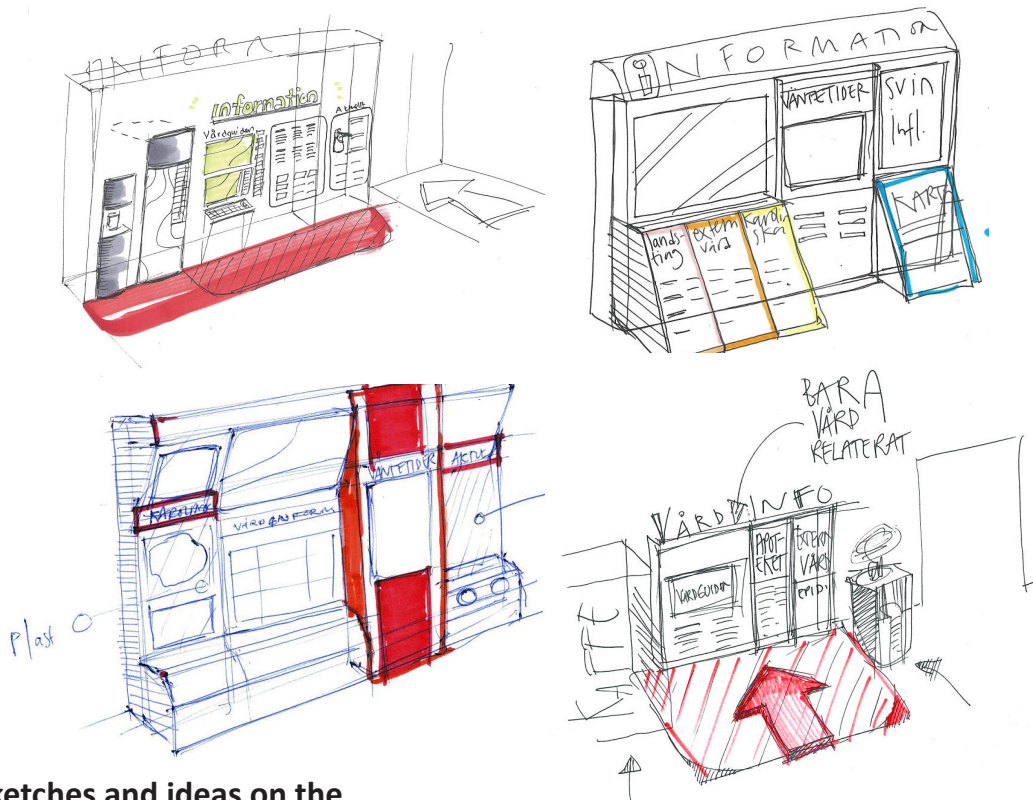


Figure 6.4 Sketches and ideas on the information module.

6.2.3 Confidentiality screen

6.2.3.2 Development

6.2.3.1 Idea generation

The idea about improving the patient confidentiality in the waiting room was approached from different points of view. The ideas concerning confidentiality approached several issues, for example how to prevent people to stand too close to the nurses' desk while other patients sit. Another was how to prevent people to approach the desk without a ticket, and to mark the area as more restricted than before. In this part of the process field studies and benchmarking, as well as the mock-up and sketches, came to be a good source of inspiration. Requirements such as space for wheelchairs, and overview of the room from the nurses' position, lead to an idea about a glass screen similar to the one already existing (figure 6.5).

Since there already existed one secrecy screen, the new was aimed to be as similar as possible. However, placement of the screen was carefully decided regarding certain conditions; the nurses' overview of the room was not to be obscured, enough room to fit and enter with a wheelchair, and room for one more person (i.e. a relative).

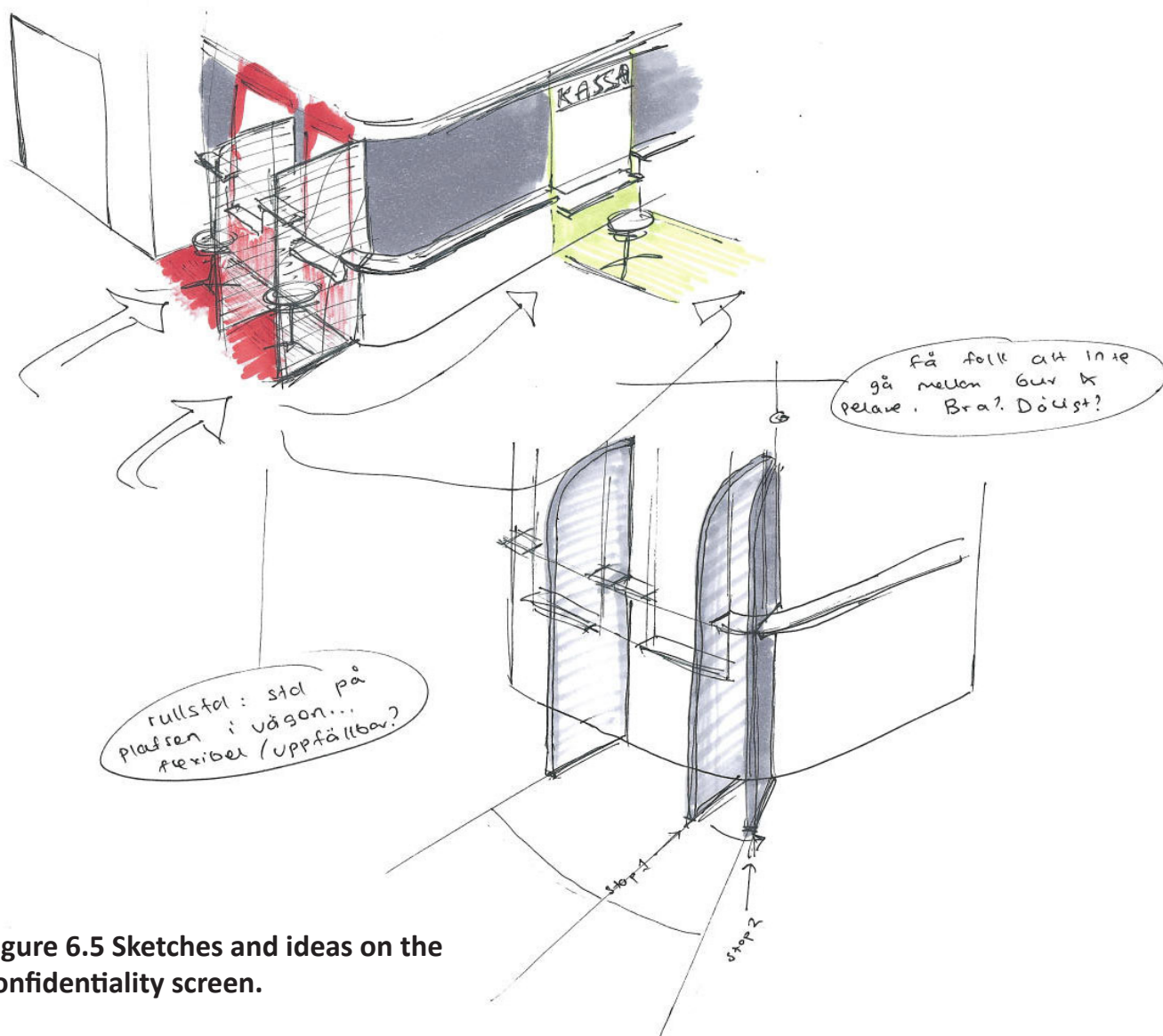


Figure 6.5 Sketches and ideas on the confidentiality screen.

6.3 VISUAL APPEARANCE

6.3.1 Graphic guidelines

The printed and displayed material in the waiting room was not formally required to follow the Karolinska Graphic Manual. To achieve recognition and resemblance to the brand and other units at the hospital, the manual was used as much as possible. That regarded font, use of logo, colours and pictures.

6.3.1.1 Idea generation

The idea generation for a graphic appearance started with a brainstorming session about the core values of Karolinska and generic hospital graphics. The common use of hospital symbols, logos, words and colours were also discussed and evaluated through computer-aided programs. From these ideas an information strategy in several directions arose.

6.3.1.2 Development

The different graphic concepts were developed through integration of the graphic manual, levels of information and use of generally accepted symbols. The choice of words and level of commandment was chosen to be as clear and simple as possible. Colours from the graphic manual were used in different constellations to achieve recognition and relation to the Karolinska brand.

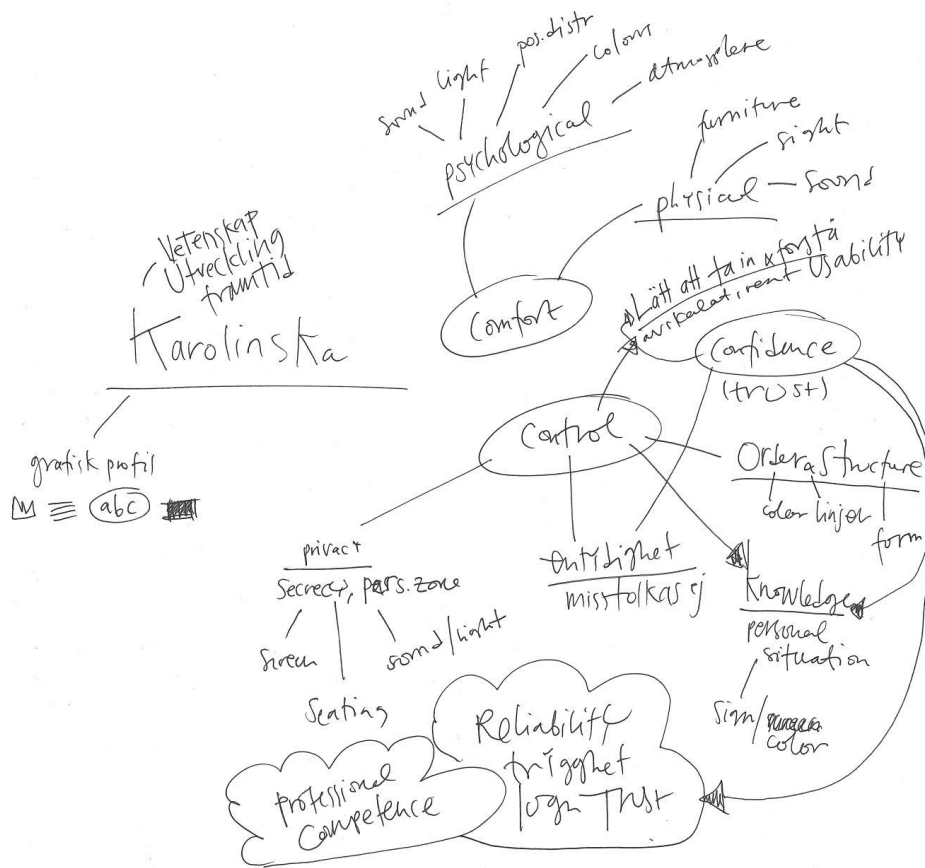


Figure 6.6 Idea generating sketch from the Karolinska graphic guidelines.

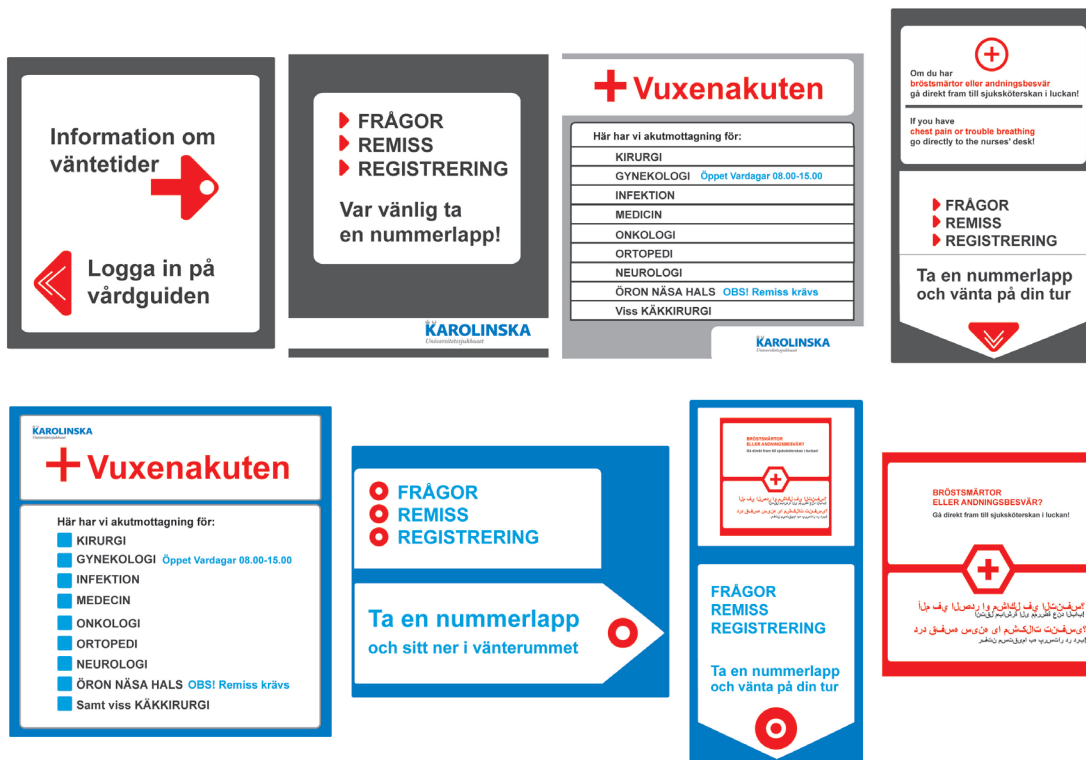


Figure 6.7 Developed concepts on signs and prints.

7 FINAL CONCEPT

7.1 SIGNAGE

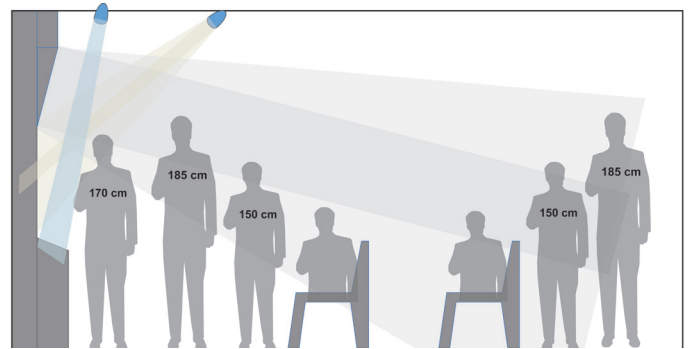
The signs in figure 7.1 were the signs brought in to the prototype phase.

7.2 ATTRIBUTES

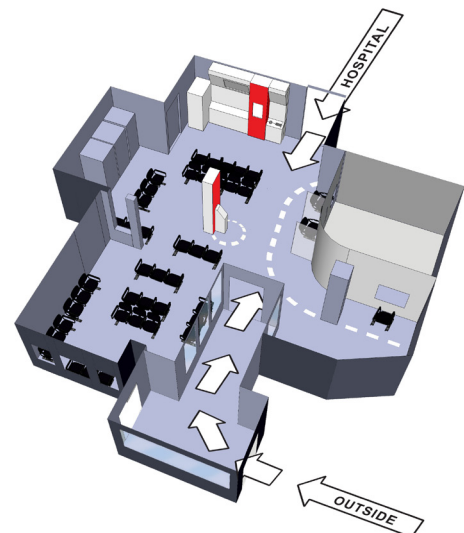
Graphic presentation of the ticket dispenser, confidentiality screen and information module is seen below in figure 7.2 and 7.3. The objects are designed both in shape, graphics and function.



7.1 The final sign concept includes signs, maps and prints for the new pillar. The signs are not according to scale in this figure.



7.2 The final concept includes design, placement and function of the different attributes in the waiting room.



7.3 The new waiting room with marked critical areas (dotted line) and the ticket dispenser visible from the two entries.

7.3 SERVICE DESIGN COMPONENTS

Referring to Ramaswamy's suggestion of service design being composed of four components, the general idea and framework of the produced concept is described in respect of those in the following chapter.

7.3.1 Service product design

To improve the quality of the communication, Information-related physical attributes have generally been reduced, clustered and redesigned into a universal style and language, to improve the quality of the communication. To enable new functions, like confidentiality at desk two, new physical attributes were introduced to the area. Due to a combination of budget and project limitations, some physical attributes like furniture, food- and drink machines, monitors and lighting, were straight off reused and others only slightly re-arranged or re-structured.

Signs - All signs were removed and their information analyzed and organized hierarchically onto new uniformly designed signs. A lot of information was removed, some reformulated, but most of all it was presented in a new aesthetical way that enabled recognition, quick understanding and confidence.

Screen - To improve the confidentiality at the triage, a new attribute in shape of a glass screen was put up at the nurses' desk. The purpose was firstly to make the patient that sit at the nurses desk to feel more confident to share private information like symptoms, health status, etc. Secondly, the screen aimed to eliminate frequent interruptive questions by other patients and relatives.

Colour code – Karolinska has a colour palette in their brand guideline. By using colour codes consequently, patients and other visitors coming to the emergency ward would quickly get an overview of the system. A significant amount of red was used at each touch point of the mandatory queuing system; from the first sign, to the ticket dispenser, and to the waiting time screen. The reason was to enhance the flow by motivating movement and provide control and feedback, through

recognition. Information touch points outside that system are coded with blue. By having used these two main colour codes uniform expressions for different areas were created, and indicate the touch points are elements part of a sub-systems.

Information station - A completely new unit was designed in order to solve one short-term and one long-term issue. The short-term was to provide users with structured and clustered information that was often asked for or looked for. The long-term was to make people that are not acutely ill, avoid going to the emergency ward by making them look for health care at more suitable places. To achieve this the attention to the Vårdguiden movie was improved by embedding it in the information station and by placing the digital queue number display at the same wall.

The information station was divided into three zones; general information, waiting time, and current epidemics and recommendations.

Waiting time display – Another completely new unit that was added to the area was a screen displaying the waiting time for the last patient in each waiting line. Since the by far most common questions all related to waiting time, it was considered a critical issue. The screen was embedded in the information station to get, and to draw attention.

7.3.2 Service facility design

The main layout of the facility in which the service was created and delivered was the same since the budget did not cover any renovation or rebuilding of the waiting room area. Flexible large objects like vending machines, furniture and ticket dispenser, were all relocated in the produced concept in order to improve the flow. The vending machines were not essential information carriers in the space, which was why they were moved to a location less visible. The new attribute, the information module, was put at their old location. Furniture could be replaced so that it better allowed adjustments to support social interaction and privacy. New furniture was ordered but would not be installed until after the project. Although, the existing furniture was together with the ticket dispenser re-arranged to better contribute to a better flow and movement pattern.

7.3.3 Service operations process design

The screen that displayed waiting time would need to be installed and connected to a computer available for the nurses. An interface and routines would need to be created in order to enable continuous updating of the waiting time.

The zone on the information module that was called “epidemics and recommendations” aimed to inform about current epidemics or temporary situations. One or several nurses would have to be responsible for what and how information would be displayed there. Although, all nurses would have to be informed about the zone in order to come up with own suggestions, give feedback and to be aware of what information Karolinska communicated to the visitors in the waiting room at the moment.

Vårdguiden and Karolinska would need to establish a contact regarding updates of the movie and future collaborations. Also, the contact would be valuable for feedback. The nurses would have a continuous interaction with the viewers of the movie, and could report their reactions, attention and reception to Vårdguiden. Karolinska was also keen on making visitors watch the movie since it contributes to a knowledge that in the long run might get people that are not acutely sick to use other health care options.

7.3.4 Customer service processes design

The touch points were as follows; signs (front door on the outside, second entry door in the entry hall and at ticket dispenser), ticket dispenser, screen displaying waiting time, seating furniture, nurses desk, information station and vending machines.

7.4 INFORMATION DESIGN

Physical Level – helping users find information

FLOW - The ticket dispenser was moved from close to the entrance door to the middle of the room. The placement enabled also visitors coming from inside the hospital to see it, but it was still in the visual field of visitors entering through the main door.

The screens in the waiting room had many different purposes; one showed TV, another an information film created by Netcorner with a message from Vårdguiden and Karolinska, and a third had been turned off. It was decided that the two turned on screens would continue showing TV and The movie about Vårdguiden, and the third would be used to display waiting time. This was completely new information in the waiting room which aimed to answer a lot of questions. The data collection showed that about half of all question to the nurses were regarding waiting time. The screen displaying the waiting time was colour coded red to express it belonged to the queue system. This was to make as many users as possible to discover it. The screen was embedded in the information module and the reason was that if users approach the screen they also approach the information module and hopefully register that there was a lot of information there. The information module would then hopefully be a natural choice when a question came to mind. But the screen displaying waiting time was not the only thing that aimed to give the information module attention. The module’s placement was also important. The new placement made it possible to quickly spot it when entering the room, and which also made it visible from all over the room. The vending machines which where put by that wall before, were moved to an other less important and less visible wall.

Cognitive Level – helping users understand information

The cognitive level emphasizes providing users with right information at the right time and to help users understand it by preventing information overload. To improve the quality of communication,

primary information, which means information that is necessary for the user to go through the system smoothly, was highlighted. Secondary information was separated from primary information, and clustered to one spot that users would need to actively approach when looked for that information. That spot was also marked with the word “information” because it is a recognizable word that most people relate to and react on, if they feel unsure or lost.

When people receive their ticket their next thought is to check what number is served at the moment in order to get an indication of their expected waiting time. A problem that was solved by the new placement of the ticket dispenser, was that the digital screens became visible from the spot people received their ticket.

People coming to the emergency ward know from experience, general knowledge or from the signage, that they need to in some way register at the desk. Given that the information from the signs made them understand that they needed a ticket to do so (except if they had heart pain or excessive bleeding) they looked for the ticket dispenser. By placing the ticket dispenser in the visual field of visitors entering the room, giving it a colour distinctly different from the rest of the room, as well as having a confirming text saying “tickets here”, the dispenser quickly would get and keep their attention. This design and placement would make the dispenser pop out so that even people that has not understood they need to take a ticket would do it. If they still would not get the message, they would be hindered to disturb the nurses and by the new screen at the desk. They would then hopefully look around and finally find the ticket dispenser.

Affective Level – motivating users to perform

After have attracted the users to read about the information, the next step is to motivate them to use it. The choice of language is then important, as well as considering cross-cultural communication.

SIGNS

The signs were developed through adapting the content to different levels of information, with the rule of thumb that less is more. Visitors at the emergency are not in a state of mind of carefully taking instructions; therefore the guidance needed to be impossible to misunderstand and easy to scan. The signs were developed to consist of a correct information hierarchy, with an appropriate level of courtesy words and imperatives. Cross-cultural information was added to the sign that communicates to the most urgent emergency cases not to take a number ticket but go straight to the nurse. To motivate visitors to follow instructions, generic icons and repeated instructions were used. Strategic placements and repeated messages of the signs would also remind and motivate patients to proceed correctly.

FLOW

The flow in the new concept aimed to eliminate clustered problem areas by motivating people to wait for their turn without disturbing the nurses and administration, nor disrespecting the patient confidentiality. The relocation of elements in the room makes a “correct” act easier to make than an “incorrect” one. In other words the placement aimed to make it an effort to not follow the system.

The main advantage of the new placement of the ticket dispenser was that the flow was directed to the middle of the room, further from the nursing desk and where there were plenty of seats. That would prevent people to linger at the entrance and quickly get them to the dispenser and then to wait. The new placement would make people waiting in a place where they would not block the sight of anything important, where they would not intrude on confidentiality or get tempted to go outside the system. The new placement would also solve a general problem; once people think they know what to do they stop bother to read. By putting the ticket dispenser far from the door, people would have time to read. The placement would allow people to react to the sign’s presence and start reading while approaching it, which would make them prepared to take the ticket.

The placement of seating furniture was changed to motivate sitting after taking a ticket from the ticket dispenser by having it close to by. The placement would also motivate approaching the information station, due to that many seats face it straight on.

CONFIDENTIALITY

The new screen at that desk was put up in order to create a private space for the patient at the desk, but also to prevent people from interrupting with questions. Most people would probably feel uncomfortable to squeeze into that space, occupied by another person, to interrupt. Most people would probably rather take a ticket and wait. The furniture placement would also contribute to reducing of the intrusion on patient confidentiality at the nurses' desk, by being placed further away from the desk.

8 PROTOTYPE BUILDING AND TESTING

YIT, which is used for installation services at Karolinska, built and installed most of the prototypes in the waiting room (figure 8.1). Because of budget negotiations and parallel work for YIT the time frame for building the prototype was heavily delayed, which also had a delaying affect on the time frame of the entire project.

8.1 ATTRIBUTES

8.1.1 Information module

The information module prototype was based on technical drawings (appendix G) and built in the YIT lab on the hospital area. While building of the prototypes Karolinska took the opportunity to repaint the waiting room, since vending machines and TV screens were being relocated. The YIT team installed the module on sight when the repainting was done and technicians from Netcorner were available to move the Vårdguiden-TV in to the module (figure 8.3). After the module was installed other attributes were attached, such as a map, brochure holders, information board and sign for waste bins.

8.1.2 Prints and signs

Prints and signs were printed at a professional print lab and attached to foam board or lightweight wood board. To easily and more cost effectively be able adjust the signs, the degree of realistic impression was determined to be sufficient with these materials instead of standard signs. The signs were then attached by YIT on desired positions.

8.1.3 Ticket dispenser

An electrician from Nemoq, the ticket dispenser producer, moved the ticket dispenser to a new position in the room. This position was set to be on a suitable distance from the confidential area by the desk, in an angle to be seen from both entrances, and where no lights were mounted in the roof right above it. (figure 8.2) For this new dispenser position a pillar was constructed (Appendix H) to keep the dispenser stable and to attach the signs on. Nemoq attached a new digital number display on the side of the pillar so that it would be visible from the entrance and therefore indicate ticket dispenser area.

Due to economic recourses a missing detail from the original concept was the marked floor around the new pillar and ticket dispenser.

8.1.4 Waiting hours screen

A TV screen was built into the information module and displayed through a custom made gap. This screen was to display a manually updatable page showing the waiting hours. The interface was meant to be managed and updated through an Internet website connected to the page displayed on the screen. The team members sat in a room beside the waiting room and updated the waiting time every 15 minutes. To estimate the waiting time Take Care, the intern system Karolinska uses to handle patients and journals, was studied. Waiting time was calculated by looking at the waiting time for previous patients, but also considering their emergency priority. This was done for each unit. It was hard since there were many aspects only visible from within the ward, which was not accessible, that also had great influence on the waiting time..

8.2 TEST ITERATION 1

Implementation

The first evaluation was executed on a busy Monday between 12 and 6 pm. The waiting hours were calculated from the internal Take Care data system and updated on the screen every 15 minutes.

This first iteration used an interface displaying a fairly precise estimation of waiting hours for each unit (figure 8.2). Further on, signs were strategically planned to be as few as possible in order to see where the level of information is sufficient.

Evaluation was made through direct observation and flow charts, where patients' behaviours and comments were registered for analysis.

Appendix L displays the signs and attributes on sight.



Figure 8.1 During the building and installation of the information module.



Figure 8.2 Left: The new pillar with ticket dispenser. Middle: Suggestion for waiting hours display. Right: View from main entrance.

8.3 RESULT AND INSIGHTS FOR FINAL TESTING

The waiting hours appeared to have a big impact on the patients. Patients talked about the displayed time, how it changed and how long they had left. Some people entering the room went straight up to see the screen and even decided to leave when concluding that the waiting hours were very long or that their unit was closed (figure 8.3). When the estimated time limit was passed some patients got impatient and approached the nurses with questions on why they had not get to see a doctor yet. Parts of the staff were sceptical to the displayed estimation of time; they somewhat felt attacked by the questions about a system they could not control. Insights about the value of internal communication and implementing ideas among the staff became very evident. Also, even though the phrase “estimated time for each unit” was clear on the screen, some people took the time estimation literally, and

had little understanding for having to wait longer. Regarding the flow, there were still some patients neglecting the ticket dispenser and approaching the desk directly after entering the room. It was also noted that people who had been in the room before searched for the ticket dispenser at the old spot. The confidentiality screen helped to keep newly arrived people from easily accessing the nurses, but in some cases they would just turn to the cashier’s desk instead. This observation gave insights and understanding about how intuition controls many of the patients. The desire to directly talk to a nurse and resistance to stand in line, lead to sequences when patients still neglected the new signs and barriers.

Solutions on how to better motivate patients to take a ticket, and for both staff and patients to accept the displayed waiting hours, modifications were made before the next test. The second iteration is, due to the time limit of this project, presented as the final result.



Figure 8.3 The information module installed and ready for use. Right: Waiting hours displaying interval instead of hours and minutes.

9 RESULT

There are two main results generated from this project. The first one is a new waiting room that have solved many of the before existing problems. The second is a guideline document, with recommendations that are based on both the tested concept and insights from the research.

9.1 THE NEW WAITING ROOM

The new concept has mainly generated five new tendencies in the waiting room; patients take time to actually read the signs, less crowding in the critical area, no interrupting of patients in triage, patients have an increased feeling of control, and more people learn about Vårdguiden and their services.

1 Patients take time to read the signs

In contrast to before people read information. It was clear that the patients linger a little longer at the signs and actually took time to read them. The touch point where people most obviously took time to read was at the ticket dispenser. The result was that many of the patients got the information that it was possible to go straight to the desk in case of heart pain and excessive bleeding. This means less people got frustrated and thought some people went ahead of the line. The fact that people had read the signs also made them see that a ticket was not only needed for registration, but for asking questions and signing in when visiting hospitalized relatives too. The staff experienced that the new concept contributed to that more patients and relatives took a second ticket when they wanted to talk to the staff at the desk a second time. Even if far from all visitors took a second ticket, this hardly ever happened before the concept was implemented.

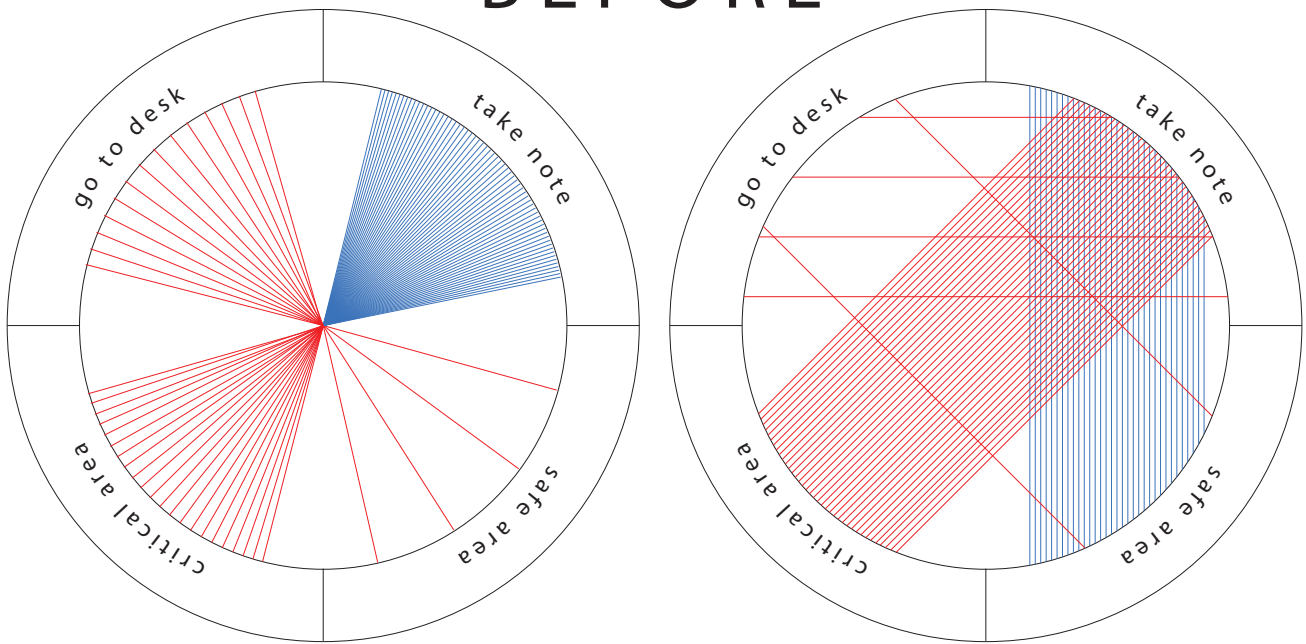
The waiting time screen could be seen from almost all corners of the waiting room, and some people were pleased to look at it at time to time from where they sat. Others approached it and studied it closely. People did not only approach the information module to look at the waiting time, but to look at the map or to take a brochure. People who took coffee generally also took a moment to study it.

2 No crowding in the critical area

The glass screen, the added sign on it, and the new position of the ticket dispenser made the critical area less crowded and easier to scan for information. Earlier the dispenser was sometimes not seen by entering people due to crowding in front of it. The new position of the dispenser also made it possible for the people coming in from inside the hospital to spot it. "The area is a little less crowded, thanks to the new dispenser position. But some people still miss the ticket dispenser to the left because they immediately look right when they get in." said a staff member from administration. However, it was very clear that more people took a ticket as a first step and that the amount of people that go straight to the desk when entering the room, queue or linger in the critical area, was essentially less. It was also observed that most people who lingered in, or close to the critical area, were those with the next number.

Due to the very inviting architectural design of the desk, there were still some people that chose the bend of the desk as a place to wait for their turn. It was observed though, that a majority of those people moved away when they laid their eyes

BEFORE



AFTER

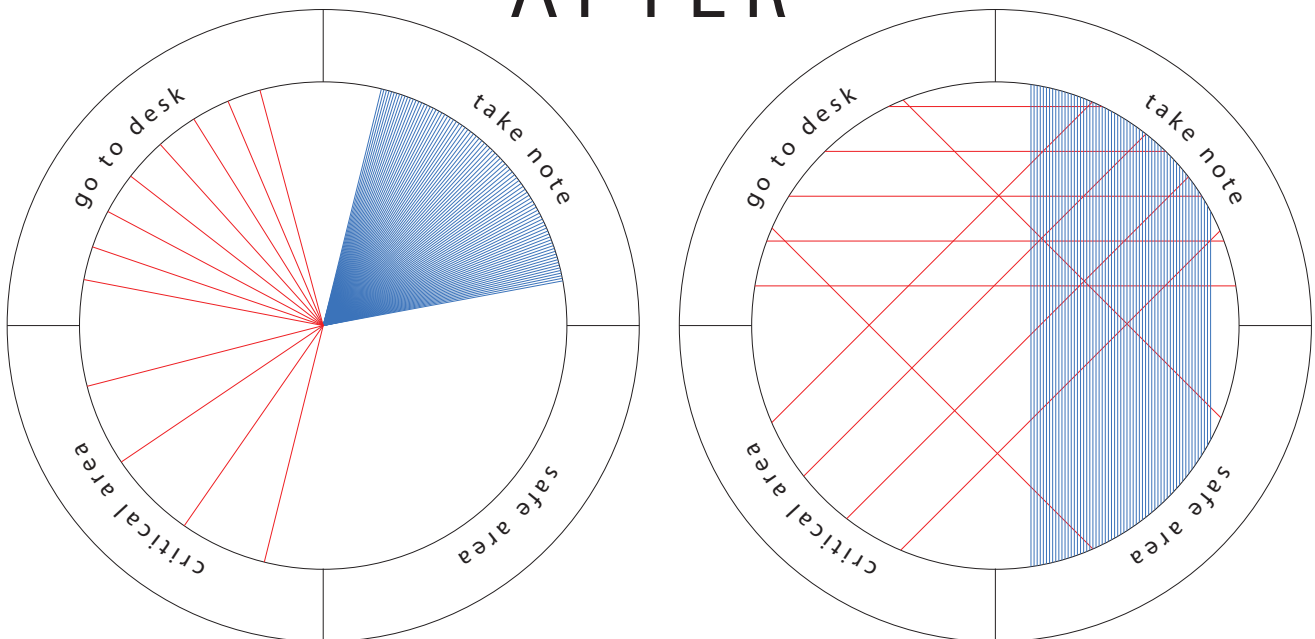
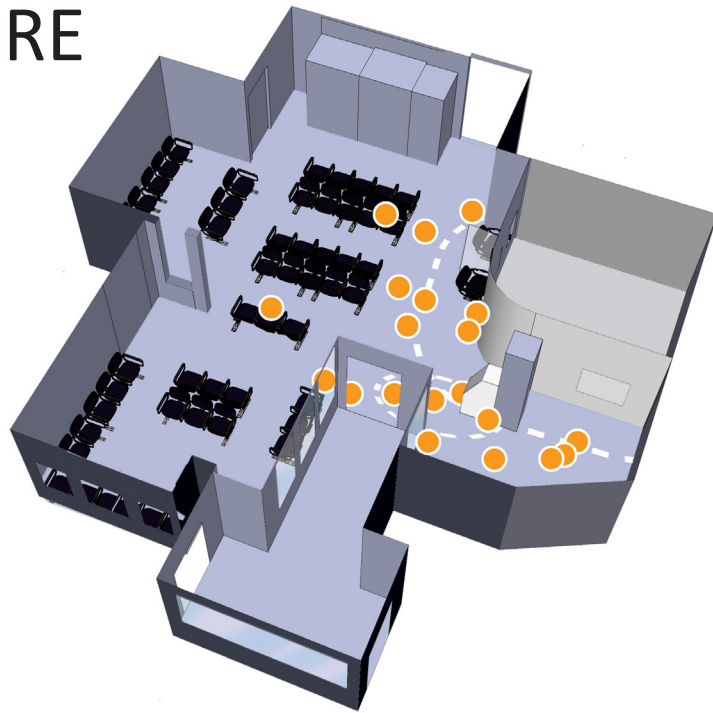
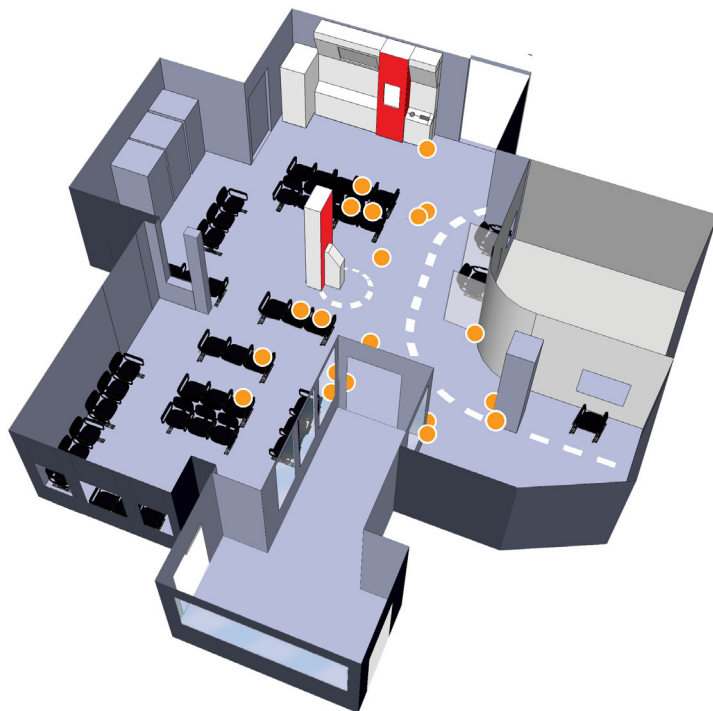


Figure 9.1. The circles to the right show the first action people do after have entered the room. Blue indicates a correct action, and red an incorrect action, which means it counteracts the system. People can choose to take a ticket, move to the safe area, stay in the critical area (which included standing in the area as well as queuing), or to go straight to the desk. The two left circles show that the percentage of people following the system correctly as a first step has increased, and that no one no longer go straight to the safe area without taking a number ticket. The right circle shows what the next step is. The upper right circle shows that in the old concept many people were in the critical area for a while and then realized they needed a ticket. Because the lines lack direction, this also show that people who had taken a ticket then stayed in the critical area. In the new concept more people now take a ticket and then move over to the safe area where they do not disturb the secrecy, nor conceal signs or the dispenser for entering people.

BEFORE



AFTER



9.2 The waiting room before and after. The orange dots represent how people position themselves in the room. The white lines mark the critical area where crowding should be avoided.

on the nearby sign on the confidentiality screen. That sign proved to be effective in more than one way. The sign's position and distance from the entrance made it almost impossible to miss when heading towards the desks. It worked well as a re-director to the ones who missed the dispenser and had just headed for the staff when they got in.

3 No interrupting of patients in triage

The confidentiality around the desk has increased thanks to the new screen and because less people linger in the critical area. The new glass screen seemed to make it clearer to entering people that it is a confidential area. Because of the physical effort it takes to actually interrupt when the nurse is busy with another patient made people not even want to try. Even if the screen and the sign seemed to eliminate the triage interruptions, it did not stop people from peeking in when nurse was free.

4 People feel more in control

Referring back to the social health theory by Ulrich, the feeling of control was a very important aspect in health care design. Control was referred to as people's real or perceived feeling of being able to influence their situation (Gatchel, Braum, & Krantz, 1989). According to Ulrich's theory patients with information about their situation felt less stressed and more in control than those who are not informed. The waiting time screen also helped to inform that there were several units in the emergency room, and that all of them have different waiting hours. By displaying the estimated waiting hours for all the units, patients got a notion of that the system was supervised and under control. Even though patients could not influence on how long they had to wait before they saw a doctor, an indication of how long it might take gave them the possibility to mentally prepare. To be informed, even when it is bad news, can often be

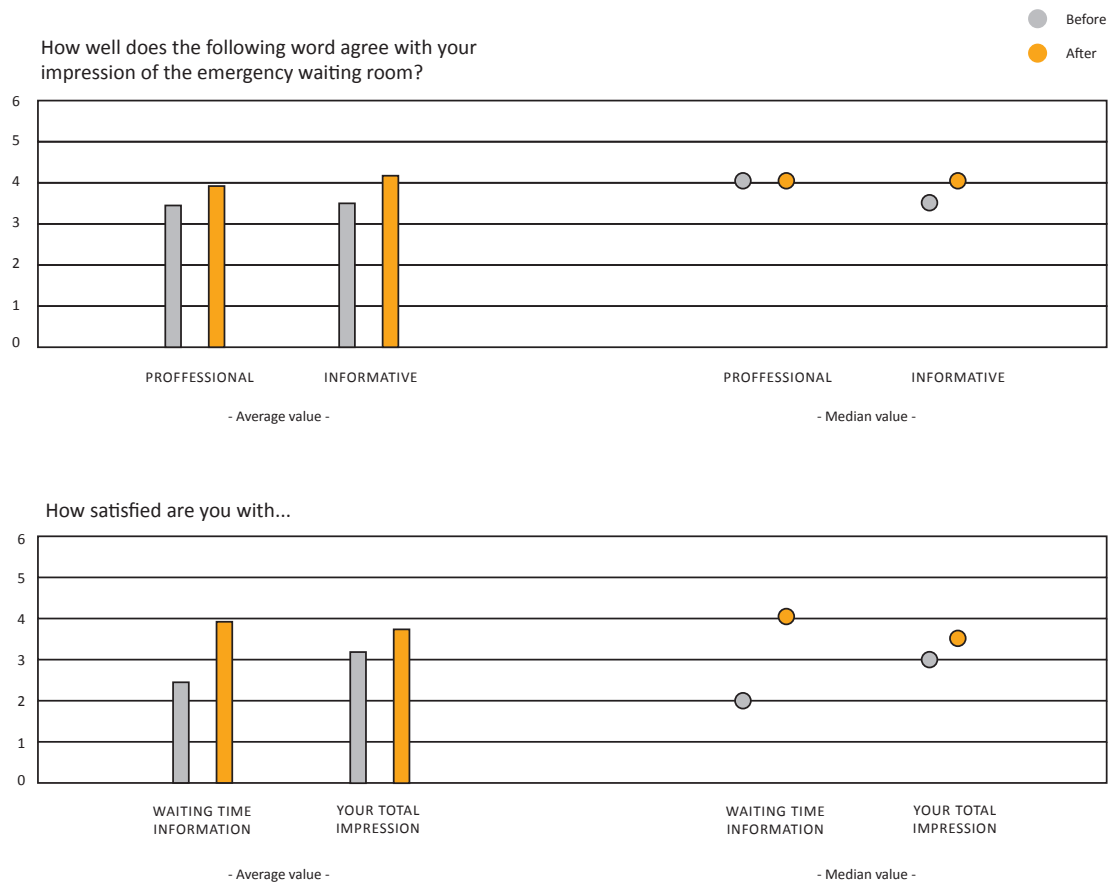


Figure 9.3 Statistics from before and after. Average value as staples and median value as dots.

easier to handle, than to not know at all. The waiting time screen would not give patients control over their hospital situation, but it did give them the possibility to control parts of their private situation. They knew whether they have time to go get a coffee, go out for a smoke or whether they should call someone to help them out with picking up their kids. The screen displaying the waiting time got a lot of attention. Some people approached it and studied it closely while some see it and glimpsed at it at time to time.

During the testing the displayed waiting time was sometimes incorrect due to miscalculations. When the displayed waiting time was for instance 2-3 hours and there were patients in the waiting room that had waited for three and a half hours, they obviously got upset and got up to ask the staff what is going on. The staff still supported the idea of continuing to display the waiting time in the waiting room. They believed it would eliminate a lot of questions that they normally get. During the testing they still got several questions regarding waiting time, but the staff all agreed on that a vast majority were caused by incorrect waiting time. A screen displaying more overstated waiting times, to avoid misleading patients, was welcomed by the staff.

One situation that was important in order to provide control was to make people sure of where they were. The concept did not solve the problem of informing people that the hospital is Karolinska in Solna. Since there is an other Karolinska located in Huddinge, it happens that people get to the wrong hospital. This problem is easy to fix but was not solved in the prototype.

5 People learn about Vårdguiden

A long-term goal for the Swedish emergency health care is to get fewer non-acute cases to the emergency ward in order to lower the waiting time and make it more efficient. There large amount of patients that come to the emergency ward without being acutely ill, can be decreased by educating the general public of what options that are preferable and often more comfortable for them. Vårdguiden's mission is to inform about those options, and to make the finding

of health care and health related information easy. In the new solution people watched the information movie from Vårdguiden. Thanks to the TV screen's new position it was inevitable to see. Another big change was that people actually took Vårdguiden brochures. Their placement and proximity to the TV seem to make people understand what it was about.

9.2 GUIDELINES

As a part of the aimed outcome, guidelines and recommendations were given for future references and for Karolinska to take part of. The guidelines were composed as both recommendations for waiting rooms in general, as well as for the specific one in Solna. It also provides useful guidelines for the development of new waiting rooms, since a new Karolinska Hospital will be ready in 2015. In addition, it provides information about adjustments that can be done without any further investigation.

The guidelines are presented in Appendix J. Some of the recommendations are more feasible for Karolinska than others. Guidelines possible to implement at Karolinska within an estimated period of two years are marked with a symbol.

10 DISCUSSION

10.1 THEORY

There is a lot of theories and studies bringing up element that contribute a to a better healthcare environment, but when carrying out a project like this, only a small fraction can fully be used often because of architectural or financial limitations. Healthcare related theories that proved to be most useful was R. S. Ulrich's three guidelines for Supportive Healthcare Environment (1991). They were descriptive enough to be easy to use, and open enough to make it possible to freely apply them on functions and elements specific for our project. The service design components listed by R. Ramaswamy (1996), and the Information design model bringing up the three levels of information, were both very helpful. Especially during the creative process when it was important to make sure all parts and aspects of the service were covered.

10.2 DATA COLLECTION

The data collection, before and after implementing the new solution, was performed on a Monday to catch the most critical day of the week. Because of that very clear difference in activity between the days of the week, it was very important to be well prepared and ready each Monday during the last phases. Because the test period got locked down to Mondays, it became a very time-consuming and sensitive process. If a test day were to be interrupted by an unforeseen happening, there would be a whole week to the next occasion. For example, on the first Monday there was a snowstorm coming in, which meant few people made it to the emergency, and the session was concluded as un-valid. Mondays

were chosen as reference day, not only to get as much data as possible, but also because during busy hours incorrect behaviour seemed to escalate when patients trigger and follow each other's actions. This means that during the data collection, the waiting room was crowded, people were anxious about the waiting hours, and annoyed because they had to sit close to each other. To carry out observations in this context was very efficient. Since the room was quite small it was easy to follow what people put their eyes on, how they reacted to signs, and how they behaved while waiting. Also, it was manageable to see all of the visitors in the room from one single spot. At an early stage interviews were tried out in the waiting room. By keeping a low voice and discrete approach a few interviews were done, but shortly it became clear that the patients were too pre-occupied to speak about experience and expectations. Since the room was crowded it was also difficult to have a conversation without everyone else taking part of it. Patients proved to be a very complex user group. They can be any gender, age, culture, etc. Because people who get to the emergency often are under some kind of stress, they do not always act and reason as they usually do. Patients who were most willing to participate and share their experiences and thought in an interview, were the ones who were the least ill or injured. Another important aspect why interviews might have worked poorly, was that they were conducted in a waiting room with extremely few distractions, which made the interviews the centre of attention. The questionnaires on the other hand proved to be a bit more efficient, since they could be filled out privately and in an individual pace. Regarding the result from the data collection, certain

details became evident. Firstly, the sample size was too small. The amount of questionnaires would have needed to be much larger than the project had time resources for. The extremes of both ends could have been less prominent if the amount of data was larger. The medical condition of the patients had a major effect on the answers. Patient with not that serious medical conditions were glad to fill in the questionnaires, share their opinion, and complain about the long waiting hours. These people were obviously the ones that had to wait the longest to see a doctor. Patients with serious illnesses were not very excited and willing to share their thoughts, which gave the data collection a rather unbalanced outcome.

The composition of the questionnaire was decided to be identical at all sessions, in order to be comparable. For research reasons people were asked to grade how well certain expressions like caring, informative and professional, agreed with their impression of the waiting room. These words were not based on facts of how this particular waiting room should be perceived or on requirements from Karolinska. They were based on the theories and assumptions. In the development of concepts only the expressions that coincided with the result from the rest of the research, were chosen to have in mind. Consequently, during the evaluation of the new solution using with the same questionnaire, the words that were not chosen got approximately the same grades. That was not surprising since the room was unchanged from these aspects. What was lost in the questionnaires was obviously the opportunity of probing, which often can prove to be essential to find the real reasons why problems exist. That was in some cases compensated by people writing their own notes and ideas. The questions asked by patients, that the nurses counted, were not treated as statistically determined data for many of reasons. There was a constant variation of staff working at the triage during the sessions, which made it difficult to keep everyone informed about the data collection.

When trying to identify what kind of questions people were asking the staff when they approached the desk without taking a ticket, we were not able to sit close by and listen due to patient confidentiality. The staff was therefore used to carry out that task. Nurses and administration found it hard to remember to register every question when it was stressful at times. Therefore the result was

treated more as an indication on what questions were the most frequently asked ones. Because of the uncertain statistical result, the measurement method was not repeated for evaluation purposes.

The outcome of the focus group turned out to be valuable for understanding the workload, and issues that nurses and administration dealt with. In general the staff was happy to contribute with their opinions and ideas during the whole project, though the attitudes differed between generations the younger part of the staff tended to be more open-minded to the possibility of changing the patients' behaviour. In the end of the project it became clear that it would have been meaningful to interview a larger group of people from the staff, which in reality would have been difficult to execute due to the variation of work hours and shifts.

10.3 PROCESS

The process of the project was affected by several factors. The service design methodology and theory was somewhat a new field that had to be studied and implemented. That led to many discussions about how to proceed in the different parts of the project, where Transformator helped with guidance and expertise.

The problematic part of the process was to consider and involve the different stakeholders connected to the project. Vårdguiden had a pilot running in the waiting room at the same time, and since Vårdguiden provided an essential part of the information it had to be considered. The company that performed the pilot for Vårdguiden, Netcorner, was consequently involved in the project. While building the prototype YIT had to cooperate with Netcorner, in order to move the screen. YIT also had to cooperate with Nemoq to move the ticket dispenser and JEDE to move the vending machines. The waiting hour screen was a central part in hour concept, and we were very thankful Netcorner helped out much by providing knowledge and service for the screen. The prototype phase, including the time it took to set up meetings with YIT and Karolinska, and discussing the budget for building the prototypes, took longer time than planned. In the end that had a major delaying effect on the iterations and test period, which also became very limited due to deadline for the project. Instead of the several planned iterations, the prototypes

went through a few smaller adjustments. Still, the involvement of so many kinds of stakeholders was a great experience. The stakeholder management and organization improved along the project, but was tricky at times due their differing engagement and prioritisation of the project.

of the several planned iterations, the prototypes went through a few smaller adjustments. Still, the involvement of so many kinds of stakeholders was a great experience. The stakeholder management and organization improved along the project, but was tricky at times due their differing engagement and prioritisation of the project.

10.4 RESULT

The tested result was inflated by two main factors; the difficulties of having access to patients in the waiting room, and the delay of finalizing the prototypes and consequently carry out evaluation tests. As mentioned before, patients are a complex user group, and hard to get first-hand information from. Also the fact that test sessions were bound to be on Mondays, which made the timing very sensitive.

The physical outcome in terms of the prototype, turned out very close to what the project aimed for and how the concept was planned. The details, e.g. the marks in the floor that were not included in the physical result were not finalized because of economic reasons and the fact that the project already was delayed. Effects that these details would have had on the result are difficult to predict. For example the coloured mark around the new ticket dispenser and around the confidential area could have had an effect on how patients perceive these areas. The function of the confidentiality screen and ticket dispenser worked without these details, however they might have had an even greater effect if the marks were in place.

The result shows that patients now go through the waiting room system more smoothly, and are less likely to hinder or prevent its efficiency. As mentioned before it is hard to ascertain patients changed impression and experience of the new design. Although, observations and questionnaires gave a indication that people have an increased feeling of control, are more satisfied with the information, have a greater understanding of the system and have a better total impression of the waiting room.

The observations and feed-back from staff also showed that other visitors than patients, tended to enter the ticket system more with the new design.

The work situation was improved in term of interruptive questions and people approaching the desk without a ticket. The improvement would most certainly have been even greater if the ledge at the desk could be removed. The ledge is a very welcoming resting place that allows leaning, being close to the desk and works as a convenient place to put bags or other luggage. If it would be possible to eliminate, the amount of people in the critical area could be decreased even more. Regarding the interruptive questions, we managed to decrease the amount of waiting time related questions. They still occurred, but a majority of the nurses and administration agreed on that only happened when the screen happened to display incorrect values. They also agreed on that it was a good solution, and that they believe the screen is able to eliminate the questions if it would work properly. Many suggested that if it would display an exaggerated waiting time to eliminate the risk of displaying incorrect waiting time.

By increasing the level of satisfaction among the patients, the hospital will be able to show the effect of applying service design. For future investments in waiting rooms and other possible areas at hospitals, the result of this project will work as guidelines with tested concepts for which investments are worth doing. The improved experience will also increase the reputation of the emergency ward for patients as well as employees.

Can service design improve an emergency waiting room?

The project carried out on Karolinska has highlighted a number of key issues and behaviour in the waiting room. Regarding the patients the implemented result showed that through creating a better flow through placement of interior, and creating an information system with a coherent graphic appearance, the flow

pattern and experience was improved. The service design thinking and journey mapping pin pointed the critical touch point from which a majority of the negative tendencies appear. Patients behave calmer and accept the situation to a higher extent when understood how the waiting room system works, as soon as it fails nervous and anxious reactions appear. After considering the system visual appearance of the waiting room is an easily tangible factor and therefore frequently commented by the patients, which is also supported by Ramaswamy's theory (1996). Comfort and order, such as intact interior and functioning lights, vending machines are apparent banal details that become crucial when spending several hours in the waiting room. That is an important aim for the concepts has been to enhance the experience. This means that Karolinska should establish a better relation to the companies that take care of their maintenance, i.e. cleaning, reparations, digital display, lamps, food and drink machines etc, and making sure that this relation works. The situation for the nurses and administration staff appeared to change in a matter of less people who approach the desk immediately with out taking a number. Also the patients were satisfied with the information about waiting hours, as long as they were correct. Which proves the system to be very sensitive to failing information and where the level of confidence for the system is easily decreased. Regarding the staff situation a complex connection between the patients and the internal hospital system was evident and positive changes for both sides are difficult to implement. Internal flow, data systems and routines did not always go hand in hand what would be best for the patients. The transparency that is required to keep the patients informed, e.g. about waiting hours, was during the test period questioned by parts of the staff due to its sensitivity to changes in the work flow or staff capacity. The patients' entire journey continues after leaving the waiting room, which is beyond the limitations of the project, but nevertheless a strong factor. The service design implemented in the waiting room has made a difference, but the effect has a potential of being greater if the entire journey would be considered.

11 CONCLUSION

From the outcome of this project a number of conclusions can be drawn. The big picture has proved to have a clear demand for service design thinking. Since patients that arrive to the emergency waiting room come with individual expectations and experiences. With symptoms from stomach-aches to broken ankles or long term diseases, the emergency is expected to be at service for all kinds of patients. Which means that the system needs to work for first time visitors, regulars, blind, old, disabled people etc. The emergency room is a brick in a huge organisation where most often patients circulate between essential touch points, before finally arriving to the emergency room. Therefore, in the big patient journey, to provide an improved service at the emergency room the touch points through out the entire journey would need to be considered. Stakeholders that have been involved in this project have different opinions about when and why one should go to the emergency. The hospital has their view, patients have another view, politicians have a third. The emergency waiting room is as much a touch point as a meeting point, where these three bricks meet and collide. Where a diversity of expectations meet a limited capacity of resources, patience and space. There is a mantra in order for Karolinska to provide good service: to exclusively attract acute case patients. That is why the total patients journey is an excellent example of where service design would make a difference. There is a general confusion about how the health care system works and therefore a massive challenge in educating the public how to proceed when in need of health care. Especially since most people recline to the idea that they one day could need to take part of the system and therefore might not engage in the matter before the day help is needed.

In short the conclusions drawn from the project, and from which parts of the guidelines are constructed, are as following:

- Since patients often are preoccupied when they are in the waiting room, information that is easily scanned, distinct and hierarchically structured is recommended. In this way people take time to read the signs to a higher extent and are consequently more motivated to follow the system.
- Transparency and feedback about personal situation is recommended to keep the patients reassured that they exist in the queue system. However, the level of patience and confidence is minimal when incorrect information occur, it is crucial for the feedback to be correct. This considers both patients and staff.
- Staff involvement in the project and solution is significantly important. Their approval and reliance on the system affects the interaction with the patients; which has proven to colour the patient's experience through out the visit.
- Facility maintenance, i.e. cleaning, reparations, digital display, lamps, food and drink machines etc, will achieve a higher degree of comfort and order. Although it can seem banal, during long waiting hours this is the most tangible factor for the patients.
- The complex connection between the patients and the internal hospital system clearly affects the flow and experience. Internal flow, data systems and routines do not always go hand in hand with what would be best for the patients. However from a holistic point of view it is very important for the entire visit.

12 REFERENCES

LITTERATURE

Arnell & Delvin, 2002 - Arnell B. Allison & Sloan Delvin Ann, 2002. Perceived quality of care: The influence of the waiting room environment, *Journal of Environmental Psychology* (2002), Vol 22, p. 345-360.

Bayo, Garcia & Garcia, 1995 - Bayo, M. V., Garcia, A. M. and A. Garcia (1995). Noise levels in an urban hospital and workers' subjective responses. *Archives of Environmental Health*, Vol. 50, p. 247-251.

Beyer & Holtzblatt, 1998 - Beyer, H. & Holtzblatt, K. (1998). *Contextual design*. Morgan Kaufmann.

Carliner, 2000 – Saul Carliner, 2000. Physical, cognitive, and affective: A three-part framework for information design. *Technical Communication*, Vol. 47, No. 4, p. 561.

Cooper 1999 – Cooper A., 1999. *The Inmates Are Running the Asylum*. New York: Sams publishing.

Dick & Carey 1990 – Dick Walter & Lou Carey (1990), *The Systematic Design of Instruction*, 3rd edition, New York, NY: HarperCollins.

Denscombe, M. (2007) *The Good Research Guide for small-scale social research projects Third Edition* pp 178-186. New York: McGraw-Hill

Gatchel, Braum, & Krantz, 1989 - Gatchel, R. J., Braum, A. and D. S. Krantz (1989). *An Introduction To Health Psychology* (2nd ed.). New York: McGraw-Hill.

Harris, 2000 - Harris, D. (2000). *Environmental Quality and Healing Environmentas: A Study of Flooring Materials in Health care Telemetry Unit*. Unpublished doctoral dissertation, department of Architecture, Texas A&M University, College Station, TX.

Hilton, 1985 - Hilton, B. A. (1995). Noise in acute patient care areas. *Research in Nursing and Health*, Vol. 8, p. 283-291.

Hosking & Haggard, 1999 – Hosking S. & Haggard L. (1999), *Healing the Hospital Environment: Design, Management and Maintenance of Healthcare Premises*, London : E.& F.N. Spon, 1999.

Keep, James & Inman, 1980 – Keep P., James J., & Inman M., (1980). Windows in the intensive therapy unit. *Anesthesia*, Volume 35, Issue 3, p. 257-262.

Leather et al., 1997 – Leather P., Pyrgas M., Beale D., & C. Lawrence (1997). Windows in the workplace; sunlight, view, and occupational stress. *Environment and Behaviour*, Volume 30, 739-762.

- Mongeau & Morr 1999 - Mongeau P. A. & Morr M. C., (1999). Reconsidering brainstorming. Group Facilitation; a research and applications journal, Volume 1, Number 1, pages 14-21.
- Osborn 1957 – Osborn A. F. (1957). Applied imagination: Principles and procedures of creative problem solving (revised ed.). New York: Charles Scribner's Sons.
- Parker & Hodge, 1976 – Parker D. & Hodge J., (1976). Delirium in a coronary nit. JAMA, 201: 132-133
- Pruitt & Grudin 2003 – Pruitt J. & Grudin J. (2003). Personas: practice and theory. Proceedings of the conference on Designing for user experiences, June 06-07, San Francisco, ACM pp 1-15.
- Ramaswamy, 1996 - Ramaswamy R. (1996), Design and Management of service processes: Keeping customers for life, Addison-Wesley Publishing Company, 1996.
- Rubin, Owens & Golden, 1998 - Rubin H. R, Owens A. J., & G. Golden (1998). Status Report: An Investigation to Determine Whether the Built Environment Affects Patients' Medical Outcomes. Martinez, Ca: The Centre for Health Design.
- Shumaker & Czajkowski, 1994 - Shumaker, S. A. & S. M. Czajkowski (Eds.) (1994). Social support and Cardiovascular Disease. New York: Plenum.
- Shumaker & Pequegnat, 1989 - Shumaker, S. A., & Pequegnat, W. (1989). Hospital design, health providers, and the delivery of effective health care. In E. H. Zube & G. T. Moore (Eds.), Advances in environment, behavior and design (Vol. 2, pp. 161-202). New York: Plenum.
- Shumaker & Reizenstein, 1982 - Shumaker, S. S., & Reizenstein, J. E. (1982). Environmental factors affecting inpatient stress in acute care hospitals. In G. Evans (Ed.), Environmental stress (pp. 179-223). Cambridge, UK: Cambridge University Press.
- Kawakita 1986 - Kawakita, J. (1986), The KJ method. Tokyo, Chuo-koron-sha. (in Japanese).
- Keil & Carmel, 1995 – M. Keil & E. Carmel, Customer-Developer Links in Software Development, Communications of the ACM, (1995), Volume 38, Number 5, p. 33-44.
- Teikari, 1995 - Teikari, M. (1995). Hospital Facilities as Work environments: Evaluation Studies in the Operating, Radiology, and Emergency Departments in Seven Finnish General Hospitals. Helsinki University of Technology Research Publications, Faculty of Architecture. Espoo, Finland.
- Ulrich 1991 - Ulrich, R. S. (1991) Effects of health facility interior design on wellness: theory and scientific research. Journal of Health Care Design, Vol 3?, pages 97-109.
- Ulrich, R. S. (1992) How design impacts wellness. Healthcare Forum Journal, Volume 20: 20-25
- Ulrich, R. S. (1999) Effects of gardens on health outcomes: theory and research. Chapter I C. C. Marcus and M. Barnes (Eds.), Healing Gardens: Therapeutic Benefits and Design Recommendations. New York: John Wiley, 27-86.
- Ulrich a - Ulrich, R. S. (2000a) Environmental research and critical care. In D. K. Hamilton (Ed.), ICU 2010: Design for the Future. Houston: Centre for Innovation in Health Facilities, 195-207.
- Ulrich 2000b - Ulrich, R. S. (2000b) Evidence based environmental design for improving medical outcomes. Proceedings of the conference, Healing By Design: Building for Health Care in the 21st Century. Montreal: McGill University Health Centre, 3.1-3.10.

Verderber 1986 - Verderber S. (1986). Dimensions of person-window transactions in the hospital environment. *Environment and Behavior*, 18: 450-466.

Wilmott 1986 - Wilmott M. (1986). The effect of a vinyl floor surface and carpet floor surface upon walking in elderly hospital inpatients. *Age and Aging*, Volume 15, pages 119-120.

Transformator 2010. [internet] Available at: www.transformator.net Accessed at: 2010-02-20.

Ulrich 2000c - Ulrich, R. S. (2000c). Effects on Healthcare Environmental Design on Medical Outcomes. [internet] Available at: <http://www.designandhealth.com/uploaded/documents/Publications/Papers/Roger-Ulrich-WCDH2000.pdf> Accessed at: 2010-03-15

ELECTRONIC SOURCES

Calabria 2004 – Calabria T., (2004). An introduction to personas and how to create them. Step Two Designs. [internet] Available at: http://www.steptwo.com.au/papers/kmc_personas/index.html

Accessed at: 2010-04-15.

Design council 2010. [internet] Available at: www.designcouncil.org.uk Accessed at: 2010-03-10.

Karolinska University Hospital 2010. [internet] Available at: www.karolinska.se/en/Karolinska-University-Hospital/ Accessed at: 2010-04-15.

Research Methods 2006. [internet] Available at : www.socialresearchmethods.net/kb/measlevl.php Accessed at: 2010-03-10

Spool 2007 – Spool J. M. (2007). Three Important Benefits of Personas. *User Interface Engineering*. [internet] Available at: http://www.uie.com/articles/benefits_of_personas/ Accessed at: 2010-04-15.

Sveriges Kommuner och Landsting 2010. [internet] Available at: www.skl.se/web/Hem.aspx Accessed at: 2010-03-23.

SVID 2010. [internet] Available at: www.svid.se/Om-SVID/Vad-design-ar/Designordlista/#Tjanstedesign Accessed at: 2010-05-23.

APPENDIX

A OBSERVATION CHART

B PATIENT INTERVIEW

C FLOW CHART

D ACTION RATE CHART

E QUESTIONNAIRE

F FUNCTION ANALYSIS

G TECHNICAL DRAWING INFORMATION MODULE

H TECHNICAL DRAWING NEW PILAR

I PATIENT'S JOURNEY

J GUIDELINES

K EMERGENCY WAITING ROOM BEFORE

L EMERGENCY WAITING ROOM AFTER

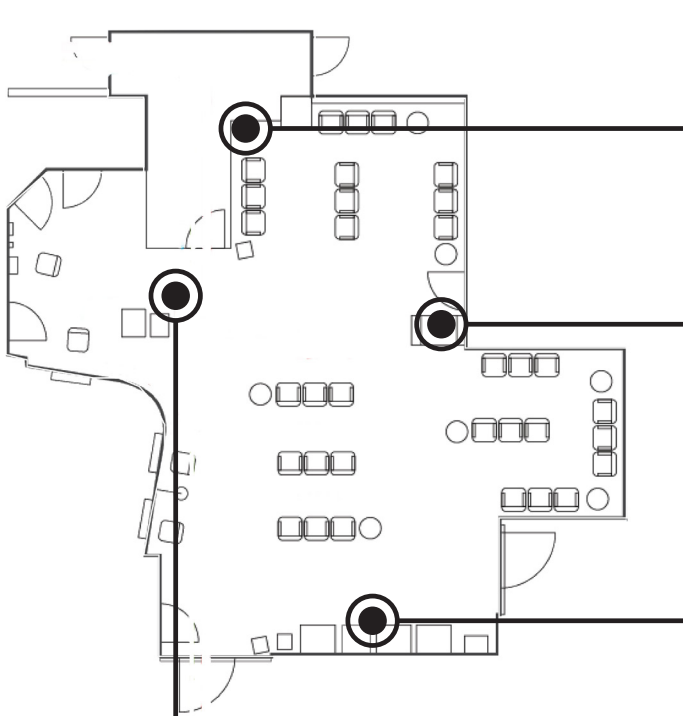
M QUESTIONS, RESPOND AND CONSEQUENCES

A OBSERVATION CHART

Datum: _____
 Tidsintervall _____ Från kl _____ Till kl _____

KÖLAPP
 scenarios

Tar lapp sätter sig	
Tar lapp går direkt fram	
Tar lapp står kvar inom höravstånd	
Tar lapp bildar kö	
Sätter sig utan lapp	
Går fram utan lapp	



UPPMÄRKSAMHET

snack/dryckesmaskin

sjukvårdsguiden

lekhörnan

uppsatta informationslappar

Anteckningar:

B PATIENT INTERVIEW

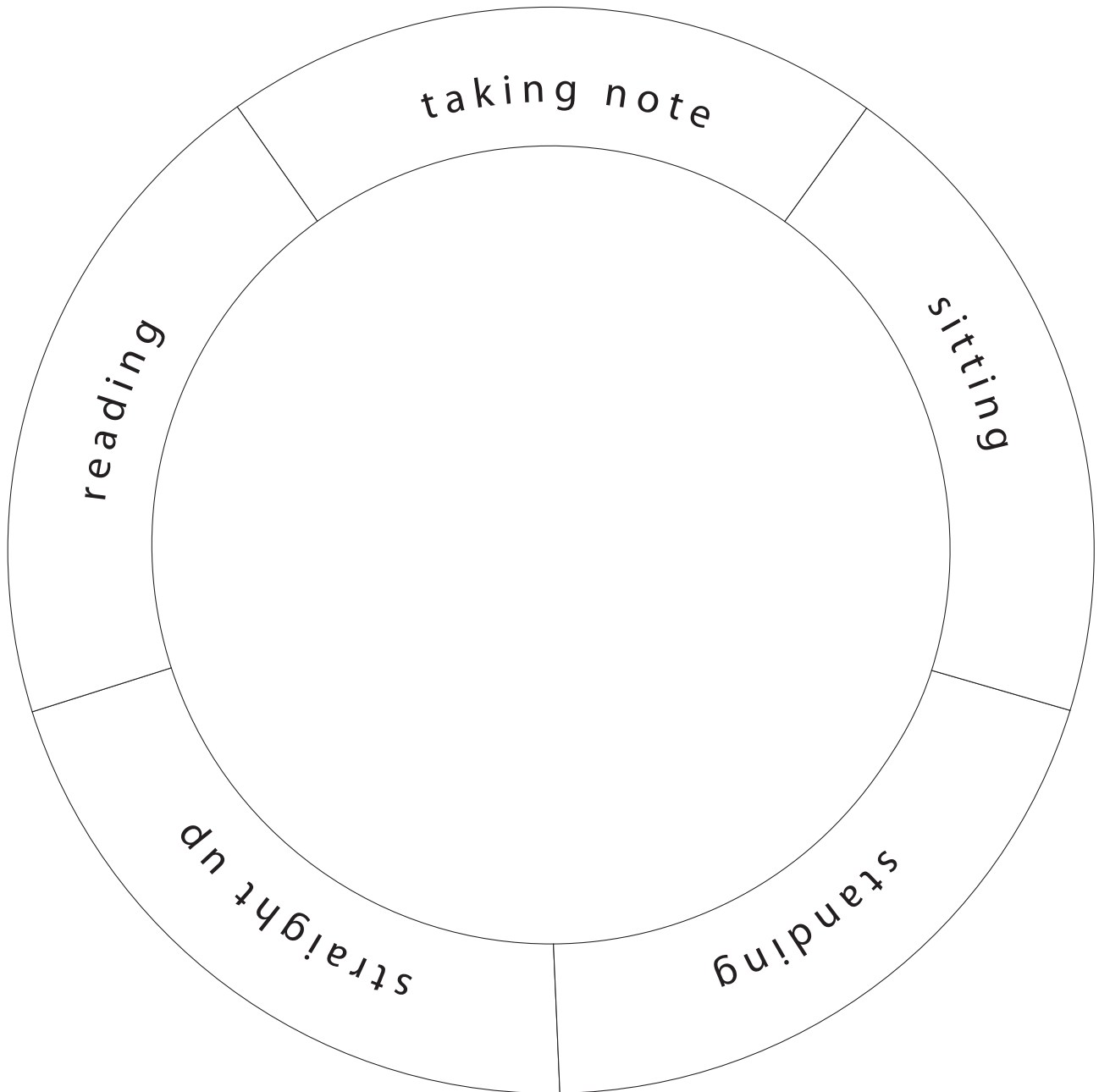
Hej mitt namn är E/P och jag håller på med ett projekt som syftar till att hjälpa Karolinska att ge bättre vård. Jag undrar om jag kan få ställa några frågor till dig? Detta gäller inte ditt personliga ärende här utan din upplevelse av Karolinska. Och du behöver inte svara på en fråga om du inte vill.

Man/Kvinna:

Ålder:

1. När bestämde du dig för att åka till akuten?
2. Kontaktade du någon typ av sjukvårdsupplysning innan?
(Vad gav de för råd till dig?)
3. Övervägde du någon gång att söka vård på annat sätt?
4. Hur många gånger har du besökt akuten?
5. Kan du beskriva den bild du hade av akutvårdsmottagningen innan du kom hit?
(Vad hade du för förväntningar på akutmottagningens väntrum?)
6. Nu när du är här, stämmer den bilden tycker du?
7. Noterade du någon information på någon av dörrarna?
Om ja: vilken information?
8. Vilken information var den första du letade efter när du kom hit? Hittade du den?
9. Känner du till Vårdguiden?
10. Har du sett någon information om Vårdguiden? (Läste du den?)
11. Finns det någon information som du saknar i det här rummet?
12. Vad gör du om du undrar något?
13. Om du skulle berätta för någon som aldrig har varit här hur det går till och vad man ska göra när man kommer in, vad skulle du säga då?
(Jag kommer in här genom dörren, och vad gör jag sen..)
14. Det här systemet du just beskrev, hur tycker du att det fungerar?
15. Om du kunde förändra någonting med systemet, vad skulle det vara?
16. Tycker du att turordningen till att komma in till läkarvård känns rättvis eller orättvis? (Hur känns det om någon som är mer sjuk än dig får gå före dig i kön?)
17. Kan du beskriva det här rummet med tre beskrivande ord?
18. Om du skulle förändra någonting i det här rummet, vad skulle det då vara?
19. Vad skulle få dig att må bättre här?
20. Vad är bra och dåligt med att sitta här och vänta på sin tur? Vad är värst/sämst?

C FLOW CHART



D ACTION RATE CHART

Namn på sjuksköterskor som fyller i detta dokument : _____

Tidsintervall Från kl **12:00** Till kl **24:00**

Dra ett streck för varje typ av fråga som ställs då någon kommer fram till luckan utan kölapp.

Samtal angående:

växelpengar	
mat	
parkering	
taxi	
buss	
väntetid	
vägbeskrivningar till andra mottagningar	
anhöriga som ligger inne	
annat: _____	
annat: _____	
annat: _____	
annat: _____	

Anteckningar:

E QUESTIONNAIRE

Hej! Under våren genomför vi ett förbättringsarbete på Karolinska Sjukhusets Akutmottagning. Genom att delta i den här undersökningen bidrar du som patient med värdefull information. Vi tackar för ditt samarbete!

Kvinna

Man

Ålder _____

1 >> Känner du till Vårdguiden?

Ja Jag har hört namnet Nej

2 >> Innan ditt besök på akuten, tog du kontakt med något av följande:
(kryssa i ett eller flera alternativ)

Inget Husläkare Sjukvårdsupplysningen
 Vårdcentral Vårdguiden Annat _____

3 >> Hur väl stämmer följande ord in på ditt intryck av akutmottagningens väntrum ?
Markera med ett kryss i ringarna.

	Inte alls			Starkt		
	1	2	3	4	5	6
Professionellt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Informativt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Förtroendeingivande	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effektivt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ordnat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Omhändertagande	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tryggt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Modernt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Under Kontroll	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Egen Kommentar/idé _____

4 >> Hur nöjd är du med

	Missnöjd			Mycket Nöjd		
	1	2	3	4	5	6
Information om väntetider	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Upplevelsen i väntrummet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ditt totala intryck	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

F FUNCTION ANALYSIS

N = necessary D = desired G = good to have
 1 = improved well 2 = improved X = unchanged

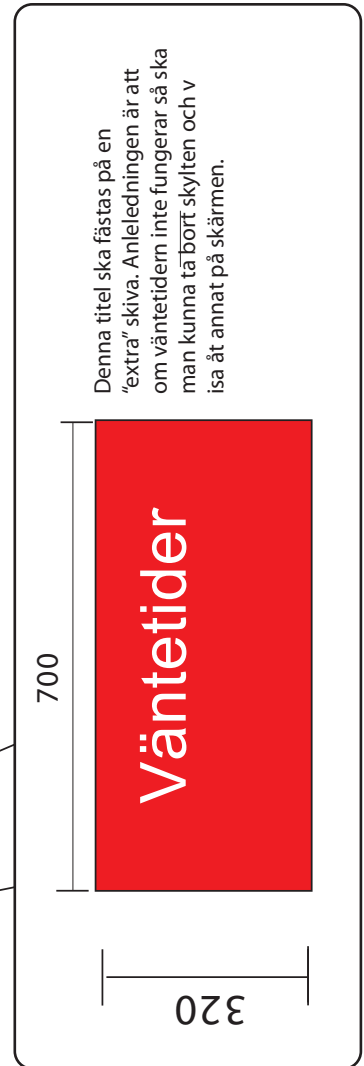
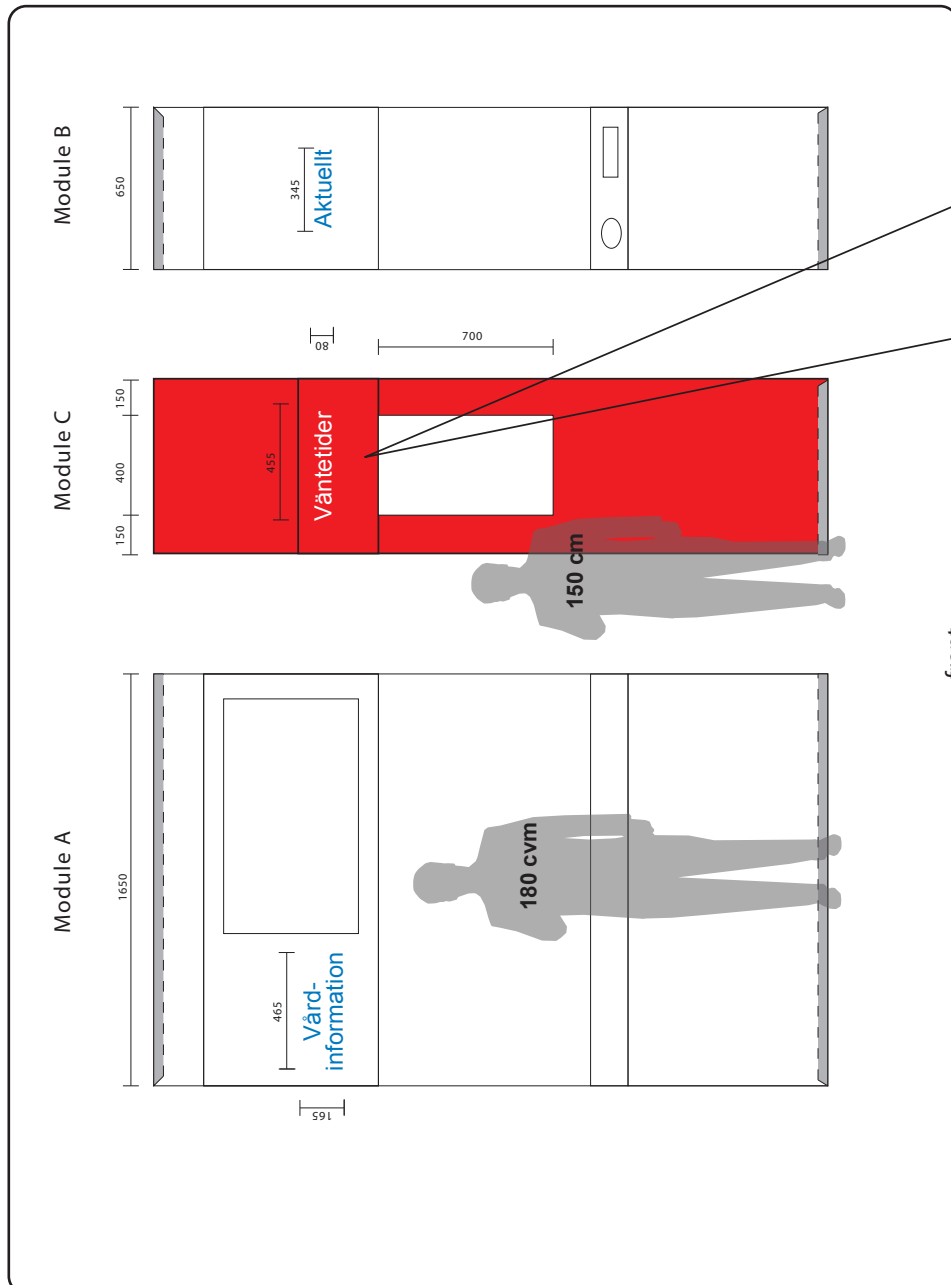
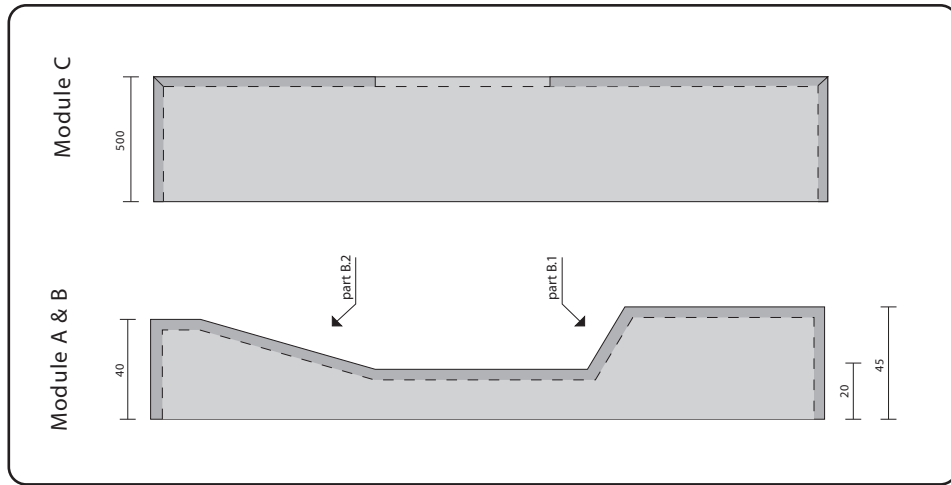
Function		Category	Specifics	
provide	information	D	other care units at Karolinska	2
provide	information	N	personal situation	1
provide	information	D	how to find hospitalized relatives	1
provide	information	D	parking alternatives	2
provide	information	D	coin machine	2
provide	information	D	food alternatives	1
provide	information	D	disinfection	X
provide	information	N	tiolettes	X
provide	information	D	of location (care units)	1
provide	information	D	Vårdguiden	1
provide	information	D	current epidemics	X
provide	secrecy	N	triage and administration desk	1
facilitate	information search	N		1
express	comfort	D		2
express	trust	D		2
express	professionalism	D		1
express	control	D		2
express	calmness	D		2
provide	physical rest	D		X
provide	psychological rest	D		2
provide	easy maintenance	G		X
provide	patient overview	D	from nurses place	X
provide	entertainment	G	for adults	X
provide	entertainment	G	for children	X
minimize	questions	N	patients ask nurses and administration	2
provide	information	G	pain killers	X
show	profession	G	nurse vs administration	X
express	hygien	D		2
provide	disinfection	D		X
provide	information	D	phone	X
provide	information	D	transportation (taxi, public transportation etc)	2
provide	entertainment	D	for teenagers	X
provide	possibility	G	to screen off oneself	X

N = necessary D = desired G = good to have
 1 = improved well 2 = improved X = unchanged

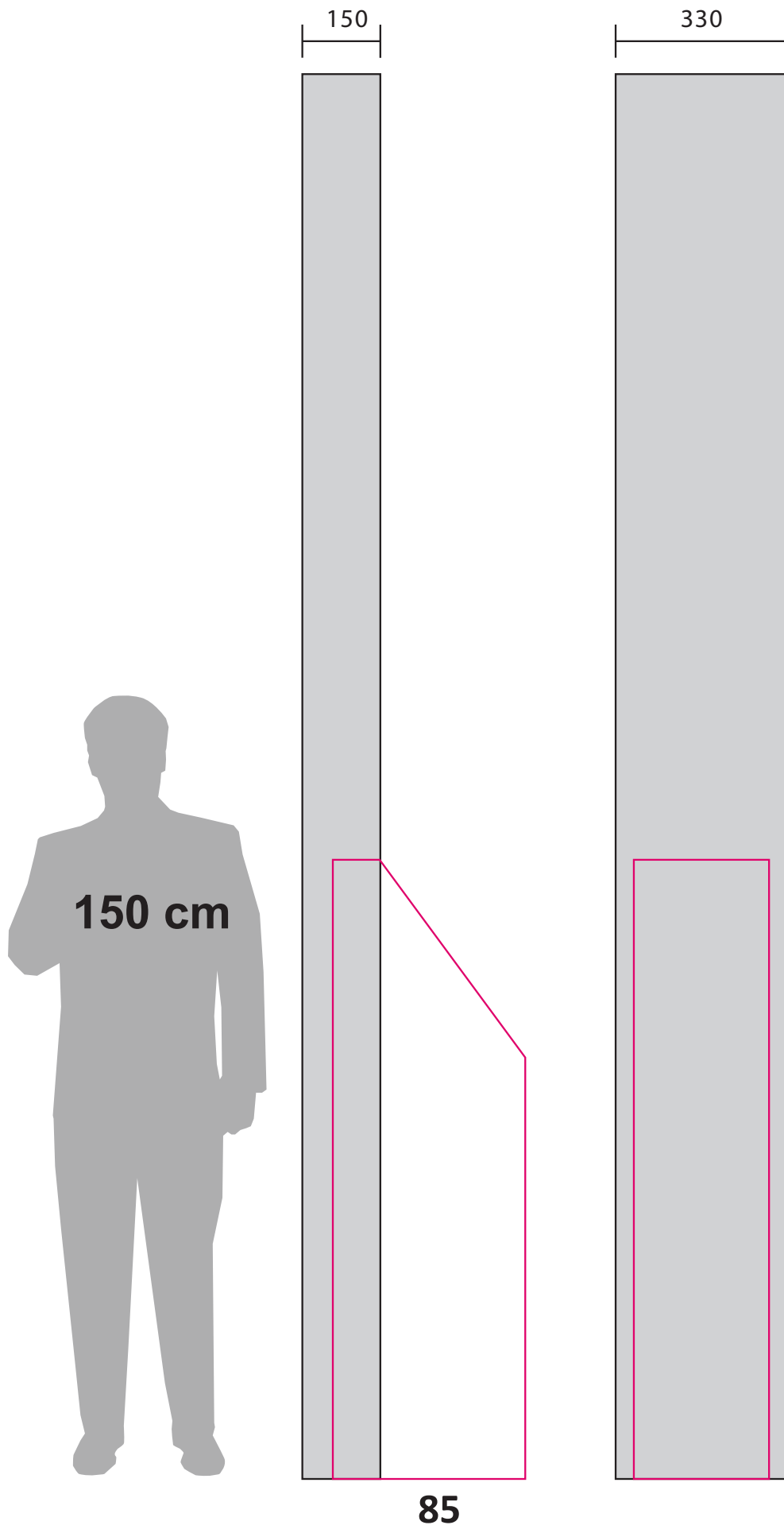
minimize	crowding	N	near the secrecy area	1
provide	information	N	what to do first, when entering room	1
provide	information	N	when and if ticket is necessary	1
provide	information	N	what to do when bleeding/chest pressure	1
provide	information	G	about translator possibilitites	X
allow	crutches	N		X
facilitate	communication	G	between nurse and patient	X
facilitate	language differences	D		2
provide	information	G	gynecologists opening hours	1
incite	sitting	G	while waiting	2
incite	respect	D	nurses desk	2
minimize	dirgardment	D	of cueing system	1
maximize	patient understanding	D	of cueing system	1
minimize	coverage	D	of information	1
express	unambiguousness	N		1
minimize	errors	D		2
provide	working environment	D	comfortable and safe, for nurses and admins	2
facilitate	efficient triage	G		2
facilitate	efficient admin	G		2
facilitate	flow	D	triage and admin	X
provide	information	G	cost and payment ruitnes	X
provide	physical comfort	D	at triage	X
provide	psychological comfort	D	at triage	2
provide	physical comfort	G	at admin	X
provide	psychological comfort	G	at admin	X
educate	visitors	D	about the emergency medical service	2
educate	visitors	G	definition of emergency case	2
educate	visitors	N	primary health care	1
maximize	visuability	D	digital screen (ticket number)	2
indicate	smoking area	G		2
provide	space	N	for wheel chair in waiting room	X
provide	space	D	for luggage in waiting room	2
minimize	infection risk	D		X
minimize	disturbtion	N	for nurses and admins	1

G TECHNICAL DRAWING INFORMATION

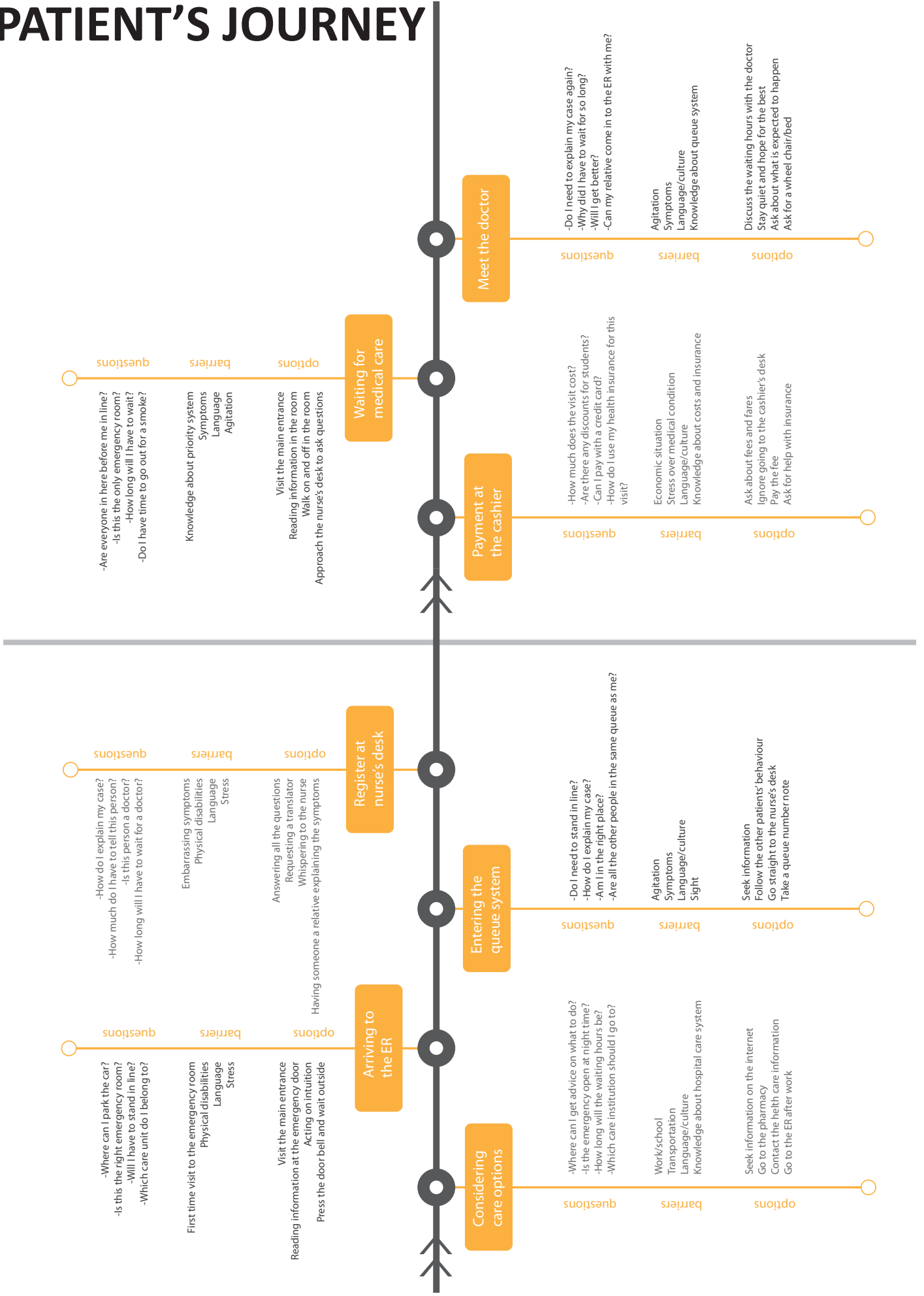
MODULE



H TECHNICAL DRAWING NEW PILAR



I PATIENT'S JOURNEY



J GUIDELINE (1/3)

STAFF

Large impact on the system

- For the implemented solution to be optimally used, it is important that staff is well informed on how to refer to the information when needed.

NOW

- One staff member at every shift should be responsible for the waiting time update or check.

NOW

- It would save the staff time and energy to inform patients where they find further information on the module, during their registration.

NOW

- Administration and nurses need a better notion of what the other team is doing, and by collaboration make the workload more efficient.

2
year

Cheap

Expensive

- Staff wondering the room get "attacked" by patients with questions. Instead of referring to the desk they should ask the patient to take a number from the queue machine. Otherwise the system fails.

NOW

J GUIDELINE (2/3)

SIGNAGE & INFORMATION

Large impact on the system

- Choice of words; clear message, motivating. Not so many "don't" rather more "do:s". Polite, but without using to many courtesy words.
- Less information means more information is read.
- Consistency, the same appearance makes people find info due to recognition
- Eye-height adapted to a short average of peoples height
- There must be a hierarchy in the given information to make it easy and quick to scan.
- Information about that patients with "heart pain and extensive bleeding" should get straight to desk, should be in more than one language. The information should be placed at two places to cover the risk of being missed the first time. The second placement can for instance be on the queue machine. Another reason to have it there is that other patients can see it and get a better understanding for why some people might go straight to the desk without number note.
- Order of words - most people know they need to in some way register which is why they are not the critical users to take a note. The ones that should, but do not, take one are usually the ones with a question or want to ask about a hospitalized relative at the ER. This is why these people's attention need to be caught quickly. Therefore the words "questions" and "relatives" should be put above "registration" on the sign reminding patients to take a note.

NOW

NOW

Cheap

Expensive

- The signs for "nurse" respectively "cashier" should be enhanced. The signs should not only be visible when standing right in front of it. The signs can also include a description on which services are done at the desks, e.g. payment and bills.

NOW

- The digital number display should be visible from every corner of the room. It should also be visible in connection with taking a note from the machine to get quick indication of queue placement and motivate staying in the safe area.

Small impact on the system

J GUIDELINE (3/3)

WAITING TIME

Large impact on the system

- Bad news is better than no news. Displaying estimated waiting time does not only stop people to ask about waiting time, and feel less frustrated, but also might get not acutely sick people to leave.

NOW

- It is better to show an interval of estimated waiting time rather than an exact time. An exact time is taken literally. Also it should not be displayed as number of patients in line to each unit. In case there is a shortage of doctors or an emergency alarm, there might be one patient in line but still hours of waiting. This can be very upsetting for patients and also lower their trust and respect to the doctors.

- When patients have been registered they should get a receipt or a note with their name and the unit for which they are queuing. This makes them know that they are not forgotten, but most importantly they now where they are going and that there are other possible units. This could help to decrease stress over wondering why a person who arrives later gets to see the doctor quicker. A receipt can also be good for the nurses as a proof of that the patient has been registered properly. This eliminates the risk of having patients to occasionally "fall out of the system" due to human error (the nurses pressing cancel instead of save when registering patients).

2 years

Cheap

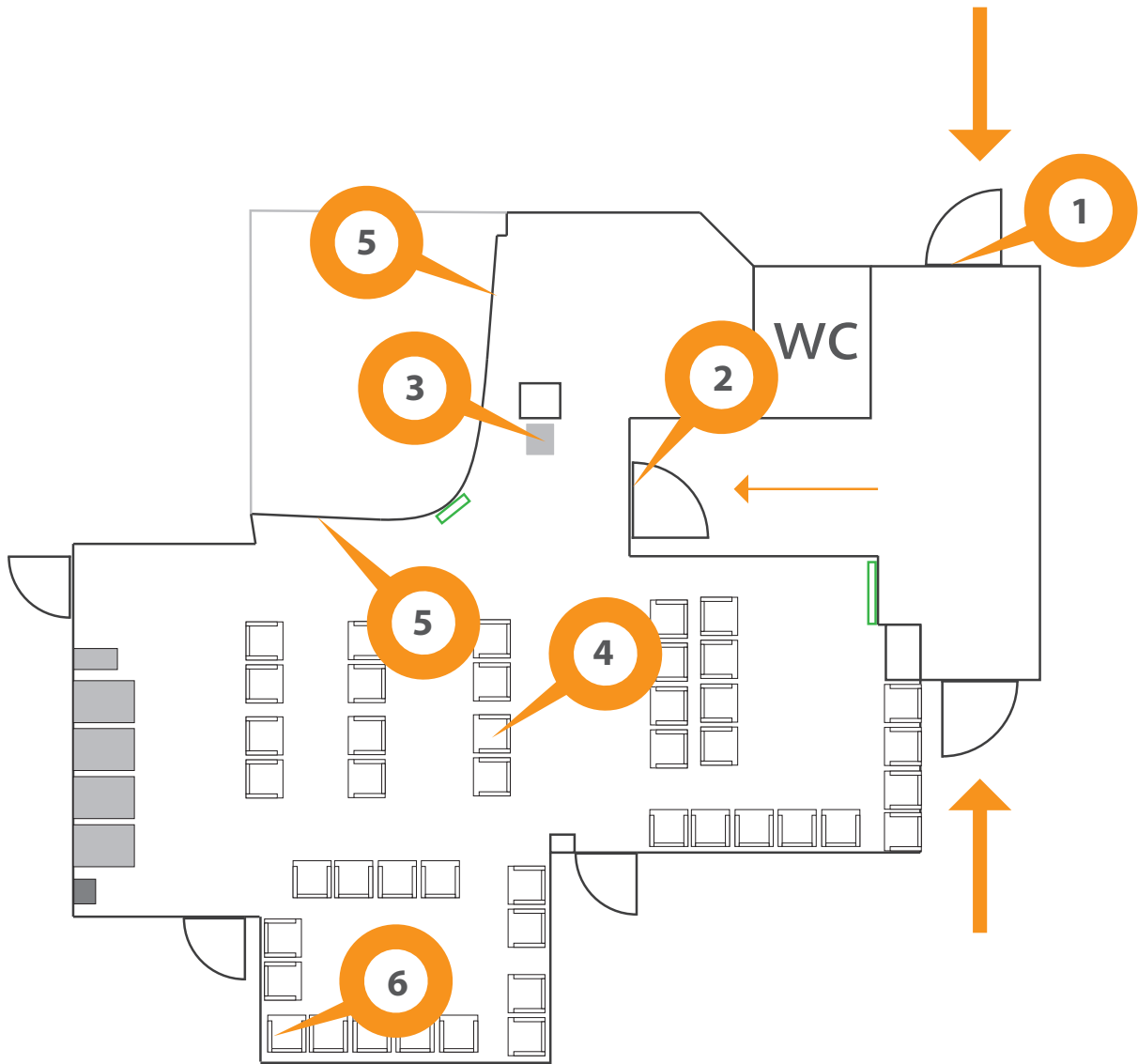
Expensive

Small impact on the system

K EMERGENCY WAITING ROOM (BEFORE)

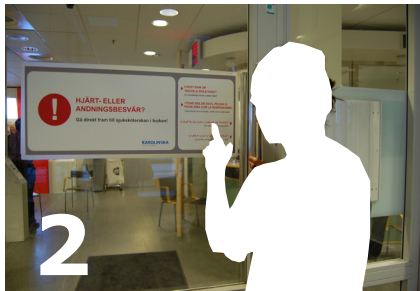


K EMERGENCY WAITING ROOM MAP (BEFORE)

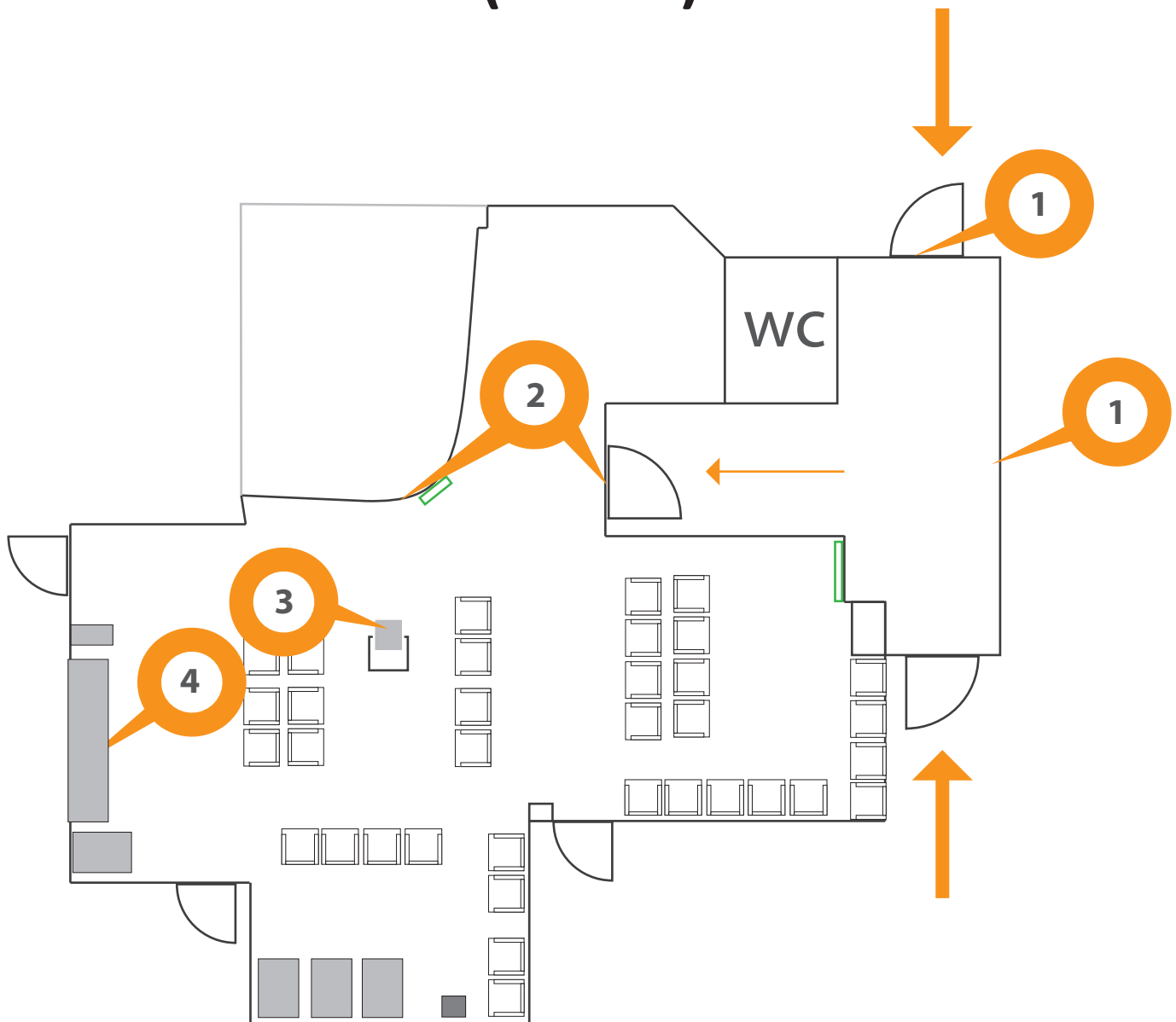


- ① Entering entrance hall
- ② Entering emergency waiting room
- ③ Queue machine
- ④ Waiting for registration
- ⑤ Registration and payment
- ⑥ Waiting for medical care

L EMERGENCY WAITING ROOM (AFTER)



L EMERGENCY WAITING ROOM MAP (AFTER)



- 1** Entering entrance hall
- 2** Entering emergency waiting room
- 3** Queue machine
- 4** Waiting for registration / medical care

M QUESTIONS, RESPOND AND CONSEQUENCES

Step 1

Questions

Where am I exactly?
(Am I at the right place?)

The emergency ward
- gynecology
- neurology
- otolaryngology
- infection
- medicine
- surgery
- orthopaedics

Respond

A sign "Emergency ward" on the outside above the entrance **build-out.**

A sign displaying all units of the ward on the outer door.

Problem

Placement:
Put on the outer door, which can appear to be too early in the system.

Appearance:
The sign is not eye-catching and does not express importance. Weak contrasts and poor usage of fonts. Disappears in the clutter of signs and hand written notes.

Consequence

Visitors do not see the information and when entering the hall they are not entirely sure they have come to the right place. This may lead to that the visitor feels confused, unsure and anxious.

What should I do?

- if I need to get hold of a wheelchair?

There is none so please carry in the person.

- if I need to park the car?

Please use...

- if I have the swine flue?

Please wait outside and call a certain number.

People do not get information about wheel chairs..

Visitors may feel irresolute and go straight to the nurses' desk and ask for help.

People do not get information about parking.

Appearance:
The sign is not eye-catching and does not express importance. Weak contrasts and poor usage of fonts. Disappears in the clutter of signs and hand written notes.

Visitors miss the information and go straight in, like ordinary patients, and cause an infection risk.

Placement:
Put up on the right wall aside of the outer door.

M QUESTIONS, RESPOND AND CONSEQUENCES

Step 1

Questions	System preference	Respond	Problem	Consequence
<p><u>What should I do?</u></p> <p>- if I have chest pressure or excessive bleeding?</p>	<p>Please go in and straight to the nurses' desk.</p>	<p>A sign above the machine inside the waiting room.</p>	<p>The information seems to be late in the system.</p> <p>Appearance: The sign is not eye-catching and does not express importance. Weak contrasts and poor usage of fonts.</p>	<p>Visitors with chest pressure or excessive bleeding will not read the note above the machine. The information should be placed so that it is unmissable and preferably before entering the waiting room in order to prepare the visitors, and to prevent them from even looking for the machine.</p>
<p>- if it is night time?</p>	<p>Please ring the bell and the door will be opened from inside.</p>	<p>A sign and bell outside the outer door.</p>	<p>Placement: Put up on the right wall aside of the outer door.</p> <p>Placement: Disappears in the clutter of signs and hand written notes.</p>	<p>Visitors get frustrated when they are not able to get in immediately. This can lead to that they think they might have come to the wrong place, or that the door is not the entrance. When they get in they might feel upset and.</p>

M QUESTIONS, RESPOND AND CONSEQUENCES

Step 2

	System preference	Respond	Problem	Consequence
What should I do?	Take a queue note and wait	A note machine	<p>Placement: Too close to the entrance.</p> <p>Placement: Partly turned away from entrance.</p> <p>Placement: Not visible from the door used by people entering waiting room from inside the hospital.</p> <p>Placement: Put straight under the digital board showing what queue number is served at the moment.</p>	<p>Visitors go past it or does not see it at once. This can lead to a disordered atmosphere, visitors feeling confused and maybe even go straight to the nurses' desk and ask for help.</p> <p>Visitors do not get an immediate initial indication on how long they are going to wait. Visitors may get an impression they are next since most people are sitting and therefore keep standing by the machine, close to the nurses' desk. This often leads to: poor secrecy for the patient served at the desk at the moment. It can also lead to that latter visitors entering also keep standing and eventually forming crowding which obstructs visitors to find the machine and in the worst case interpret the crowd as a physical line and therefore not take a note.</p>
Do I need to follow the system?	Everybody, except those with chest pressure or excessive bleeding, does.	A sign above the machine.	<p>Placement: Appears too late in the system.</p> <p>Appearance: The sign is not eye-catching and does not express importance. Weak contrasts and poor usage of fonts.</p>	<p>When approaching the machine, visitors have in mind to take a note and might miss the information on the sign right above it. Even if visitors see the sign they may not look at it and read what it actually says. The purpose of the sign is to make visitors who should not stand in line to approach</p>

