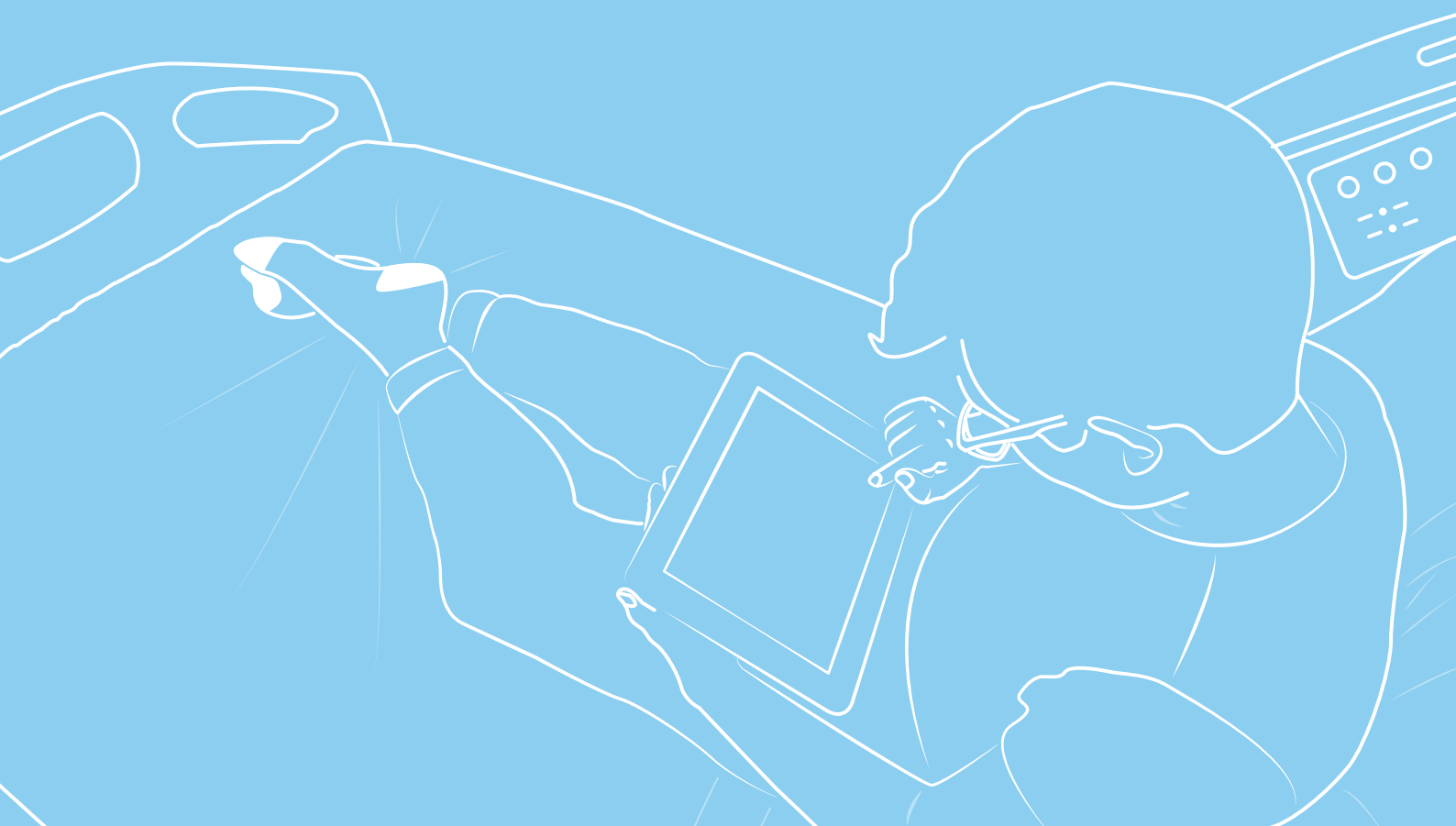
IMPROVING THE PATIENT EXPERIENCE FOR CHILDREN AT THE PAEDIATRIC ACUTE MEDICAL UNIT

Master Thesis
Rochelle Simons



IMPROVING THE PATIENT EXPERIENCE FOR CHILDREN AT THE PAEDIATRIC ACUTE MEDICAL UNIT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Improving the Patient Experience at
the Paediatric Acute Medical Unit

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thank you

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Last but definitely not least, I want to thank all the children and parents that helped me in this project. Even though most of you were at a place where you didn't want to be, you still found time and energy to help me in my research. Without your feedback, I wouldn't be here today.

Rochelle Simons
Delft, April 2018

in a nutshell

EXECUTIVE SUMMARY

An acute admission is a disruption from daily life and affects the child patient and his or her family. To reduce this disruption, the VKC is planning to build a Paediatric Acute Medical Unit (P-AMU) in the coming years. The VKC (Vrouw-Kind Centrum; Woman-Child Center) is the center of excellence in the field of all woman and child healthcare inside of the AMC and VUmc alliance. Their mission puts a strong focus on patients that participate and have control within their own healthcare, which they want to achieve by enacting on their key values, these being: Open, Sensitive, and Innovative.

The P-AMU will provide 24/7 care, and focuses on rapid and effective diagnostics, formulating treatment plans, and starting the execution of said plans within a maximum of 72 hours. Literature research showed many benefits of an AMU from the organizational perspective with the main benefit being; containing chaos in one place makes the other regular nursing departments more plannable, which will improve the quality of care. The main goal of the P-AMU is for children to "...go from home, back home as fast as possible...". However, there is still little knowledge on the effects on the patient experience of such a division.

Literature research about patient experience showed that a better patient experience can increase the quality of care, resulting in more satisfied patients. More satisfied patients are more likely to; complete treatments (e.g. medication regimens), experience a reduced risk in medical malpractice, be loyal, engaged, dedicated, as well as cooperative and compliant. The current patient feedback via CQi lacks understanding of why certain areas are rated lower, and in what way these areas can be improved to receive higher scores.

Design research was conducted to fully understand the patient experience during the paediatric acute admission process. The results identified two main themes; unsure: not knowing when, where, and what to expect; and bored: which occurs during the many moments of waiting. This uncertainty consists of two kinds; the medical uncertainty and the uncertainty about the process, where the medical uncertainty is a stable factor and the uncertainty about the process is a variable. The patient journey clearly showed more fluctuation in patient's emotions and more innovation opportunities at the emergency department (ED) in comparison to the paediatric nursing department. Therefore, improving the patient experience at the P-AMU already starts at the ED.

In the design research, various innovation opportunities were identified. With feedback from the heads of the paediatric divisions of both the AMC and VUmc, the design goal was formulated as followed:

*"Design a tool that **improves the communication** of child patients and parents with the healthcare system about the acute admission process, and that puts the **children in control** in a **playful** and **understandable** way, in order to make them feel **less unsure and bored** during the acute admission."*

To guide the design process, an interaction vision was formulated that projects the interaction qualities. This was done by means of

the metaphor of 'playing with LEGO'. When children play with LEGO, they can decide what to build and how to build it (*in control*). The kits have an instruction manual that visually explains how to build their kit, so they are able to do it by themselves (*guiding*). However, it is also a lot of fun to do it with a parent or with other kids (*engaging*)! The various little bags in the kit give them the opportunity to make additions or build different version of the kit. In this way it stimulates playful freedom and creativity (*playful*). By giving them boundaries for creativity it enhances their ability to be creative (*clear*).

An iterative design process was performed where child patients, medical professionals, and technical and design experts provided feedback from their perspective on the intermediate designs. This eventually led to the development of the final concept design, 'Mijn Buddy' (Figure 1). 'Mijn Buddy' is a digital application designed for children, aged 8-13 years old, that provides insights into the acute admission in order to reduce uncertainty about the acute admission process This will eventually lead to a better patient experience. The connection of 'Mijn Buddy' with EPIC, the digital patient record, makes sure the journey is personalized and adjusted to a patient's individual situation to provide the right information at the right moment. It helps child patients and parents to manage their expectation by providing information about what, who, where, and when things will happen.

The core principles of 'Mijn Buddy' are:
1. Giving an overview of the general acute admission process
2. Personalizing the journey along the way via real-time data from EPIC
3. Providing information about every step in the journey in an understandable and playful way
4. Providing fixed guidance by means of a 'Buddy' that helps and guides child patients, and parents, during the acute admission
5. Showing insights into the treatment team
6. Showing an indication on waiting time and therefore change the perception of it
7. Giving the child patient a feeling of control

An interactive prototype was developed to evaluate 'Mijn Buddy' with both a number of child patients and (non-patient) children in their home environment as well as paediatricians and ED-doctors. The feedback and outcomes of this evaluation study were very positive. 'Mijn Buddy' increased the knowledge about an acute admission for appendicitis, so it can be assumed it will reduce the uncertainty about the admission process. Children perceived the use of the app as fun and easy to use. Not only did child patients that were unfamiliar with the hospital and their journey see a clear added value, familiar patients also perceived the information provided by 'Mijn Buddy', like who to expect and when, as useful. Recommendations to further improve the design were also identified from this evaluation study, such as showing the possibility of a transfer to another hospital in the patient journey.

'Mijn Buddy' was only tested with one kind of acute admission (appendicitis), whereas there are a variety of reasons for an acute admission. Further research and pilot tests are needed to implement the application in the current healthcare system. 'Mijn Buddy' has the potential for many future extensions and build-ins like feedback surveys and pain level measurements. Furthermore, with small adjustments 'Mijn Buddy' can also be valuable for a larger age-range. It is recommended to bring 'Mijn Buddy' into the market in various sub-phases with continuous testing, adjusting, and developing.

Figure 1 *The 'Mijn Buddy' application - insight into your acute admission process in order to reduce uncertainty about the process.*

READING GUIDE

In this report, different indications will be used to indicate various items, like quotes and conclusions and insights.

CONCLUSIONS & INSIGHTS

"Quotations"

GLOSSARY

To create consensus about the meaning of various terms used in this report, the definitions are formulated. Here, a list of definitions in alphabetical order is given.

Actors
People, products, and processes surrounding the patient that actively contribute to the health of the patient.

Acute admission
An acute admission is a clinical admission that is unexpected and therefore not planned.

Patient
A person under treatment of a medical specialist.

Patient Experience
The way a patient experiences, or feels about, the interaction with actors within their received healthcare, which is influenced by a user's internal state, the moments of interaction, the context within which the interactions occur, and the characteristics of the designed healthcare system.

Patient Journey
The complete journey of a patient that will undergo a medical treatment, starting from the first symptoms to healing.

Patient Satisfaction
A patient's rating of satisfaction with the received care. It can be seen as a patient's end-state of an individual's assessment of goal attainment. (La-Vela & Gallan, 2014).

Top-referral care
Care is divided into high, medium, and low complex care, top-referral care addresses the high-complex care.

ABBREVIATIONS

AMC
(NL: Academisch Medisch Centrum) Academic Medical Center; a collaboration between the University Medical Center Amsterdam and the University of Amsterdam.

AMU
(NL: Acute Opname Afdeling) Acute Medical Unit; clinical department where unexpected/ acute patients are admitted which focuses on rapid and effective diagnostics, formulate treatment plans, and start executing them within max. 72 hours.

CQi
Consumer Quality Index; annual survey to measure the patient satisfaction. They are executed by all UMC's in the Netherlands, and commissioned by NFU to create the annual NFU benchmark.

ED
Emergency department; the department treating all acute medical cases in the hospital.

EPIC
The company providing the electronic (or digital) patient record system. Both the AMC and VUmc are using EPIC for their electronic patient records, or EPD (NL: Elektronisch Patiëntendossier).

NFU
(NL: Nederlandse Federatie Universitair Medische Centra) Dutch Federation of University Medical Centers.

NPS
Net Promoter Score. The NPS is a management tool to measure the customer loyalty. This is score is determined by answering the question; "How likely would you recommend our organization to a friend or colleague?" The answer ranges between 1-10 and the scores are between -100% and +100%. The percentage of customers who are promoters (P) and subtract the percentage who are detractors (D). This equation is how we calculate a company's NPS: P – D = NPS (Reicheld, 2006)

P-AMU
Paediatric Acute Medical Unit; a unit that provides acute medical care for children (0-18 years) which focuses on rapid and effective diagnostics, formulate treatment plans and start executing them within a maximum of 72 hours.

UMC
(NL: Universitair Medisch Centrum) University Medical Center; a hospital carrying out top-referral patient care. This is associated with special and often expensive and complex, diagnostic, procedures and treatment. Within the top-referral domain, each UMC has its own specialties, which usually reflect core areas in medical research. (AMC, 2010)

VKC
(NL: Vrouw-Kind Centrum) Woman-Child Center; the collaboration between the women and child care Division C/E of AMC, and Division III of VUmc.

VUmc
(NL: Vrije Universiteit Medisch Centrum) A collaboration between the UMC and the 'Vrije Universiteit' in Amsterdam.

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08 // EVALUATION STUDY

09 // CONCLUSION & RECOMMENDATIONS

INTRODUCTION

This thesis aims to provide insights into how to improve the Patient Experience (PX) of acutely admitted child patients at the future Paediatric Acute Medical Unit (P-AMU). Through design research, a better understanding of the PX in acute situations is created. Based on the insights found here, a design solution is presented that improves the PX for paediatric acute admissions.

The VKC

The focus department in this thesis is the VKC (Vrouw-Kind Centrum; Woman-Child Center), which is a collaboration between the AMC and VUmc. In the coming years, a full collaboration on all divisions will become reality between the two hospitals. The VKC will mainly operate at the AMC, which will also be the location for the future P-AMU. VKC's vision is for patients to participate and have control within their own healthcare, which they want to achieve by enacting on their key values, these being: Open, Sensitive, and Innovative.

Paediatric Acute Medical Unit (P-AMU)

The P-AMU is one of the plans within the alliance to improve paediatric healthcare. An acute admission is considered a disruption from daily life and affects the child patient and his or her family. To reduce this disruption, the VKC is planning to build a P-AMU in the coming years. This is a clinical department that will provide 24/7 care, and focuses on rapid and effective diagnostics, formulating treatment plans, and starting the execution of said plans within a maximum of 72 hours. The main goal is for children to go back home as quickly as possible. Medical professionals consider this to be in the child patients best interest.

Scope

The scope of this thesis falls within improving the PX for children at the P-AMU, which means it is broad and has many factors at play. The scope was narrowed down and redefined in the process. In the beginning, the scope included all acutely admitted child patient (0-18 years old), excluding oncology, psychiatric and intensive care admissions, via all possible routes such as the Emergency Department (ED) or transfers from other hospitals. During the design research, the scope was redefined by improving the PX at the P-AMU by enhancing the communication about the acute admission process for 6-16-year-old children. This was only focused on acute admission via the ED.

Problem definition

Currently, plans are being made for the development of the P-AMU. This is mainly done from a management and organizational perspective, this including focusing on issues such as determining the amount of beds needed and the necessary qualifications of nurses. However, the patient perspective is not yet focused on in this stage of development.

Multiple studies have shown a positive effect of an AMU. The benefits include shorter lengths of stay, a decrease of waiting time for patients at the ED, higher discharge rates, improved bed management, smoother patient flows, and higher efficiency of resources (Moloney, 2005) (St Noble, 2008) (Scott, 2009) (Subbe, 2011) (Vreelandgroep, 2011) (Holleman, 2015) (van Galen, 2017). However, there is still little knowledge on the effects of such a department on the PX. The effects of the P-AMU on the PX could not be included in the research of this thesis since the P-AMU doesn't exist yet. Nevertheless, insights form the research into the current PX of acute admissions can be taken into account when developing the P-AMU.

The AMC and VUmc use the Consumer Quality Index (CQi) to rate their care and as a way to get

feedback from patients. However, this is measuring the patient satisfaction rather than the PX. So, research is needed to gain a deeper understanding of the PX of paediatric acute admissions in order to improve the PX.

Methodology & design process

The assignment given at the beginning of this project doesn't describe a clear, well-defined problem. PX is a complex phenomenon consisting of many influences. Therefore, it can be described as a 'wicked problem' (Lindberg et al., 2010). The Design Thinking Methodology focuses on creating design solutions for these wicked problems for a unique user group (Figure 2). This user-centred method was used to structure the design process within this thesis. Every step in the process is defined by a diverging phase, where choices are created; a clustering phase, where choices are categorized; and a converging phase, where choices have to be made (Buijs, et al., 2009) (Figure 3).

This thesis consists of four phases; research & empathize, define, ideate, and test & evaluate. However, throughout the design process continuous researching, defining, and evaluating takes place. Figure 4 provides an overview of the design process of this thesis and the corresponding chapters of this report.

Research

The first phase of the project is to empathize with the stakeholders and to understand the problem in its respective context. To understand the context, field and literature research about the VKC (Chapter 1) and the principle of an AMU (Chapter 2) is done. The field research includes interviewing medical professionals and shadowing at an AMU for adults. Literature research into PX developed a better understanding of its definition and included factors, and provided insight into how to research it (Chapter 3). The current patient feedback data is analyzed to get a better understanding of the current patient satisfaction and the occurring problems.

The insights from the field and literature research are applied to setup and conduct design research. This qualitative user research includes sensitizing booklets and interviews with child patients, to provide insights into the patients and parents' expectations, emotions, needs, and experiences, and to gather information about the process of an acute admission (Chapter 4).

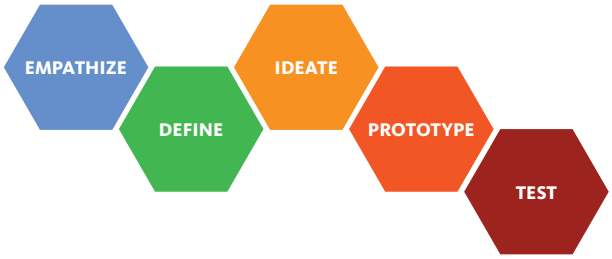


Figure 2 *The different steps within the Design Thinking method*

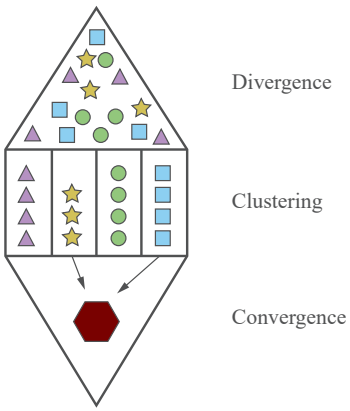


Figure 3 *Version 6.1 of the Creative Problem Solving Model*
Source: Isaksen & Treffinger, 2004 (Buijs et al., 2009)

INTRODUCTION

Define & Ideate

By combining the insights from the literature, field, and design research, three main innovation opportunities were identified. To redefine the focus, one of the innovation opportunities was chosen. A design brief was defined, describing the design goal, interaction vision, interaction qualities, and a list of requirements and wishes (Chapter 5). In the conceptualization phase (Chapter 6) the possible concept directions within the design goal were explored. Creative tools such as How To's, 5W's & 1H, and multiple brainstorming sessions were used in a creative session with designers and fellow design students. Three main concept directions were identified. One of the directions was chosen, and through multiple iterations with child patients, medical professionals, UX designers, an e-Health manager, a childcare worker, a PR representative, and a medical applications specialist, a final concept design was created (Chapter 7).

Evaluate

To evaluate the final design, an interactive prototype was developed and tested in an evaluation study with child patients at the hospital, as well as children in their home environments (Chapter 8). Finally, recommendations for further research and development, and implementation were proposed (Chapter 9).

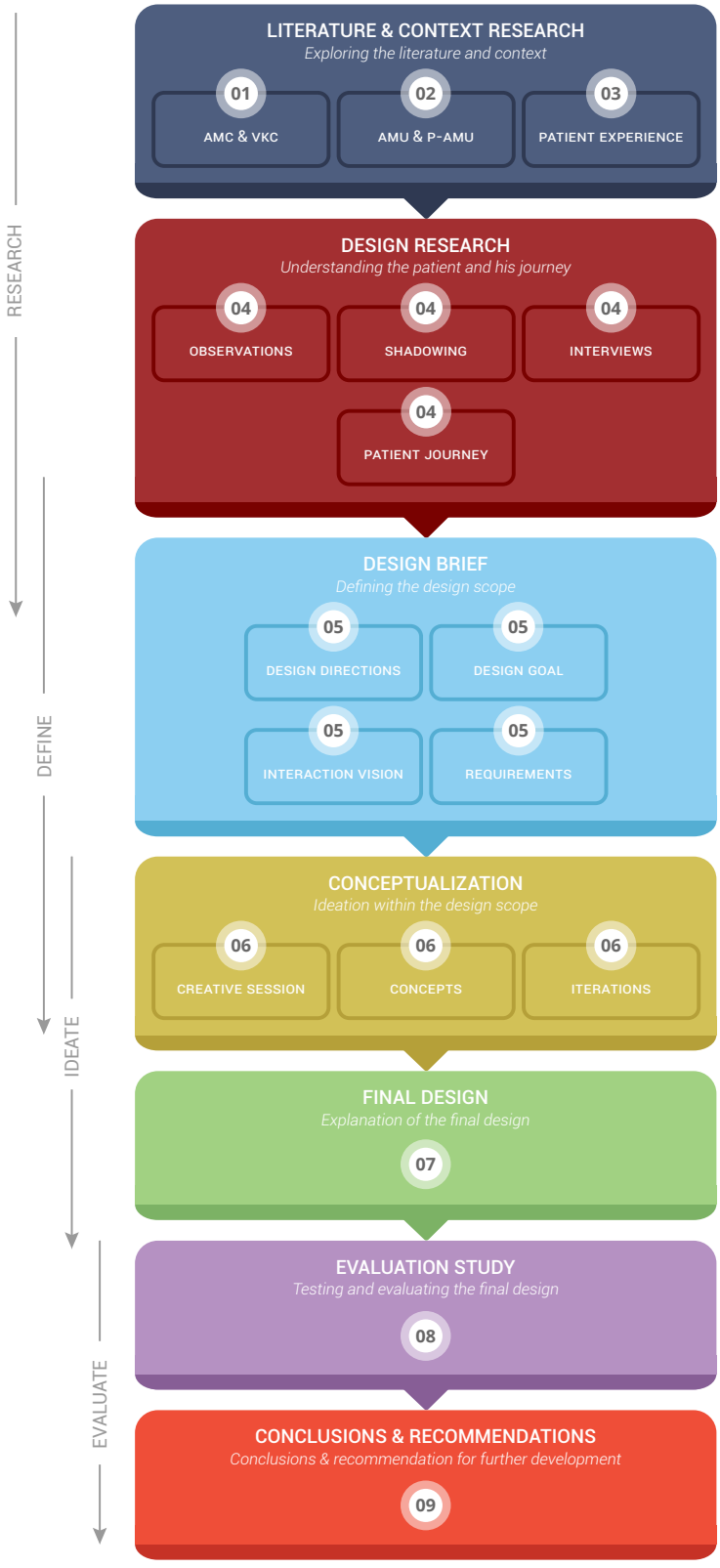


Figure 4 *Overview of the structure of this thesis and report*


amc
Universiteit van Amsterdam

01 THE VKC

This thesis aims to provide insights into how to improve the patient experience (PX) of acutely admitted child patients at the future Paediatric Acute Medical Unit (P-AMU), which will be located at the VKC within the AMC. The AMC (Academic Medical Center) in Amsterdam is a medical university center that provides care, treatment, and research. The AMC and VUmc (Vrije Universiteit Medical Center) are currently merging into one organization. Some divisions, including VKC (Vrouw-Kind Centrum/ Woman-Child Center), are ahead of the transitions and they are already creating a plan to combine and integrate the women and child care. A new division within the VKC will be the AMU (Acute Medical Unit) specialized in child care. This thesis will focus on improvements of the patient experience of that P-AMU.

THE AMC & VKC

1.1 The AMC

The Academic Medical Center, or AMC, in Amsterdam is a medical university center. The AMC's three main tasks are: patient treatment, education and training, and (scientific) research (AMC, 2016). Both the AMC and VUmc (Vrije Universiteit Medisch Centrum) belong to the eight University Medical Centers (UMC's) in the Netherlands, where the AMC was the first one established in 1983 (AMC, 2009). A UMC provides care, treatment and research for more complex medical conditions or top-referral patient care. The focus areas of the AMC are:

- Cardiovascular diseases
- Infection and Immunity
- Gastrointestinal diseases
- Neurological and psychiatric disorders
- Oncology
- Public Health and Epidemiology
- Woman-Child (inclusive reproductive science) (AMC, VUmc, 2013).

In the Netherlands, the healthcare for rare diseases are mostly accommodated in centers of excellence, so knowledge and experience about that rare disease is centered in one place. In 2015 the Dutch government assigned 32 rare diseases to the AMC as a center of excellence to provide top-referral care. This means that the AMC is one of the front runners of centers of excellence. (AMC, 2016).

1.2 The merger of AMC - VUmc

Since 2011, the boards of the AMC and VUmc are exploring the possibilities to create an Academic Medical Alliance. In September 2017 this alliance has been approved by all parties involved, and from 2018 on the transformations will start.

This merger will mainly be applied to the administration and board, meaning the current separate locations of AMC and VUmc will remain the same. The main objectives for the alliance are:

1. Creation of 'Center of Excellence' per division for research and care

The AMC and VUmc have specific knowledge and expertise in several areas. Combining the knowledge, expertise, patient groups and specific infrastructure at both locations will lead to several 'centers of excellence' that provide very high (technology based) care.

2. Increasing the quality, accessibility, and functionality of the 'high complexity/low volume'-care

To guarantee quality, innovation, accessibility, and functionality of the patient care, it is necessary to centralize several illnesses or treatments. Especially because the top-referral care creates demands on the volume to maintain the high-quality standard for the provided care.

3. Intensifying coordination and direction of the acute care

A more intense collaboration on acute care is necessary to increase the capacity of the acute care particularly in the geographical areas of Noord-Holland and Flevoland, both in size as in complexity. (AMC, 2011)

1.3 The VKC

The Woman-Child division within the AMC is called the C/E division; here all medical care for women and children is united. The children's care within the C/E division is called Emma Children's Hospital. The Woman-Child division consists of the sub-departments Gynaecology, Obstetrics, Reproductive Medicine, Oncological Gynaecol-

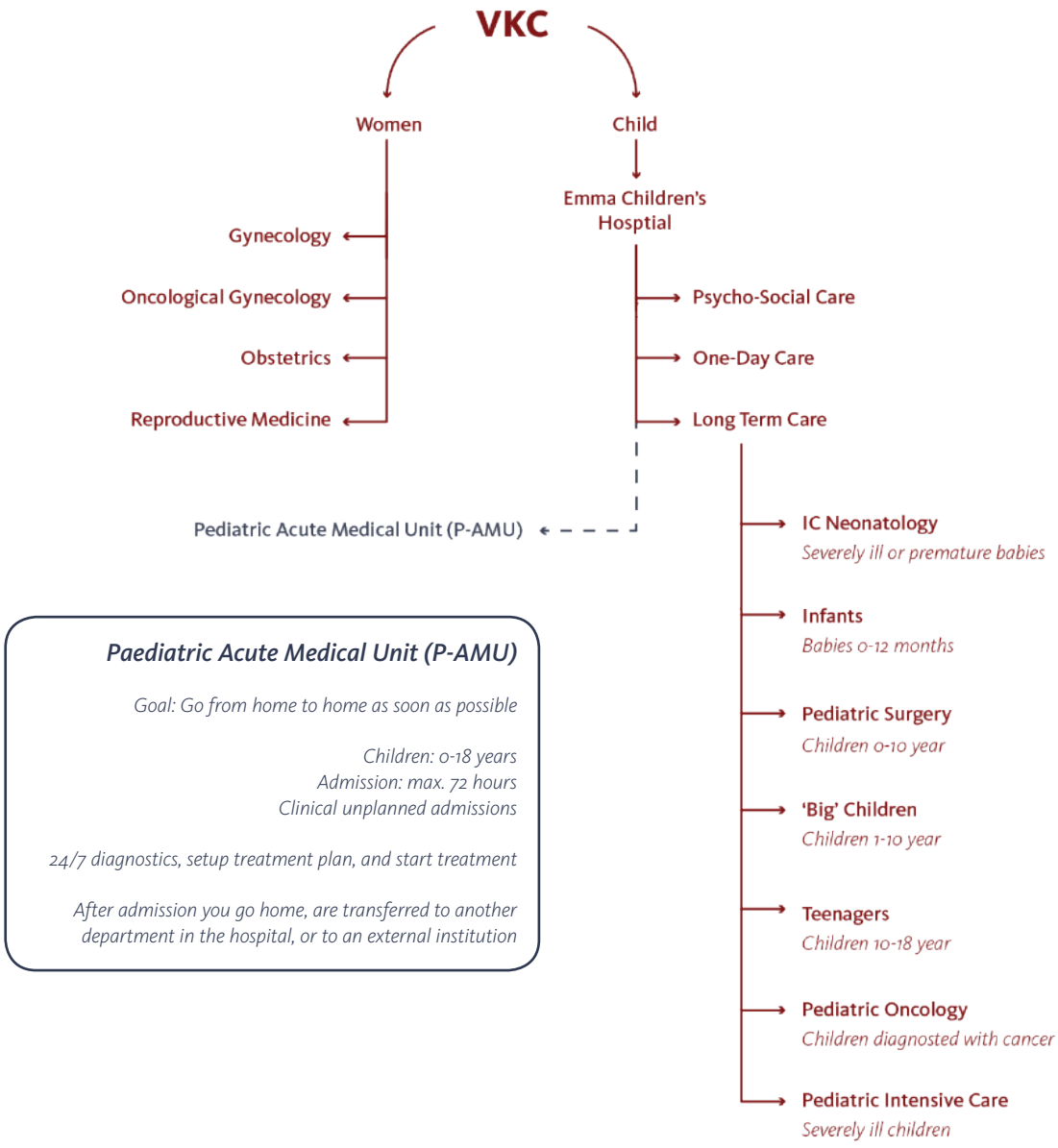


Figure 5 *The structure of the Woman-Child departments of the VKC; Vrouw-Kind Centrum (AMC & VUmc)*

ogy, and the Emma Children's Hospital. Figure 5 gives a first glance at this complex division. As one can imagine, this division has to deal with a wide variety of patients, diseases, needs, and wishes. With the help of scientific research and the latest technologies, the care being provided is continuously improved. AMC's goal is to provide medical assistance with consideration of the environment, wishes, and cultural background of patients (AMC, 2010).

The center of excellence around all woman and child healthcare is called Vrouw-Kind Centrum, or VKC (Woman-Child Center). The Woman-Child division of the VUmc is called Division III. The merger of these divisions of VUmc and AMC according to the alliance is the VKC (Figure 6). The divisions of both UMC's were already collaborating with each other and therefore they are ahead of the developments of the alliance (AMC-VUmc, 2011). This new center will be one VKC, operating at two locations. However, it will be mainly located at the AMC, whereas only a small part of the children's care will stay at the VUmc (AMC,VUmc, 2013).

In Figure 7, an illustration is given that explains how the centers of excellence are divided between the 'AMC; Meibergdreef (MBD)', and 'VUmc; Boelelaan (BL) and Louwesweg (LW)'. The main location of the VKC is the MBD. The paediatric AMU will be located at the MBD.

VKC's goal

The goal of the VKC is to provide care for patients with all kinds of complex and specific illnesses, or top-referral care, by taking into account the development and social surroundings of a patient, his or hers friends and family, and their care network. They want to work towards a situation were they can guarantee care for 99% of the patients needing complex care. Within 5 years they want to belong to the top 5 of woman-child centers in Europe when it comes to both care and research (VKC, 2018).

VKC vision

The VKC provides care, together with the patient and his or her social environment, derived from the best available evidence. The patient and the family are at the center of this care model, which is based on shared decision making and it fits the level of development or stage of life of the patient. Maximum opportunities are provided to the patient despite his or her illness.

Participation and control lies with the patient

Every patient is, before anything else, a person with their own values, history, and expectations of life. This requires a good collaboration between the VKC and the patients, their social network, the different expertises within the treatment teams, and the world outside of the organization. The VKC aligns their care as much as possible to the individual situation of the patient (VKC, 2018).

Figure 6 *VKC is a collaboration between AMC and VUmc on the Woman-Child departments*

Figure 7 *Centers of excellence of the Vrouw-Kind Centrum (VKC) divided over the AMC and VUmc*

THE AMC & VKC

VKC values

At the VKC, collaboration consists of three values; Open, Sensitive, and Innovative. (Figure 8) These will be clarified below (VKC, 2018).

"We are: Sensitive, Open, Innovative"

Open

The VKC wants to be approachable and accessible for their patients, their family and friends, colleagues, and others. They want to be open and transparent in their communication by providing high-quality and honest information that is easily accessible. An open atmosphere is the base for safely providing and receiving feedback. This is needed to realize the best results in patient care, research, and education. E-health techniques give patients the opportunity to improve their health, especially from their own environment. When possible and desirable they are in control of their treatment.

Sensitive

Attention is paid to a patient's psychosocial, social and cultural context, medical history, and current situation. Their quality of life is at the center of the VKC care model. Because of these principles it is assumed that patients feel seen, heard, welcome, important, and safe. The VKC takes into account societal development and changes in needs and demands in care. They want to be caring and loyal towards colleagues and respect other opinions. Individual qualities of the employees will be recognized and leveraged upon.

Innovative

Being innovative means the continuity of provable improvements of healthcare. Scientific research and implementation of research findings in clinical care are very important. The VKC want to develop and evaluate new ideas and techniques. They are not just treating illnesses, they are treating the patient in the context of his or her family and personal environment including school, family, or work.

CONCLUSION & INSIGHTS

The VKC will be going through some major changes elicited by the alliance between the AMC and VUmc. Since the care will be reorganized there is an opportunity to integrate the patient experience in their plans. Within the mission of the VKC the participation and control lies with the patient. The key values of the VKC are 'Open', 'Sensitive', and 'Innovative'. These need to be taken into account during this thesis.

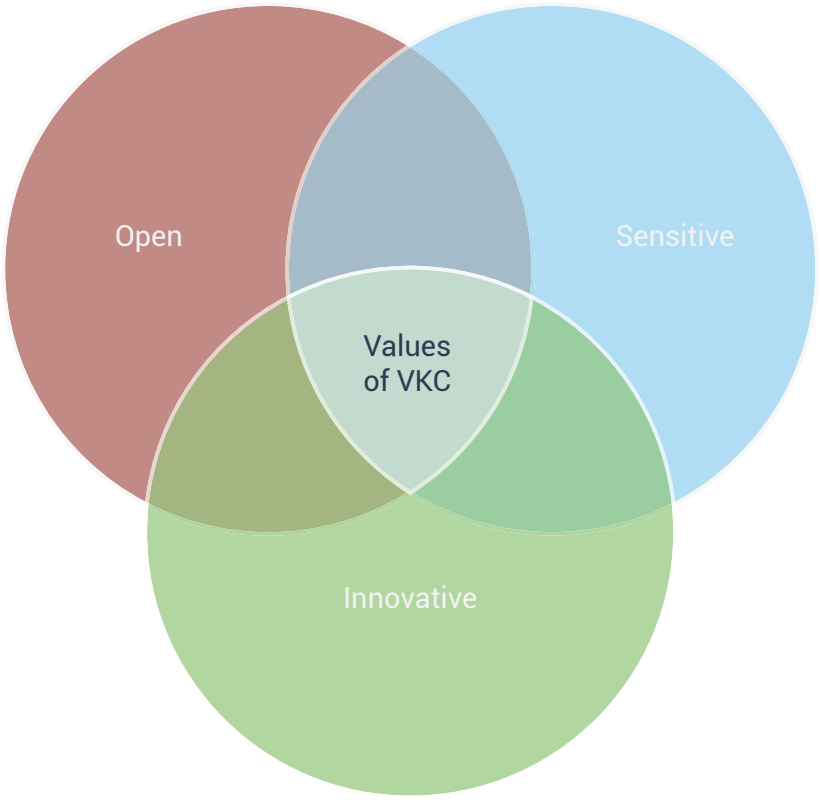


Figure 8 *The key values of the VKC; 'We are: Sensitive, Open, Innovative'*

02 THE ACUTE MEDICAL UNIT

The Dutch acute healthcare system is constricted due to the aging population, budgetary limitations, higher expectations of care, shortage of beds, and an increase in acute admissions at the Emergency Department (ED) for the last decade (van Galen, 2017) (Scott, 2009). Around 35 percent of all medical care in the Netherlands is categorized as acute, and in 2014 the C/E division had the highest number of acute admissions (AMC, 2010)(Holleman, 2015). As a result, hospitals are looking for a way to cope with the huge influx in required acute medical care. Several research studies have shown that an AMU could be a solution to many of these concerns. An AMU is a specifically designed department to provide care to acute illnesses for up to 72 hours with the main goal to create a more organizable nursing department and to send more patients home in a shorter period of time. AMUs in England and Australia are already widely implemented and have proven their advantages such as reduced length of stay, and higher discharge rate for adult care (Moloney, 2005) (St Noble, 2008)(Scott, 2009)(Subbe, 2011)(Vreelandgroep, 2011) (Holleman, 2015) (van Galen, 2017). Since 2000, the number of AMUs in the Netherlands has been rising; however they all exclude admissions of pregnant women and children. Currently, there are only a few AMUs specialized in paediatrics worldwide. The VKC wants to implement the first paediatric AMU in the Netherlands. Several professionals were interviewed to get a good understanding of the current plans and perspectives on the P-AMU.

"What happens when an acute admission is taken in is that all the attention goes to that one admission and the quality and safety of the rest of the division falls back." - Nursing Manager

THE ACUTE MEDICAL UNIT

2.1 Definition of an AMU

The Acute Opname Afdeling (AOA), the Dutch name, has many English synonyms such as Acute Planning Unit (APU), Acute Medical Ward (AMW), and Acute Medical Assessment Unit (AMAU) (Scott, 2009). The 'Acute Medical Unit' (AMU) is the most common name and will also be used in this thesis. An AMU is often referred to as a 'Short-Stay Unit, so it is important to state the difference, Scott et al has defined an AMU as:

"Designated hospital ward specifically staffed and equipped to receive medical inpatient presenting with acute medical illness from emergency departments and/or the community for expedited multidisciplinary and medical specialist assessment, care and treatment for up to a designated period (typically between 24 and 72 h) prior to discharge or transfer to medical wards" (Scott, 2009)

Therefore an AMU is different from the regular nursing departments, as can be seen in Table 1. Implementing an AMU has an effect on the regular nursing departments. The main effect is that unexpected admissions, that create chaos in regular nursing departments, are now focused in one place which makes the other nursing departments more plannable and less hectic.

"You create chaos at one place and you take away chaos at other places" - Manager ACU AMC

2.2 Advantages & disadvantages

Research has shown various advantages of implementing an AMU (Table 2). Rapid assessment, diagnosis, and treatment is possible when working with a multidisciplinary team led by an acute medical professional and a well-equipped environment, resulting in a shorter length of stay (LOS), shorter waiting times for patients at the ED, higher discharge rates (DDR), improved bed management, smoother patient flows, and higher efficiency of resources (Moloney, 2005) (St Noble, 2008)(Scott, 2009)(Subbe, 2011)(Vreelandgroep, 2011) (Holleman, 2015) (van Galen, 2017). Around 70% of all the patients that register at the ED qualified for admission at the AMU according to Scott et al. Of those patients 20-50% were discharged within 48 hours* (Scott, 2009)(van Galen, 2017)(St Noble, 2008).

*It should be noted that the literature on AMUs is mostly based on regular hospitals and not specifically a UMC. The top-referral care at UMCs could affect the results of LOS, DDR, and RR (readmis-

AMU	Regular nursing department
24/7 admissions	Admissions during office hours
Emphasis on diagnostics	Emphasis on treatment
Many disruptions	Few disruptions
Multiple specialisms	1 or 2 specialisms
Short admission duration	Long admission duration
Frequent discharges	Less discharges

Table 1 *Difference between AMU and regular nursing department (Presentation AMU, VUmc)*

sion rates). According to Browne (2000), a Short Stay Unit was successful in both general and academic Children's Hospitals. However, there is little research about the application for an AMU specialized in children within a UMC.

Within the AMU, doctors will perform more visits, making sure the first visits take place in the morning so steps can be taken immediately and no time is wasted in the treatment of the patient. It is essential that these visits are multidisciplinary so decisions can be made quicker, everyone is on the same page, and everyone knows what he/she needs to do. The goal of these visits is to get a clear clinical picture of the patient's situation, determine/adjust the treatment plan, and to communicate with and inform the patient. The downside of multidisciplinary visits is that it is very difficult to get all doctors in one room at one time due to their full schedules. Furthermore, expectations of quick decision making can put more pressure on doctor's already overloaded workloads. At the AMU it is important that one person coordinates the process and really emphasizes the patient's needs.

"The AMU aims for generalization, so the specialisms aren't leading. Often if something isn't designated to one specialisms, no one will take action."
- Acute Internist AMU & ED AMC

For the VKC, building this new division is only efficient when there are enough patients that would qualify for an admission at this division. The planned location for this new division has approximately a maximum capacity of 24 beds. In a report, the AMC explored the possibilities of an AMU. Data from 2014 showed that at the C/E (Woman-Child) division 42% of the patients were admitted for more than 72 hours. This means that

Advantages	Disadvantages
Increases quality of care	Possibly extra transfer for some patients
Increased multidisciplinary collaborations	Multidisciplinary visits are difficult to plan
24/7 care	If not fully occupied, it's an expensive division
Reduced length of stay by quick diagnostics	Quick decision making could increase workload of doctors
Lower mortality rates through faster initial actions	Doing more visits increases workload of doctors
Quieter elective nursing departments	
Improved patient satisfaction	
Reduced misplaced admissions through improved triage	
Less transfers for patients to facilities	
Better bed management at elective nursing departments	

Table 2 *Overview of advantages and disadvantages of an AMU found in literature research (Moloney, 2005) (St Noble, 2008)(Scott, 2009) (Subbe, 2011)(Vreelandgroep, 2011) (Holleman, 2015) (van Galen, 2017)*

58% of the patients were discharged within 72 hours (Holleman, 2015). To know the effect of an AMU specialized in childcare, the amount of admitted patients is important. The first calculations with data of acute paediatric admissions from 2016 shows that 75% of all patients would qualify for an admission at the P-AMU and were sent home within 72 hours (Table 3). With the future system of an P-AMU (with faster diagnoses, etc.) even more patients would qualify for this P-AMU and could be sent home within 72 hours. So from a management/organizational perspective, this new division has many advantages and also has a high enough volume to create efficiency.

2.3 The Paediatric-AMU (P-AMU)

The Paediatric-AMU (P-AMU) is a medical unit which focuses on acute medical care for children. Since there are only a few P-AMUs worldwide, the Charge Nurse Manager from the Children's Acute Assessment Unit (CCA) in Christchurch Hospital New Zealand was contacted to get their perspective on the P-AMU (Appendix 1). The reason children are excluded from regular AMUs is because different knowledge and skills are needed to care for children, as also explained by Jacob, a nurse who used to work at the 'Teenagers' division of the AMC. Examples regarding the medical difference of this are diseases that develop differently for children than adults since they are developing, and different ranges for heart rates. On a social level, different communicating skills are needed when working with child patients.

"Besides the fact that paediatrics is a totally different business then taking care of adults, children also need to be addressed differently. Switching between adults and children is difficult for the nurses." - Nurse AMU VUmc

The VKC has decided that the P-AMU will have a maximum admission duration of 72 hours and will exclude oncology patients, psychiatric patients, and Intensive Care patients. The main goal is for children to *"...go from home, back home as fast as possible..."* (Snel van huis naar huis). This is what the AMC considers a patient-centric approach since the assumption is made that fewer disruptions from 'normal daily life' is what is in patients best interest and is what patients prefer. If during the anamnesis it is clear that the patient has to stay longer than 72 hours, they will be placed on the regular nursing divisions, and will only have to wait for an available bed at the P-AMU.

Group	Discharged <72h [%]	# Admissions	Notes
All patients <18 acutely admitted	74.8	8044	
All patients <18 acutely admitted, admitted >4h	20.4	2197	The max. ED admission duration is defined as 4h
Patients that qualify for admission at AMU	75	1645	Stay >4h excluding infants, oncology and IC patients

Table 3 *Analysis of amount of paediatric admission at AMC and VUmc, data from March - December 2016*

The top 5 of indications for an acute admission in paediatrics is upper respiratory infection, asthma/ bronchial hyper-reactivity concerning allergies, fever, gastroenteritis (bacteria/virus), and anaemia (Figure 9) (Holleman, 2015).

2.4 Process of the P-AMU

In general, acute (non-elective/unexpected) patients come in through the ED or the outpatient department (Figure 10) and are assessed within a certain period of time. To get an impression of how the process of an acute admission looks like, the current process at the ED (Figure 11) and at the paediatric nursing department (Figure 12) were analyzed. Many medical professionals were interviewed and shadowed to get a good understanding of the context and processes (Appendix 2 - 9).

The process at the ED is fairly simple however it is a process that needs to be addressed step by step. It can be very difficult to plan the process since it is often depended on results from the diagnostics.

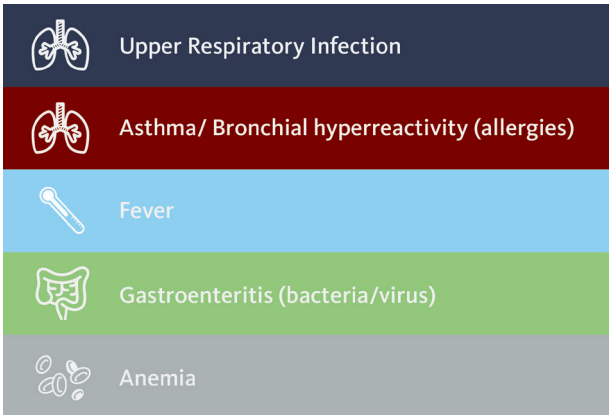


Figure 9 *Top 5 indications for acute paediatric admissions (Holleman, 2015)*

The acute process at the paediatric nursing department is less straightforward. This is mainly caused by the categorizations of age between the departments. These categorizations make sense in planned paediatric care because child patient will be surrounded by people there age. However, acutely admitted children are often placed on any available bed which often is on another age department. For acute admission, the availability of a bed has a higher priority than being admitted with children of similar age.

Combining these processes together with the literature about AMUs resulted in the visualization of the process of an acute admission at the future P-AMU (Figure 13). A clean model is created that is focused on efficient and effective care to minimize the disruption from daily life and for child patients to go back home as quickly as possible. However, research into acute paediatric admissions should reveal whether that is enough to improve the patient experience.

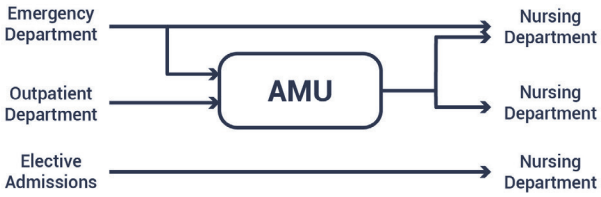


Figure 10 *General flow of AMU within hospital systems. Note; intake via Emergency Department or Outpatient Department via AMU to the nursing department (Vreelandgroep, 2011)*

THE ACUTE MEDICAL UNIT

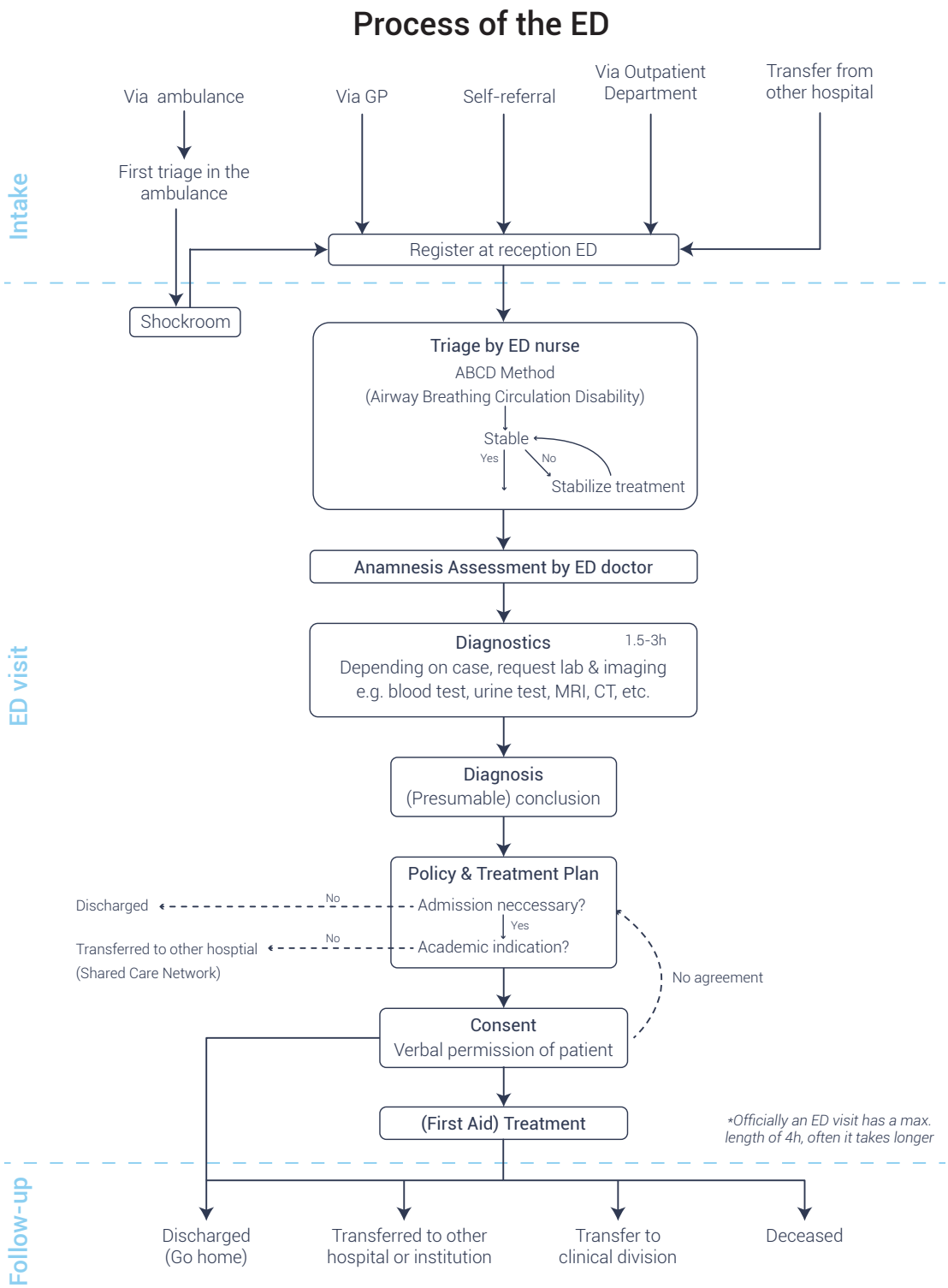


Figure 11 *Current process of an paediatric acute admission at the ED at AMC (Berendsen, 2017) (Appendix 7)*

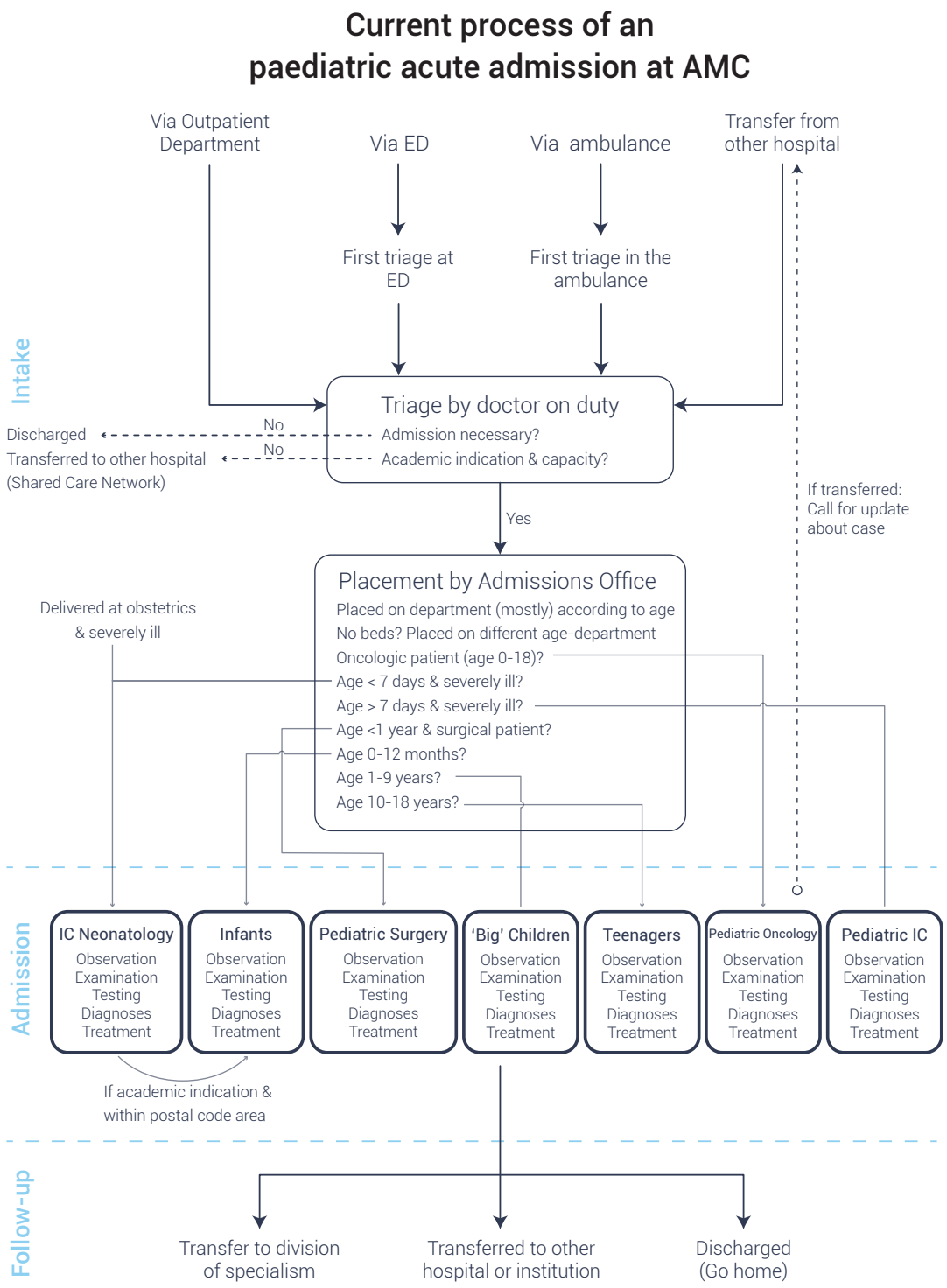


Figure 12 *Current process of an paediatric acute admission at a nursing department at AMC (Bollé, 2017) (Appendix 3)*

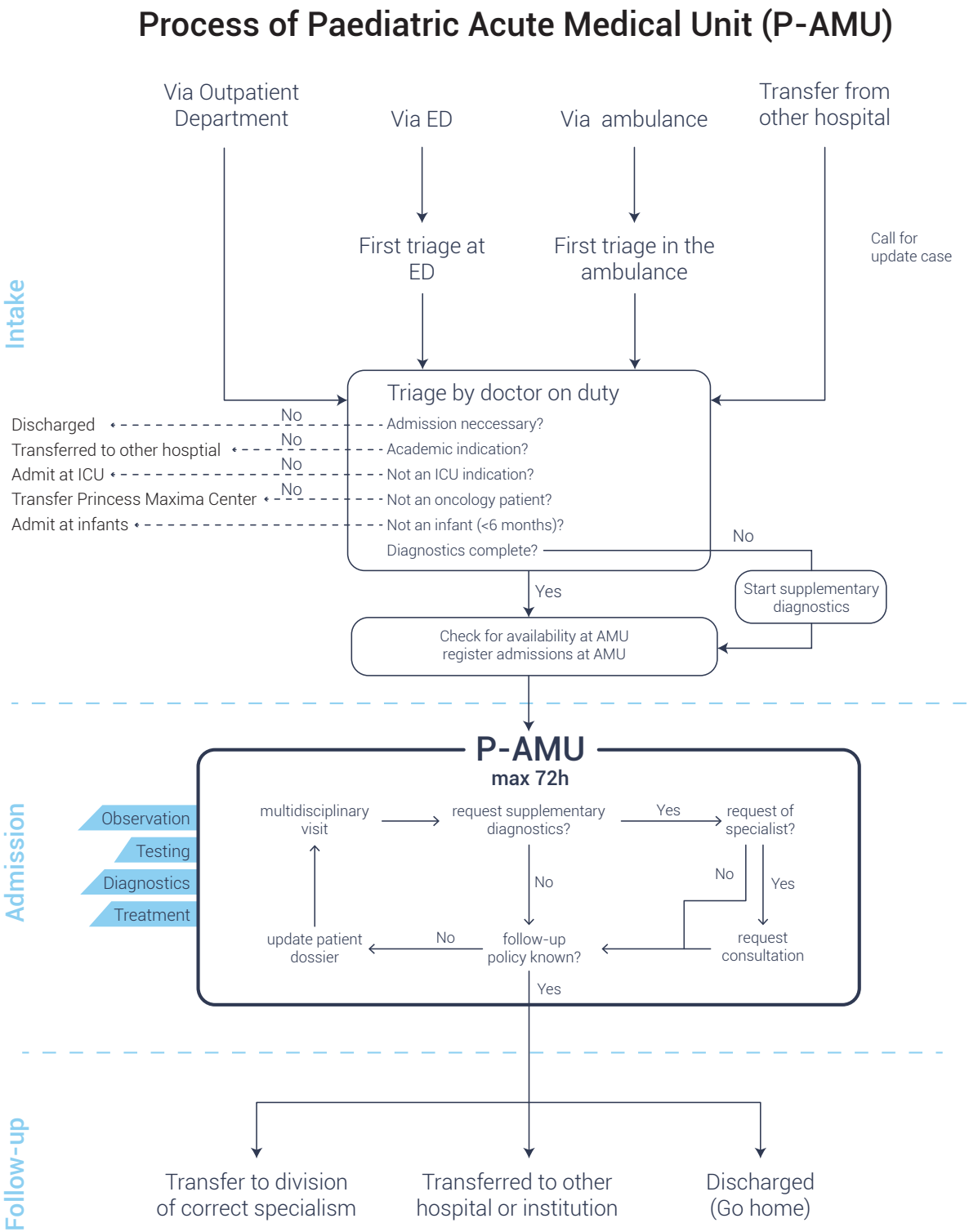


Figure 13 *Current process of an paediatric acute admission at the P-AMU*

CONCLUSION & INSIGHTS

A P-AMU is a clinical department wherein children that need to be acutely admitted are placed. This unit provides 24/7 care and focuses on rapid and effective diagnostics, formulating treatment plans, and starting the execution of said plans within a maximum of 72 hours. The multiple multidisciplinary visits a day and the priority being put on diagnostic facilities will create plannable care at the regular nursing departments. Oncology patients, psychiatric patients, and IC patients will be excluded for the P-AMU. IC patients will be excluded since their primary focus is on care, they need more care and attention than provided at the P-AMU. Oncology patients will be excluded as these patients will be treated at Princess Maxima Centre in the future. Psychiatry patients will be excluded since the care requires in depth knowledge and expertise about a patient's individual situation, and therefore they will be treated at a psychiatry department of the hospital.

Although multiple studies have shown a positive effect of the AMU, there is still little knowledge on the effects on the patient experience. Therefore, it can be stated that from an management/organizational perspective an AMU has many advantages, but it is important to take a closer look at how to improve the patient experience. The three key values of the VKC; Open, Sensitive, and Innovative, should also be included in the plans of this new division.

03 PATIENT EXPERIENCE & PATIENT SATISFACTION

The rapid technical innovations within healthcare emphasize on treatments and cures rather than on the 'caring for people' (Coultier, 2013). It is important to put the focus back on the patient, specifically the patient experience, since it is recognized as being one of the pillars of quality of healthcare. There are many terms relating to patient experience, such as patient engagement, patient participation, and patient satisfaction. Patient experience is the most comprehensive term; also including expectations, emotions, needs etc. on all subjects within healthcare (communication, accommodations, provided care, etc.). The terms Patient Experience and Patient Satisfaction are often used interchangeably, however there is a difference in their meaning. A definition of both terms is given and methods to measure them are explored. A framework for he key factors of PX in paediatrics is presented. The results of the Consumer Quality Index (CQi) will be discussed for both the paediatrics department (PD) and the emergency room (ED) of the AMC and VUmc to identify problems in care according to patient feedback.

PATIENT EXPERIENCE

3.1 What is Patient Experience & Satisfaction?

Patient Experience (PX) is defined by the Beryl Institute as "*the sum of all interactions, shaped by an organization's culture, that influences patient perceptions across the continuum of care*" and is, more and more seen as one of the three pillars of quality of healthcare, next to clinical effectiveness and patient safety, (LaVela, Gallan, 2014) (McCarthy et al, 2016). However, almost every article about PX uses a slightly different definition. It becomes even more of a grey area when trying to compare this to Patient Satisfaction (PS). PS is not equal to PX because Patient Satisfaction is a rating of satisfaction with the received care and not what a patient did or did not experience in their interaction with the received care (Browne et al, 2010). LaVela and Gallan (2014) describe patient satisfaction as '*one end-state of an individual's assessment of goal attainment*'. Patient experience data elicits information on what actually happen as opposed to the patient's evaluation of what occurred (KPMG, 2013), also demonstrated in an example (Figure 14) given by Bleich et al (2009). The PS rate makes it possible to compare the care at various hospitals and institutions and create transparency for the patients (Jenkinson, 2002). To conclude, regardless of the fact that there is a lack of clear definition between both terms, what is less important is whether one's research is focused on PX or PS, it is rather that the main goal is to incorporate the patient perspective to increase the quality of care (LaVela, Gallan, 2014).

Relationship between PX & PS

From a user experience designer's perspective, the relationship between PX and PS can be formulate as followed: when understanding the PX of the complete process of the received care, improvements can be made to adjust the care to patient's needs and increase the quality of care which will likely result in a higher PS, or simply said it will result in more satisfied patients. PX data can elicit why PS is rated higher or lower.

Importance of PX & PS

In literature multiple benefits can be found of satisfied patients. They are more likely to; complete treatments like medication regimens, experience a reduced risk in medical malpractice, be loyal, engaged, dedicated, as well as cooperate and be compliant. All of these things often result in better health outcomes (Bleich, 2009) (Browne, 2010). From a financial point of few, hospitals want their patient to return and for patients to recommend their personal network to visit the hospital, often referred to as behavioural loyalty (LaVela, Gallan, 2014).

Elements of PX

The definition given by the Beryl Institute gives an overall idea of what PX is. However, PX is not just the sum of interactions and the influence on the perception. The patients have needs, the experience elicit emotions, and there are also moments of no direct interaction that are important, for example when patients are waiting. It begs

Box 1. **Sample vignette dealing with respectful treatment**

[Patricia] went to a crowded clinic. At first no one greeted her, but after she had waited for 5 minutes, a nurse called her to an area where she was examined behind a small screen that hid most of her body from the other patients.

How would you rate the way [Patricia's] privacy was respected during physical examinations and treatments?

1, very good; 2, good; 3, moderate; 4, bad; 5, very bad.

Figure 14 *An example of Patient Experience versus Patient Satisfaction taken from the World Health Survey in 2003 (Bleich et al, 2009)*

the question, what are the effects that those interactions have on expectations, emotions, and needs?

The literature about User Experience (UX), a specialization within the design field, can be studied to get a more complete understanding of the elements of PX. PX emanates from UX and is distinguished from UX by having a clear focus on the medical field. UX is defined by the sum of a user's emotions and needs, interactions, context of interactions, and why they behave in certain ways. According to Hassenzahl and Tractinsky (2006) and Lallemand (2015), "*user experience is a consequence of a user's internal state, the context within which the interaction occurs, and the characteristics of the designed system*".

Definition of PX

In the context of this thesis, Patient Experience is defined as a combination between the Beryl Institute's definition and the definition of User Experience. Therefore, the Patient Experience is defined as:

"Patient Experience is the way a patient experiences, or feels about, the interaction with actors within their received healthcare, which is influenced by a user's internal state, the context within which the interactions occur, and the characteristics of the designed healthcare system."

Figure 15 shows the user experience model by Hassenzahl and Tractinsky adjusted to Patient Experience.

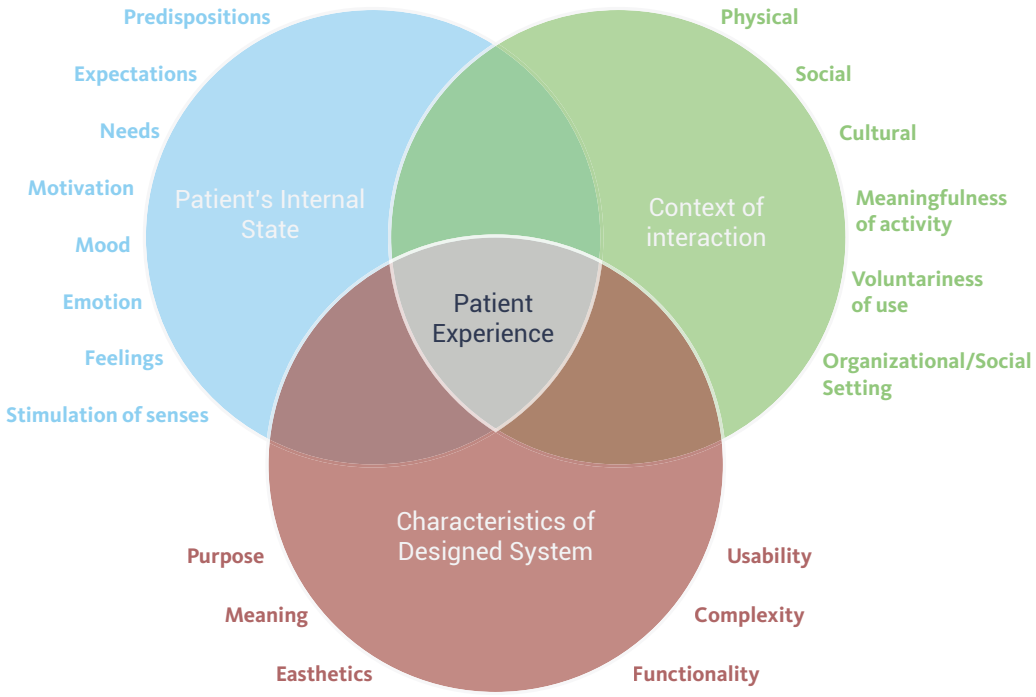


Figure 15 *Elements of Patient Experience derived from the User Experience model defined by Hassenzahl and Tractinsky (Hassenzahl, 2006) (Lallemand, 2015)*

3.2 Key factors in PX in paediatric care

It is important to measure and thoroughly understand the PX since it gives insights into how to improve healthcare, and ultimately, how to provide high-quality care to all patients (Ahmed, 2014). An admission, or even a visit to the hospital, is a disruption from daily life and affects the whole family causing increased levels of stress and anxiety (Hopia, 2005). To create as little disruption as possible, the main goal of the P-AMU is to "*...go from home, back home as fast as possible*". It is important to separately investigate the PX of both child and parent(s) since they often do not have the same needs, expectations, emotions, etc. A framework of key influences of PX has emerged from the literature research in this section (Figure 16). The influences 'expectation management' and 'communication & information' are the critical components required to increase the PX, they coordinate the influences closer to what a patient experiences (second row in framework), e.g. perceiving of time, or feel anxious. It is clearly visible that PX is complex and the influences are all connected and affecting each other. The individual influences are elaborated on next.

Expectation Management

The Expectancy-Disconfirmation Paradigm suggests that if expectations are not met, it decreases satisfaction (Oliver, 1977). Expectations are considered as a desire or want. Influencing the expectations of patients, for example informing patients about the ED procedures by giving them a brochure, can make patients adjust their expectations to then correspond more closely to reality, resulting in higher patient satisfaction (Krishel & Baraff, 1993).

According to Fred Lee (2004), who applied the principles of Disney to a hospital to create patient loyalty and better patient experience, the patient's perception of the values; safety, politeness, show, and efficiency, is of great significance. So even if you might think you've organized your care efficiently, if the patient doesn't perceive it that way then you've missed the goal (Lee, 2014). All in all, expectations can be seen as the center or starting point of patient satisfaction and patient experience.

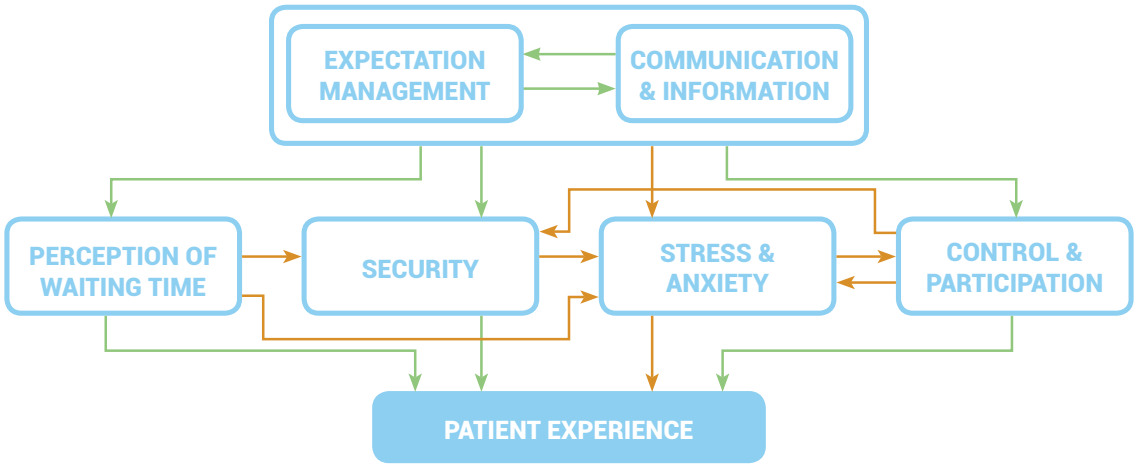


Figure 16 *Framework of key influences of Patient Experience derived from literature. Orange arrows indicate negative or decreasing influence, green arrows indicate positive or increasing influence*

Communication & Information

Communication is one, if not the biggest factor, in patient satisfaction and is therefore also important for the PX (Shirley & Sanders, 2013). Effective communication and the responsiveness of medical professionals and staff are important patient values and could help medical professionals to manage patients' emotions, to provide medical information, and to determine patients' needs, expectations, and perceptions (Browne, 2010) (Ha & Longnecker, 2010). Where there is a clear need for information by patients, it is important to not over-inform them since there is a limit to the amount of information that they can absorb in such a stressful situation like an acute admission (Hopia, 2005). Research showed that 40–80% of medical information provided by medical professionals is forgotten immediately (Kessels, 2003). There are also preferences on how to communicate with patients, such as the ways described by Shirley & Sanders (2013) which entails medical professional sitting down while communicating, to pay full attention to the patient, to listen, to encourage the patient to ask questions, and to validate concerns. A preference for the children is that they prefer to be talked 'to' instead of being talked 'about' and communicate in a way where they fully understand what is being said while using a simpler vocabulary (Jensen, 2012).

"Good intentions and good care don't always lead to the perfection of good care." - Fred Lee

Stress, Anxiety & Security

Hospitalization can be traumatic for a child, especially if the parents are very anxious, which will reflect upon the child, or if the parents are not accompanying the child (Shields, 2001). For most children the psychosocial aspects of pain, including emotions like fear, stress, and anxiety, are often more unpleasant than the physical pain experience itself, according to Pope (2015). She also wrote that emotional responses such as distress and anxiety are commonly associated with the anticipation of pain (Pope, 2015). Parents experience intense emotions like anxiety mixed with insecurity, guilt, fear, and grief. They often feel hopeless and insecure about how they can contribute to the care of their child (Hopia 2005). In the observational research of Hallström et al (2002), security is identified as the main need of parents. Communication and information are important factors to address issues related to stress, anxiety and security.

Control & Participation

Parents would like to have a role in taking care of their child and in the decision-making process because this gives them a sense of control and makes them feel like they are a partner in care (Hallström, 2002). This feeling of control is accommodated in the project 'Parents at the Visits' ('Ouders bij de visite'), where parents are engaged in the doctor visits and are heard and seen as an expert in taking care of their child. This takes place at the AMC and the trial has shown very promising results with parents that are keen to participate in this initiative. Shared decision making, where parents and child are engaged to participate in the decision-making process concerning procedures, and family integrated care, where parents are actively participating in the care of the child, accommodate the need for control and participation.

"I thought it was very pleasant that I, as a parent, could join visits every day. During these visits I actually got the impression that my expertise as a parent was of importance." - Parents of a 6-year-old girl (StoryCard Sep 2017 #14705)

Perception of Waiting

Waiting is the number one complaint that hospitals receive. People often find it frustrating to wait and, as a result, it has a negative effect on the PX (Shah, 2015). In his research regarding experiences in the waiting room, Corsano et al (2015) noticed that children feel little anxiety and negative emotions, whereas parents experience boredom, anxiety and concern about their child. During waiting there are two important aspects that needs to be taken into account; the perception of waiting and the expectations of waiting. Like Shah (2015) already noted: *"...managing patient expectations has shown to be a key factor in reducing the dissatisfaction levels among patients and improving ED patient experience and satisfaction"*. Efforts are made to make the healthcare system more efficient and decrease waiting times, nevertheless waiting is often inevitable in acute cases. Therefore, it is important to meet patients needs while they are waiting. When it comes to the expectation of waiting time, a differentiation can be made between the actual waiting time and the perceived waiting time. Communication and information play a mayor role in the expectation and the perceived waiting time.

3.3 How to measure PX?

PX is multidimensional and complex. LaVela and Gallan (2014) state, PX can be measure by using mixed methods, quantitative, and qualitative research methods.

Quantitative PX Research

From a designer's perspective, solely using quantitative research methods cannot capture the multidimensionality and complexity required to create a complete understanding of the PX. Nevertheless, they can give an indication of where improvements are needed e.g. information provided to the patient upon discharge. Quantitative research tools that are used nowadays are various questionnaires, most notably the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) and the Picker Patient Experience Questionnaire (PPE). These methods gather quantitative data, which means a high response number is needed to guarantee reliability of the results (Ahmed, 2014). These questionnaires cover topics like communication, comfort, responsiveness, and support. More information about HCAHPS and PPE can be found in Appendix 10. However, measuring the PX by using these methods versus measuring PS is questionable, and opinions about this are divided. The various definitions of PX and PS and the interchangeability of their uses makes it difficult to make a clear distinction in researching them.

Qualitative PX Research

Common qualitative research methods used to gain a better understanding of the PX include conducting interviews (face-to-face or over the phone), observations, shadowing, and focus groups. Often hospitals already use focus groups, received complaints and compliments, and interviews to measure the PX. It should be taken into account that different research methods have different outcomes, as Ahmed (2014) writes, "*...data collected through interviews more frequently result in reports of negative experiences of care when compared with the results of surveys, which have been criticized for producing bland positive responses.*" Another qualitative research tool is patient journey mapping, this shows the steps in the process and the experiences at the various touchpoints. This gives a clear overview and understanding of the PX over time. More information about patient journey mapping can be found in Chapter 4.8.

CQi and NPS measurements at AMC and VUmc
Currently, the AMC and VUmc, together with all other UMC's in the Netherlands, use the Consumer Quality Index (CQi) and the Net Promoter Score (NPS) to measure how patient feel about their care. The CQi is used to measure patient satisfaction whereas the NPS is a management tool to measure customer loyalty, or in this case patient loyalty. For more information about these methods see Appendix 11. Nevertheless, these methods are used to measure the PS and therefore it is important for both AMC and VUmc to start investigating the PX to make the right improvements in their healthcare. Further on in this chapter, the results of these methods are discussed to get a better idea of the current patient satisfaction at the VKC.

"We don't systematically get feedback from our patients, this is something we could improve. I think it is a good idea to, for example, to hand out IPads at the ED and ask patient to give feedback and rate the patient journey. In this way we could also get insights in problems we might not see as problems" - Acute Internist AMU & ED

3.4 When to measure PX?

Besides the tool used to measure the PX, the timing of measurement also makes a difference. Lallemand et al (2015) stated that a UX measured at the moment of interaction (Momentary UX) was preferred when compared to a measurement after use (Episodic UX). This can be demonstrated, for example, where expectations and predispositions play a role in the UX. Retrospectively assessing the UX can create biased outcomes and therefore the Episodic UX might not give an accurate interpretation of what happened. Unfortunately, this is what happens with the current quantitative research methods at the AMC and VUmc, there is no research (yet) that involves patients during their admission or visit.

3.5 The PS of the paediatric admissions

Currently, the PS of the AMC and VUmc is measured using the (CQi) and the (NPS). The graphs and charts in this report are based on the data published by MediQuest. In the survey, the maximum score per question differs, therefore the scores in the charts will be expressed in 'percentages of the maximum score', in this way a comparison between the scores can be made. A higher score means a higher level of satisfaction.

The paediatric division of the AMC is rated at an 8.67/10 for Q1 2017, which is an increase as can be seen in figure 14 (Figure 17). In contrast, the paediatric division of the VUmc is rated at 8.26/10 for Q1 2017 (Figure 18). The NPS of the AMC is 56.0% for Q1 2017, this means that more patients would recommend their care to others than discommend. The NPS of the VUmc has decreased to 45.2% for Q1 2017 compared to Q1 2016, this still means that more patients would recommend their care to others than discommend.

The spider chart (Figure 19) shows the results of the paediatrics admissions at AMC and VUmc rated on various topics. Depending on the goals of the hospital, a score of at least 80% or higher is desired. The main areas for improvement of the AMC are participation, information about medication, and the content of the admission interview. Similarly, the main areas for improvement at the VUmc are hospital accessibility, room & stay, the content of the admission interview, and information when discharged.

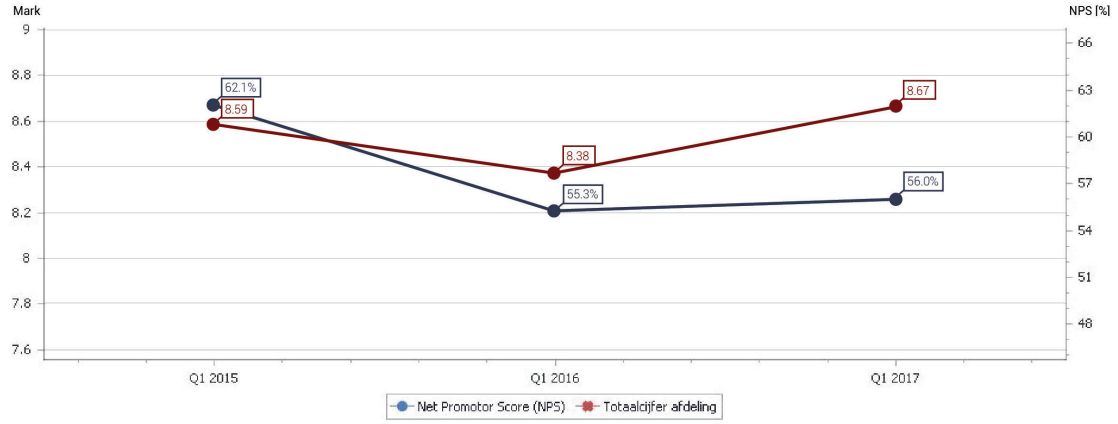


Figure 17 *NPS and mark of the paediatric division at AMC - Q1 2017 (results: general, filter: paediatrics, n=75)*

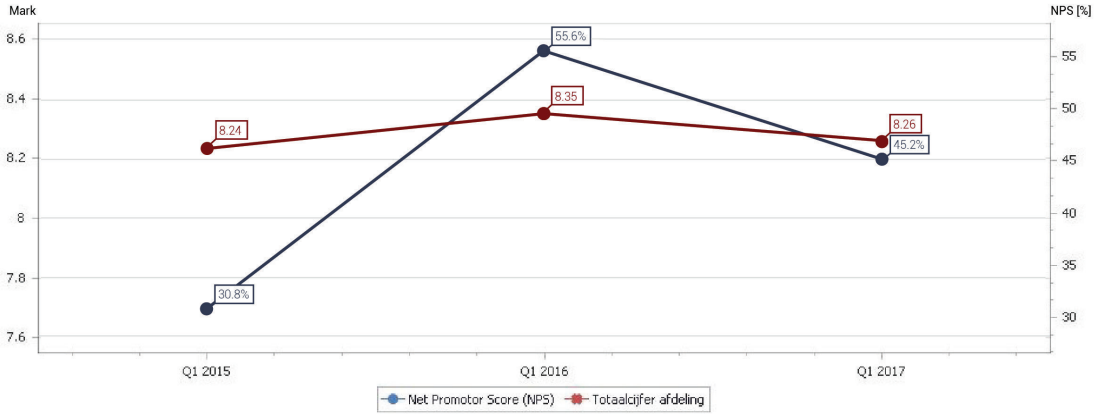


Figure 18 *NPS and mark of the paediatric division at VUmc - Q1 2017 (results: general, filter: paediatrics, n=31)*

In the CQi surveys, patients were asked to point out one improvement related to the care in the paediatric division. Most responses were regarding communication and provision of information at various moments in the process, see also the quotes in figures 17 and 18.

The CQi gives an idea of the general areas of improvement for the paediatric nursing departments, however it neither explains why an element is rated low, nor in what the patient's needs are to improve that element.

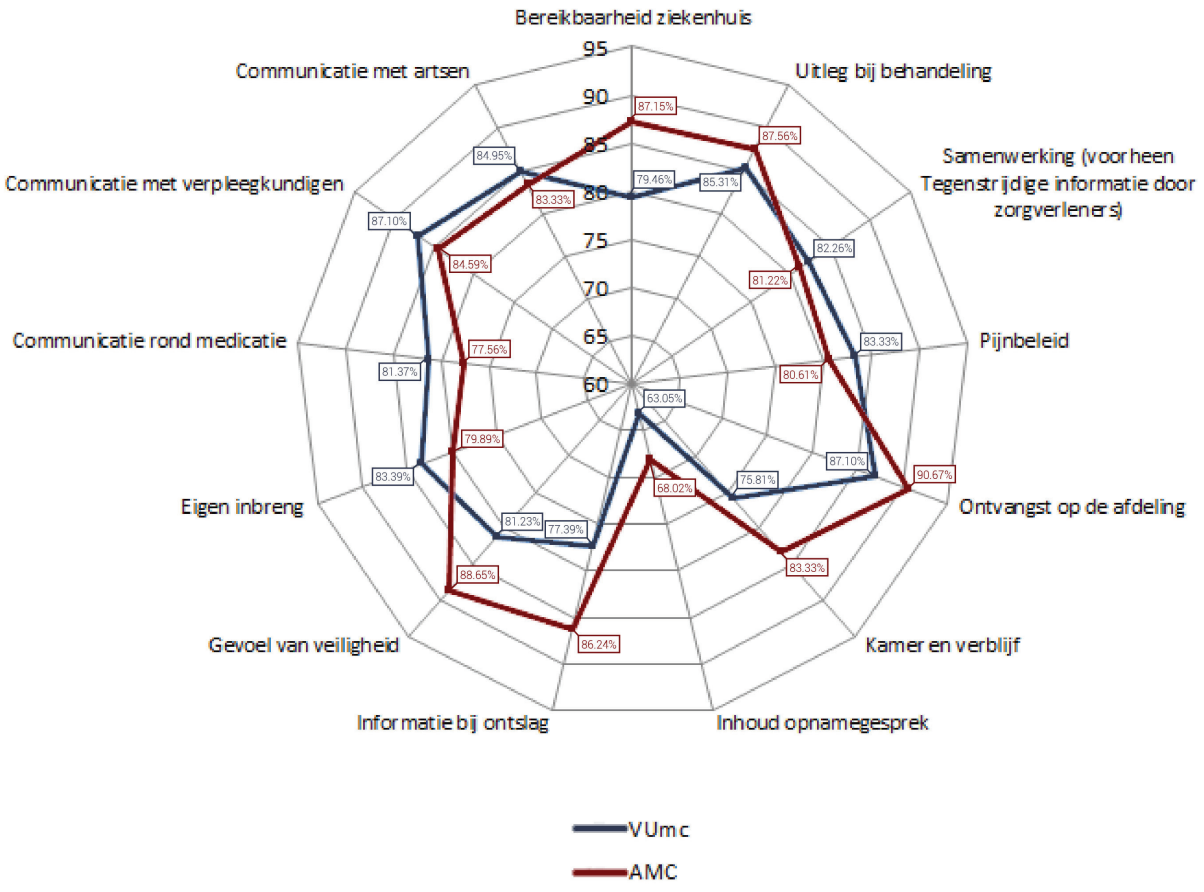


Figure 19 *Spider chart of paediatric admissions at AMC and VUmc Q1 2017 (Results: admissions general, filter: paediatrics, n(AMC)=75, n(VUmc)=31); To increase readability, the minimum and maximum values of the axes are automatically calculated based on the highest and lowest value. The minimum value of this chart is 37.55%. The maximum value of this chart is 90.15%.*

"Communication is not always unequivocal (coordination between various medical professionals is not clear)"

"Having insight in the next step, or in other words, that the nurse can indicate when she will come again and what will happen."

"At some places in the hospital they don't explain what they are doing, I would prefer if they did."

"During my admission lots of people came by, like; the handicraft car, the childcare worker, the teacher, the animal car, the book car, massage lady. We indicated multiple times that I wasn't comfortable with it, unfortunately they still visited me."

Figure 20 *Overview of quotes from respondents about improvements of paediatric division at AMC; CQi AMC, MediQuest, Q1 2017*

"At the paediatric division more/better work transfers between ward physicians are needed, or even better: 1 assigned ward physician."

"Communication with outpatient department concerning test results and appointments."

"The bad work transfer between the nursing staff, paediatricians, and cardiologist."

Figure 21 *Overview of quotes from respondents about improvements of paediatric division at VUmc; CQi VUmc, MediQuest, Q1 2017*

3.6 The PS of the ED at AMC and VUmc

There is no CQi score nor a NPS for the Emergency Department (ED) at the AMC and VUmc. However, there is data on the key indicators of an ED. The spider chart (Figure 22) shows the results of the survey for both ED's. Within this data there is no specification to children because there is little data on paediatric cases at the ED, so this chart includes the reviews of all adult patients of various departments. Depending on the goals of the hospital a score of at least 80% or higher is desired.

The spider chart indicates room for improvement for the AMC on the topics of; information before treatment, waiting times & speed of action, information when discharged, participation, and aftercare. For the VUmc the main areas for improvement are; information before treatment, information during treatment, participation, and aftercare. It is very clear that 'information before treatment' scores very low for both hospitals. No data or quotes about improvements indicated by the respondents is available.

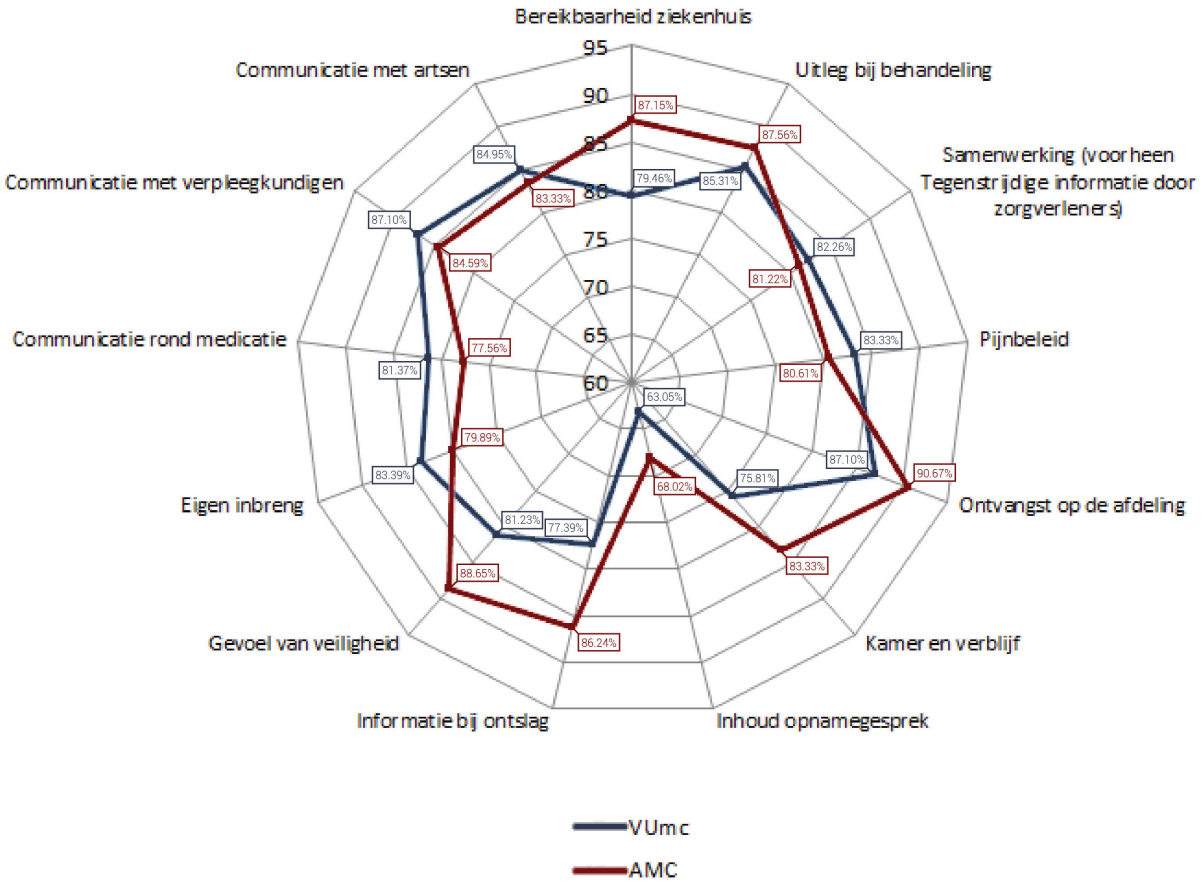


Figure 22 *Spider chart Admissions at ED at AMC and VUmc Q1 2017 (Results: CQi Emergency Department, n(AMC)=53, n(VUmc)=94); To increase readability, the minimum and maximum values of the axes are automatically calculated based on the highest and lowest value. The minimum value of this chart is 63.05%. The maximum value of this chart is 90.67%.*

In the surveys, patients were asked to point out one improvement for their care at the ED. Most responses were regarding waiting time & speed of action, communication and provision of information of various moments in the process, see the quotes in Figure 23. Again, the CQi gives an idea of the general areas of improvement for the ED, however it neither explains why an element is rated low, nor in what way that element should be improved.

PATIENT EXPERIENCE

"The care at the ED was good. I would especially like to change the support when going back home and the preparation of what will come. I was very confused after a fall, however I thought I could handle public transportation, which, in retrospect, I couldn't. I would have like to be warned for this. Besides that, the nurses gave me the impression that I would quickly be back on my feet so I didn't receive any instructions/warnings. Now, 4 months later, I am still not fully recovered from my concussion. I would have like to be prepared for the effects." (respondent VUmc, ophthalmology)

"Lots of time in between the different steps of the medical examination, which I understand, however a more rapid process would be pleasant." (respondent VUmc, neurosurgery)

"I was asked whether I wanted to see my family before my surgery. My answer was no. However, my family was still brought in. I think you should either not ask me or really don't do it." (respondent VUmc, pulmonary medicine)

"A little more information about how long and why I have to wait so long after the first inspection of my illness." (respondent VUmc,

"Indicate even more clearly how long you have to wait when a nurse is asking for advice somewhere else." (respondent VUmc, internal medicine)

Figure 23 *Overview of quotes from respondents about improvements of ED; CQi VUmc, MediQuest, Q1 2017*

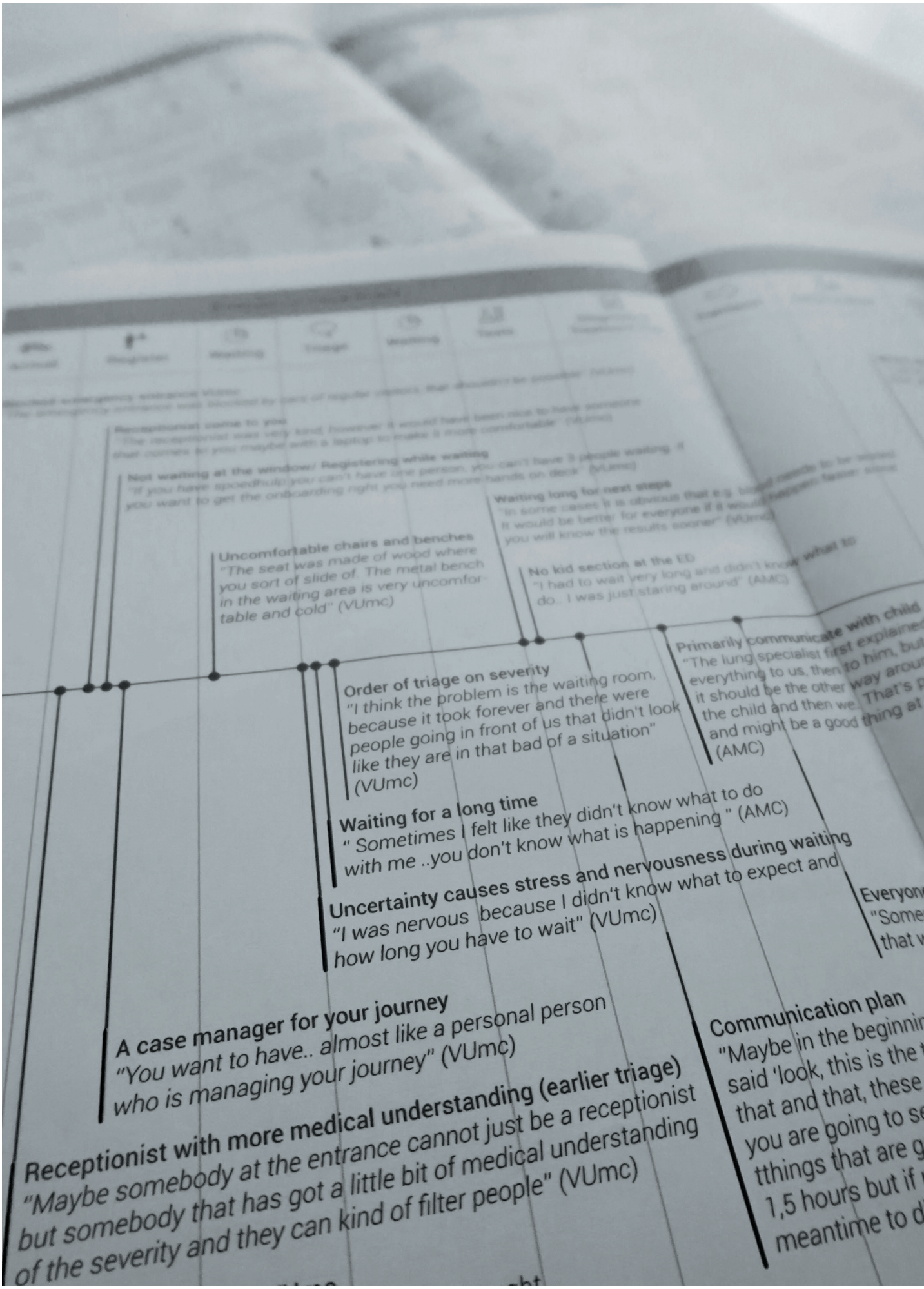
CONCLUSION & INSIGHTS

PX is the way a patient experiences, or feels about, the interaction with actors within their received healthcare, which is influenced by a user's internal state, the moments of interaction, the context within which the interactions occur, and the characteristics of the designed healthcare system. This is unequal to PS which is described as the end-state of an individual's assessment of goal attainment of the perceived care. A framwork including 5 key factors of PX emerged from literature research, including: Communication & Information, Expectation Management, Stress/Anxiety & Security, Control & Participation, and Perception of Waiting Time.

It is important to research the PX to increase the quality of care, resulting in more satisfied patients. These patients are more likely to; complete treatments like medication regimens, experience a reduced risk in medical malpractice, be loyal, engaged, dedicated, as well as cooperate and be compliant, and it results in better health outcomes

The PX can be measured using qualitative methods, or a mix of qualitative and quantitative methods. Common qualitative research methods used include conducting interviews (face-to-face or over the phone), observations, shadowing, and focus groups. The PX is preferable measure while interacting with the provided health service. The current quantitative Patient Satisfaction methods used by AMC and VUmc fail to fully understand patients' expectations, needs, emotions, and experiences. Patient Satisfaction research can indicate broad areas for improvement however to create meaning full improvements, more in-depth and case-specific research is needed which can be accomplished by PX research.

The main areas for improvement at the paediatric division, according to the CQi, are communication and provision of information (content of admission interview, information about medication, information when discharged). At the ED, the main improvement is clearly 'information before treatment'. Other topics of improvement at the ED are information during and after treatment, information when discharged, participation, and aftercare. The CQi shows how satisfied patients are with these predefined topics. However it neither explains why a topic is rated low, nor in what way that topic should be improved. More in-depth research is needed to create the right improvements and that's why a design research was setup to fully understand the patient experience during a paediatric acute admission. More information about this research can be find in the next chapter.


Uncomfortable chairs and benches
"The seat was made of wood where you sort of slide of. The metal bench in the waiting area is very uncomfortable and cold" (VUmc)
Order of triage on severity
"I think the problem is the waiting room, because it took forever and there were people going in front of us that didn't look like they are in that bad of a situation" (VUmc)
Waiting for a long time
" Sometimes I felt like they didn't know what to do with me ..you don't know what is happening " (AMC)
Uncertainty causes stress and nervousness during waiting
"I was nervous because I didn't know what to expect and how long you have to wait" (VUmc)
A case manager for your journey
"You want to have.. almost like a personal person who is managing your journey" (VUmc)
Receptionist with more medical understanding (earlier triage)
"Maybe somebody at the entrance cannot just be a receptionist but somebody that has got a little bit of medical understanding of the severity and they can kind of filter people" (VUmc)
Communication plan
"Maybe in the beginnin
said 'look, this is the
that and that, these
you are going to se
tthings that are g
1,5 hours but if
meantime to d

04 DESIGN RESEARCH

To design a product or service that improves the patient experience, you need to know how patients experience the current care, what the moments of interaction are, and who the main actors involved in their treatment. This chapter will provide insight into the design research that has been done to gain a better understanding of the current patient experience of a paediatric acute admission at the VKC. This research was developed and executed, including both the experience of child patients that need to be acutely admitted, and their informal caregiver(s), in order to find answers to two main research questions; '*What is the current process of a paediatric acute admission?*' and *'How do child patients and informal caregivers experience the current acute admission process?*'

DESIGN RESEARCH

4.1 Aim

The aim of this research is to gain a better understanding of the process of the current acute admissions and the experience of both child patients and informal caregiver(s) throughout the two departments in the process of the acute admission; the ED and the Paediatric Nursing Department. Insights of this research will lead to a detailed overview of a patient's journey to identify the main opportunities for innovation, and input for the establishment of the P-AMU.

Research Questions

The research questions are as followed:

1. What is the current process of a paediatric acute admission?

1.1 What are the steps of an acute admission, and are they different per specific medical complaint or illness?
1.2 What are the main actors that play a role in this admission process, and what kind of interaction occurs?
1.3 Do the child patients and informal caregiver(s) mind a possible extra transfer to a different medical department during the admission?

2. How do child patients and informal caregivers experience the current acute admission process?

2.1 What are the expectations of child patients and their informal caregiver(s) when acutely admitted?
2.2 What needs & values are important for child patients and informal caregivers during the process of an acute admission?
2.3 Which emotions do child patients and informal caregivers have during the process of an acute admission?

4.2 Research Methods

For this research a sensitizing booklet followed by a semi-structured interview were used as methods to perform the user research. A pilot was done to validate and optimize the information letters (Appendices 13 & 14), the informed consent form (Appendix 15), the sensitizing booklet (Appendix 16) and the semi-structured interview. The results of the pilot and any changes made to the methods can be found in Appendix 17.

Sensitizing booklet

The sensitizing booklets were focused on the expectations, emotions, and experiences in two phases; arrival and stay at the ED, and the stay at the paediatric nursing department. In this booklet both the child patient and the informal caregiver(s) described their expectations, emotions, and experiences throughout the process, see Figure 23. They received the booklet at the ED and they took this booklet with them on their journey through the hospital.

Interview

A semi-structured interview was conducted with the informal caregiver(s) and the child patient (Figure 24). The data that was filled in the sensitizing booklet led the interview, and especially the time-line (Figure 25). In this way, a deeper understanding of the current process and experiences of the patient were gained, and the reasons why people feel a certain way at a specific moment in the process were discovered. The interview was recorded to perform a detailed data analysis.

Figure 23 *The main pages of the sensitizing booklet focusing on the expectations, emotions and experience of both child patient and parents. For the full version see Appendix 16.*

Figure 24 *Interviewing a child patient about their acute admission at the paediatric nursing department at VUmc.*

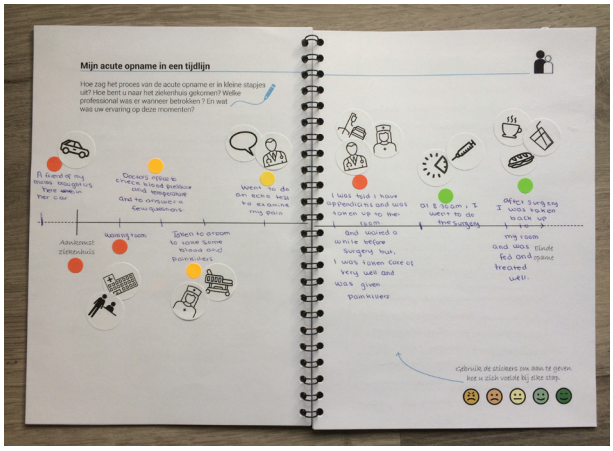


Figure 25 *Time-line made by a child patient and her mother in the sensitizing booklet (VUmc).*

DESIGN RESEARCH

Participant Requirements

This research was conducted in both the AMC and VUmc since the P-AMU will be a collaboration between the two UMC's. The participants in this research must represent the child patients of the P-AMU. Therefore, specific inclusion and exclusion criteria were defined. For the full description about the participants and reasoning of the inclusion and exclusion criteria, see Appendix 12.

Inclusion criteria:

- Children 6 -16 years old
- Entered hospital via ED AMC (or VUmc)
- Have to be acutely admitted
- Transferred to paediatric nursing department
- Expected stay of 24-72 hours

Exclusion criteria:

- Admissions for Oncology, Psychiatry and IC
- Admissions mainly for observation
- Non-Dutch speaking participants
- Transfers to other hospitals or institutions
- Patients that are sent home from the ED

Participant Recruitment

The recruitment of the participants was done via the paediatrician-assistant working the emergency shift (Spoeddienst) at the Outpatient Department. When a patient was registered at the ED and it became clear that the child patient would be admitted, ideally, the nurse or doctor invited the researcher to talk to the patient and informal caregiver(s) to see if they are willing to participate in this research. The personal invite by the researcher was desirable since the patients had the opportunity to directly ask questions about the research and they knew who they had an interview with later. Practical experience has shown that often the medical professionals are very busy and the researcher had to individually reach out to the patients. The personal invite was a key factor to include participants in the research, since patients wanted to participate to help the specific visible individual instead of just an institution.

Research Procedure

After handing out the booklet to the patient at the ED, the patient was interviewed when the end of their stay at the paediatric nursing department was approaching. For the full research procedure, see Appendix 18. However, in practice, changes had to be made to the research procedure to increase the number of participants. Child patients that were already admitted to the paediatric nursing department after their stay at the ED were included in retrospect. Furthermore, child patients with an age close to the inclusion criteria (6-16 years), child patients that were transferred from ED's of other hospitals, and English and non-fluent Dutch speaking participants were also included.

Data Analysis

After all interviews were performed, the acquired research data was analyzed to be able to draw conclusions. The audio files of the interviews were used to identify over 150 statement cards with positive, negative, or striking quotes from the interviews (Figure 26). After creating the statement cards, the first step was to see the similarities and differences between the steps in the different time-lines and whether one general pathway could be identified. Certain steps for example 'seeing a lung specialist or a paediatrician' were generalized and defined as 'seeing a specialist' to make a general pathway. Once the general steps were defined, all the statement cards were placed in this general pathway (Figure 27) to see if at a specific moment in the pathway similarities, differences, and links could be found.

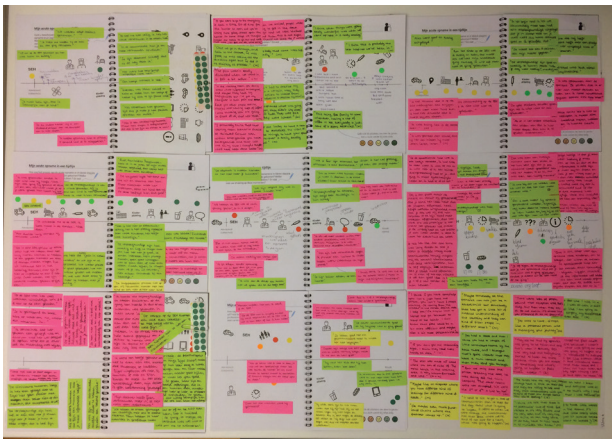


Figure 26 *Picture of quotes of interviews in the individual sensitizing booklets; pink quotes were negative remarks, green quotes were positive remarks, and yellow quotes are striking quotes for opportunities or improvements indicated by the patient.*

Figure 27 *Analysis overview of all statement cards placed into the general pathway to find similarities, differences, and links.*

♀/♂	Age	Medical complain at arrival	AMC/ VUmc	pro-/ retrospective	# acute admissions	Familiar	Language of interview	Note
♂	15	Infection after surgery	AMC (Pilot) (1)	Retrospective	0	✓	Dutch	Came back after bone biopsy previous week
♀	16	Unknown - tightness of chest	AMC (2)	Retrospective	>10	✓	Dutch	Special arrangement with ED (call and come)
♂	5	Appendicitis	AMC (3)	Retrospective	1	✗	Non-fluent Dutch	Came back to ED after send home night before
♂	10	Pneumothorax	AMC (4)	Retrospective	>40	✓	Dutch	Transfer ED Spaarne to AMC paediatric ward
♂	14	Kidney problems	VUmc (1)	Retrospective	1	✗	Non-fluent Dutch	Was send from different ED to AMC ED
♂	8	Appendicitis	VUmc (2)	Prospective	0	✗	Dutch	Came back to ED after send home night before
♀	13	Severe pneumonia	VUmc (3)	Retrospective	1	✗	Dutch	Has been at the paediatric ward for a week
♀	15	Appendicitis	VUmc (4)	Prospective	0	✗	English	On a trip in Holland

Table 4 *Overview of the participants included in user research; showing the factors: gender, age, medical complaint, AMC/VUmc, retrospect or prospect, number of previous acute admissions, whether they were familiar at AMC/VUmc, language of interview, and important notes per participant.*

4.3 Results of Design Research

Participant Information

In table 4 an overview of the included child patients is shown. Out of 8 participants, only one case had an unknown diagnosis. In 3 out of 7 cases (appendicitis) no further testing was needed at the nursing department. There were 2 participants, out of all 8, that have frequently been acutely admitted in hospitals.

Patient Journey

Journey mapping is a context mapping tool that is used to visualize a user's journey in relation to a product or service over a period of time. The data is visualized in the Patient Journey (Figure 29) specified in the expectations, behaviour and emotions of the patient, the behaviour of the medical professional, the moments of interaction, and the opportunities for innovation. This give a clear understanding of the patient experience throughout the journey. This tool is easy for all project stakeholders to understand, it is a conversation tool to share knowledge between specialist and it triggers creative thinking (McCarthy et al, 2016).

The Patient Journey also included data of previous field research for example, the interviews of the medical professionals and observations.

In this patient journey of a paediatric acute admission (Figure 30), the general steps, duration, expectations, patient's behaviour, moment of interaction, medical professional's behaviour, emotions, and innovation opportunities are included. These will be elaborated below.

General steps acute admission

The general steps for an acute admission for both the ED and the paediatric nursing department are shown in Figure 28 and 29. These were derived from comparing all the individual timelines. The first part of the journey takes place at the ED, whereas the second part takes place at the paediatric nursing department. For each of these steps an indication of average time is provided, these can however strongly differ per situation.

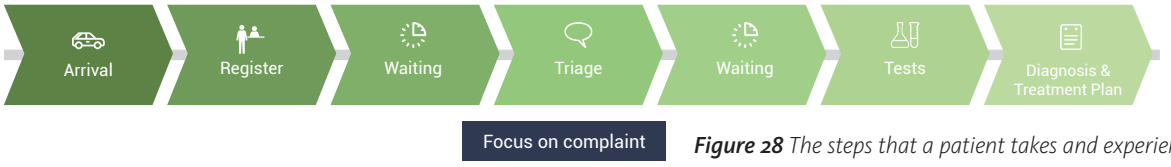


Figure 28 *The steps that a patient takes and experiences during the stay at the Emergency Department (ED); arrival - register - waiting - triage - tests - waiting - diagnosis and treatment plan*

Figure 29 *The steps that a patient takes and experiences during the stay at the paediatric nursing department; transport - settling down - waiting for treatment - treatment - recovering - discharge*

Expectations

The expectations of the patient are categorized per department instead of per step. The expectations were written down in the booklet and were also elaborated on in the interviews. For the emergency department people don't expect to be waiting long, which in most cases is not in line with what they experience. They don't expect to be waiting more than 30 minutes to be seen by a doctor. This means the first encounter, the triage, should ideally happen within 30 minutes. When it comes to the paediatric nursing department people just expected to be taken care of, which is often what happened. People experienced their stay at the paediatric nursing department as very positive, this could be because expectations have been met or even exceeded. Furthermore, a difference in expectations was seen between the patients that have frequently been acutely admitted and patients who have never been acutely admitted before. The children that have experienced it before know what to expect, even if it is a different hospital they have a clear expectation of what will happen.

"We expected our son to get a good treatment" - expectations paediatric nursing department VUmc

Behaviour of child patient

The patient's behaviour is described per step in the journey. It is striking at how many moments of waiting there are throughout the journey.

Moment of interaction

The moment of interaction and the medical professional's behaviour are both described. The steps show that medical professionals have to do a lot of administrative work in EPIC. Furthermore, the child patients sees quite a number of different professionals in the first part of the journey. Since both VUmc and AMC are university medical centers, doctors-in-training will also visit the patients, which was not visualized in this journey is. This was done in the Patient Network.

Patient Network

The patient network visualizes all actors involved in the healthcare. Actors are people and processes surrounding the patient that are actively contributing to the health of the patient. In Figure 31 a visualization of the patient network is shown, this illustrates a quite clear network. It should be noted that this network is generalized to accommodate all acute admissions. The main actors within the process will be described below.

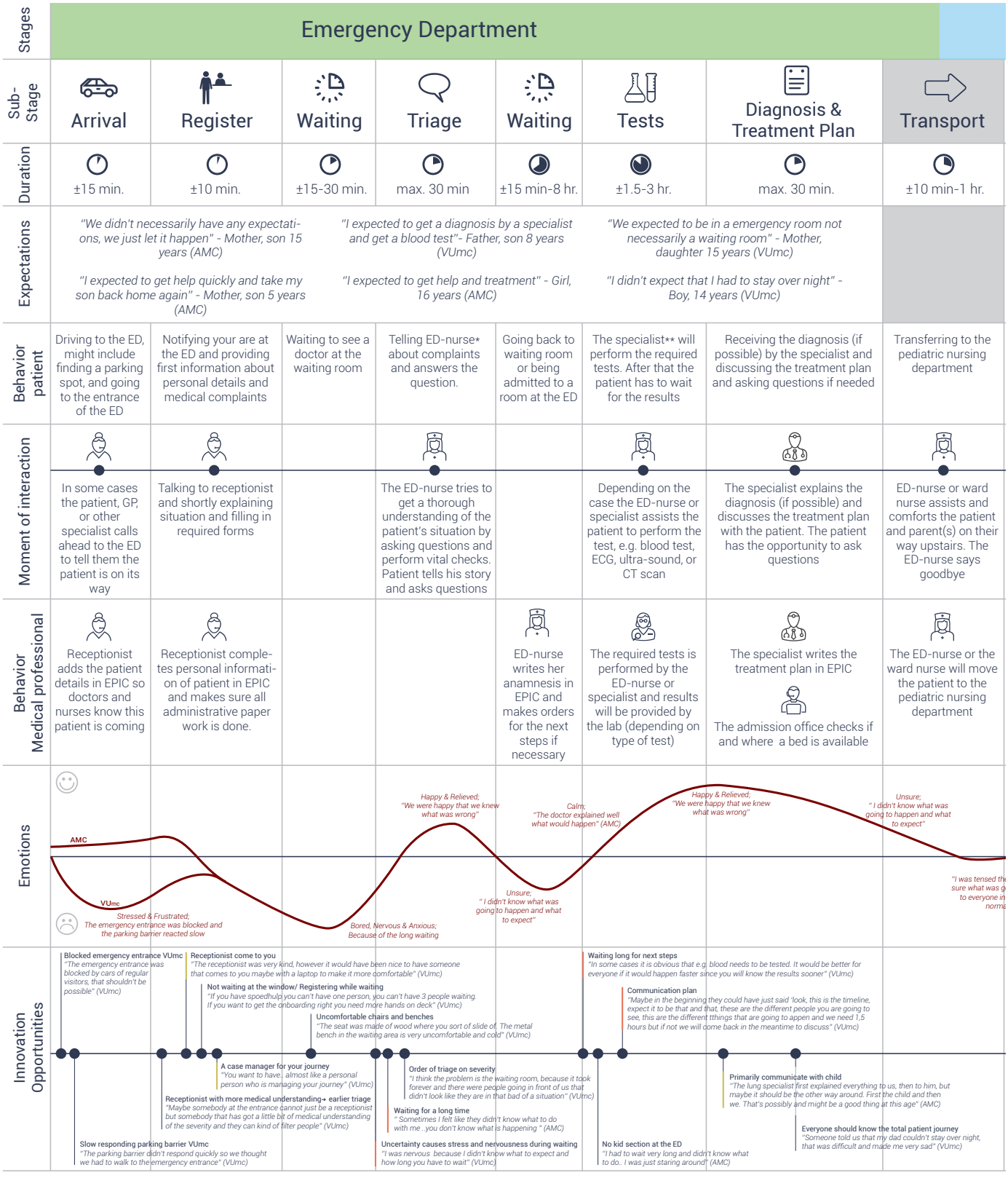
Informal caregiver(s)

The informal caregiver(s), in most cases the parents, are a very important part of the team that takes care of the child patient, they know the child best. And not only do they support and comfort the child, they sometimes also communicate on behalf of them. In the P-AMU they will join the visits and therefore their perspective and remarks on the health progress can be beneficial for the medical team.

"It was very nice that, as a parent, you could join the visits every morning and you could hear right away what the treatment plan for that day would be, and you could join the conversation and you felt heard, it was a very pleasant experience" - StoryCard Sep 2017 #13772 Parents 4-year-old boy, Paediatric Nursing Department AMC

"I thought it was a very pleasant experience to join the daily visits as parents. During these visits I actually got the impression that my expertise as a parent mattered." - StoryCard Sep 2017 #14705 Parents 6-year-old girl, Paediatric Nursing Department AMC

DESIGN RESEARCH



* The person that will do the anamnesis depends on previous contact, severity of complaints and related specilism

** The specialist is different per medical complaint; e.g. the surgeon, lung specialist, or gastr

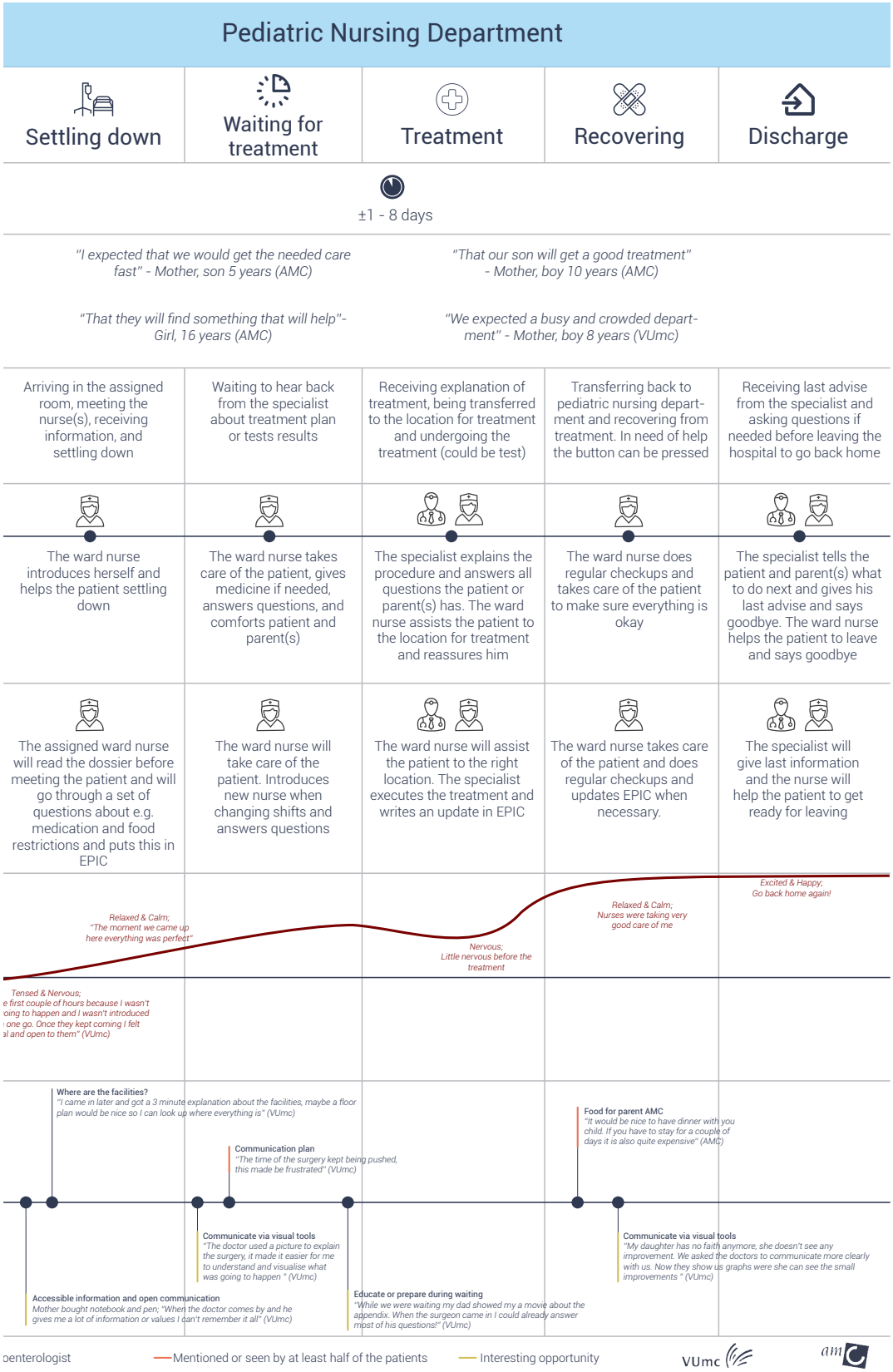


Figure 30 *The patient journey of the current paediatric acute admission at the AMC and VUmc*

Family & Friends
Another part of the social network are family and friends, for example grandpa and grandma. The child enjoys spending time with loved ones and likes to be entertained by them, for example playing together in Kinderstad.

Triage-Nurse
The triage-nurse is the first medical professional a child patient encounters, therefore this can be marked as important moment of interaction. The triage-nurse will perform an anamnesis and color code each patient to determine an order in which patients will be seen.

ED-Nurse
The ED-nurse will carry out the anamnesis to categorize the patient on a scale of severity. They do this by asking questions and physical checkups. They will also take care of the child patient when they are admitted into the ED, for example administer medication.

ED-Doctor in training
The ED-Doctor in training will see the child patient and perform a more targeted checkup. If a specialist is needed, the ED-doctor will involve him/her and hand over the responsibility of the patient.

Specialist
The child patient will be linked to a specialism, the doctor related to that specialism will be the specialist. He will have the final medical responsibility of the patient until the patient is discharged, or is transferred to another division, or is taken over by another doctor. They keep evaluating and adjusting the treatment plan to make sure the child patient receives the care they need. Depending on the medical complaint there can be multiple specialists involved, however one specialist will always have the responsibility over the child patient.

Nurses at the Paediatric Nursing Department
The nurses at the paediatric nursing department make sure that the treatment plan made by the head practitioner is executed. There is a difference between AMC and VUmc. The nurses at AMC take care of the patients of all specialisms 24/7 within a certain age rage. This requires nurses to have knowledge and skills of all paediatric specialisms in the acute phase. The nurses at VUmc take care of patients per specialism.

Admission office
When a child comes in and needs to be admitted acutely the admission office is called to check whether there is a bed available. If so the patient will be referred to the P-AMU. If there is no bed available, they can look at the possibilities of the other division or they will decline the patient and referred to another hospital.

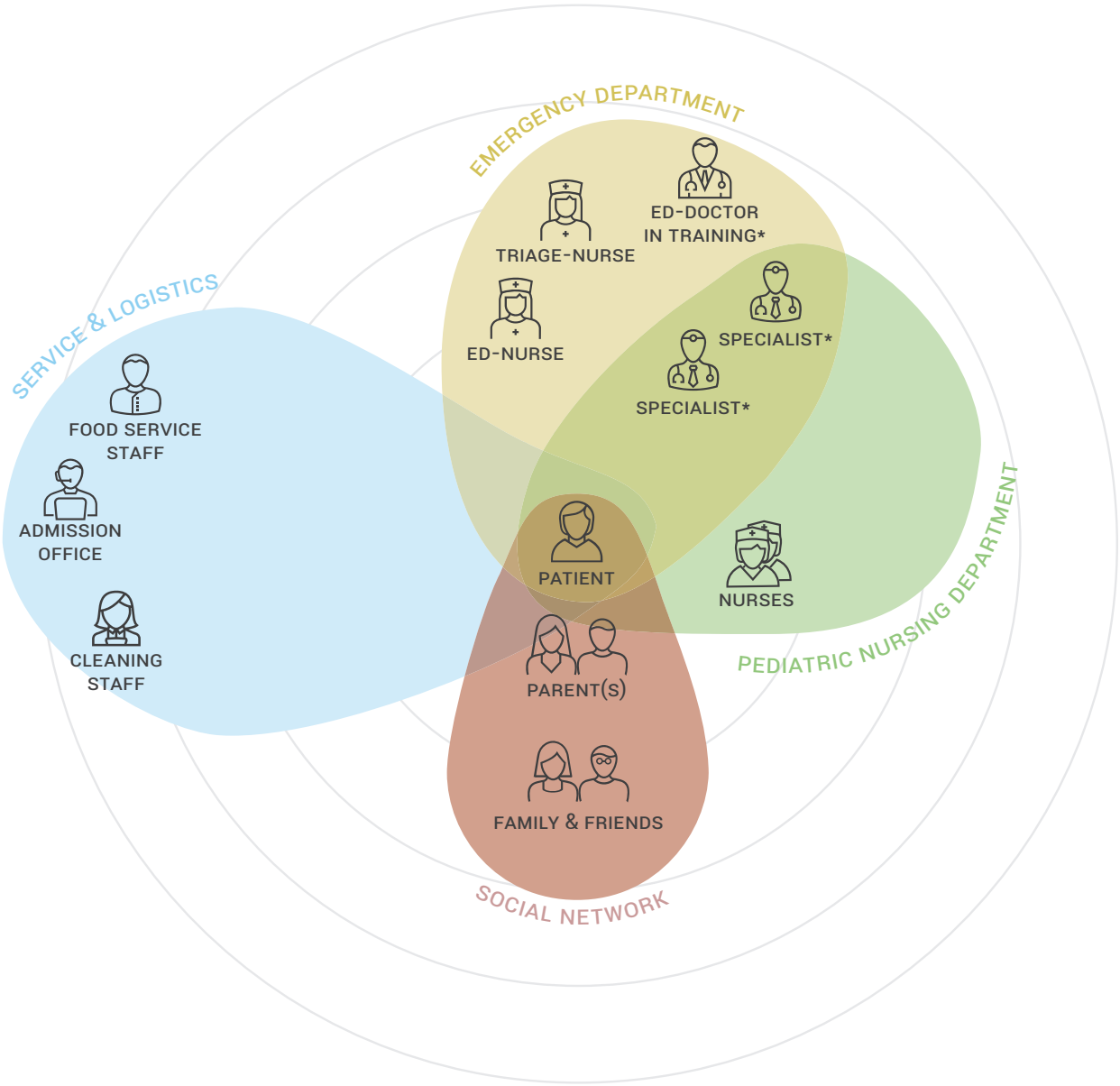


Figure 31 *The patient's network; these are the professionals that are involved in the care of the patient. The closer to the center, the greater involvement they have with the patient.*

** The number of certain medical professionals involved, strongly depends on the case*

Emotions

There were 2 main emotions that were present in the statement cards of almost every patient; 'Unsure' and 'Bored'. In Appendix 19 all statement cards related to the two themes are listed. It should be mentioned that 'Unsure' occurs in two ways, uncertainty about the process, and medical uncertainty (Figure 32). The medical uncertainty is the uncertainty about the medical complaints and conditions and in this research this will be seen as a fixed factor that will always be there. However the uncertainty about the process is a variable that is influenced by many factors.

As described in Chapter 3.2, two of the key influences of patient experience are expectation management and waiting. This is related to the main themes found in this user research and therefore very important to address.

So, we can say there is a base level of uncertainty; the medical uncertainty. In the current situation the uncertainty about the process is increasing the level of uncertainty. The main question is 'how can we prevent the increase of the level of uncertainty, keep it at least stable, or ideally decrease this level?'.

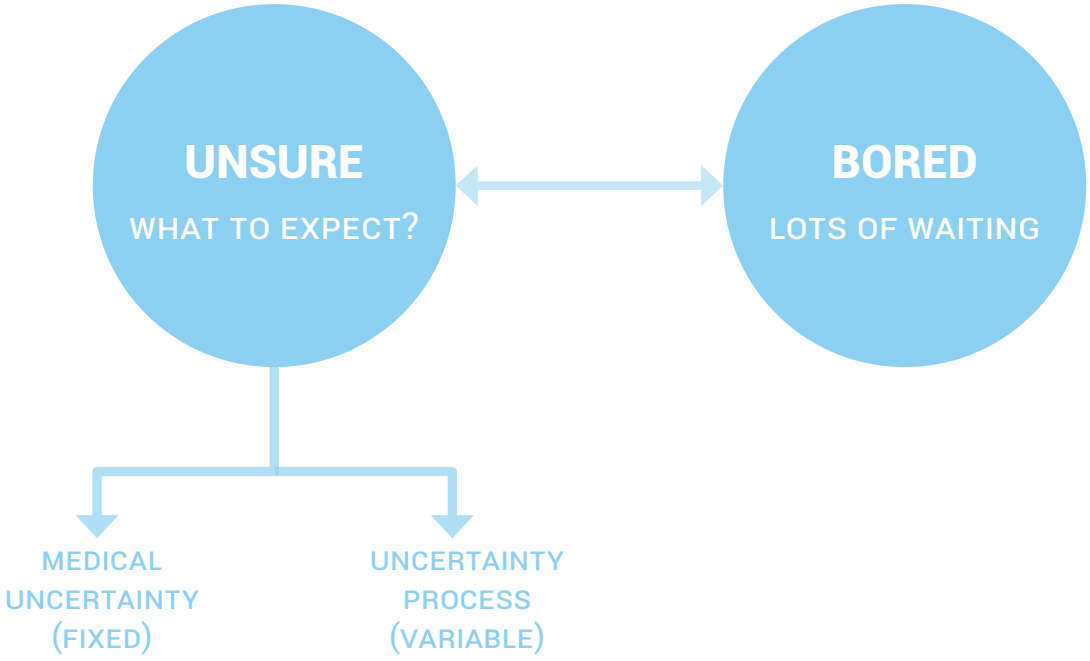


Figure 32 *The two ways of uncertainty; the always present medical uncertainty and the variable uncertainty about the process.*

Unsure

Unsure refers to not knowing what to expect, when to expect it, who to expect, how long it is going to take, etc. This happens at various moments throughout the journey for example in the waiting room, after the triage, and before treatment.

"Then when we went to the room, I think probably there was not anybody who explained us from the beginning what exactly was going to happen, so we had different people coming in. Maybe in the beginning they could have just said 'look, this is the time-line expect it to be that and that, these are the different people you are going to see, this are the different things that are going to happen, and we think we need 1,5 hours but if not, we will come back in the meantime to discuss." (VUmc)

Bored

Bored refers to the multiple moments of waiting throughout the journey and is almost always mentioned by the children, not necessarily by the parents. Both themes are related to each other, bored occurs in the same moment in the time-line of an acute admission, when you are waiting. When you don't know why you are waiting or how long etc. you feel unsure.

"I was bored at the ED, I was just staring around... nothing to do" (AMC)

"At the ED I was a little bored, I didn't had anything to do because I just arrived and I didn't know if I had a appendicitis, so yea... I just read some magazines.. I read them all twice.." (VUmc)

The emotion line in the Patient Journey is an interpretation of the data from the emotions tools in the sensitizing booklet (see Figure 33 and 34) combined with the data from the statement cards derived from the semi-structured interviews. At the ED many fluctuations in the emotions can be seen, these are linked with the many moments of waiting and often accompanied by feeling unsure about the process. This mainly came forward in the statement cards were both child patient and parent indicated they were feeling unsure. Literature research has shown that parents emotions reflect on children so it's difficult to make a distinction between child patient and parent when it comes to uncertainty.

Children's emotions

Children were asked to rate their emotions at 3 different moments; at arrival, first hours, and end of stay. This was for both the ED and the paediatric nursing department. As can be seen in Figure 33, the emotions for the ED are mostly on the negative side of the emotion circle, whereas for the paediatric nursing department the emotions were mostly rated positively. At arrival at the ED all children felt tense, whereas at the end of their stay they felt neutral. At the arrival at paediatric nursing department the children mostly felt tense and neutral, whereas towards the end of their stay they felt cheerful.

It should be noted that the emotion 'bored' wasn't indicated by the children, however it was one of the main emotions derived from the statement cards. This could be explained by the fact that it is not the primary feeling when children are asked about their emotions at a certain moment in time.

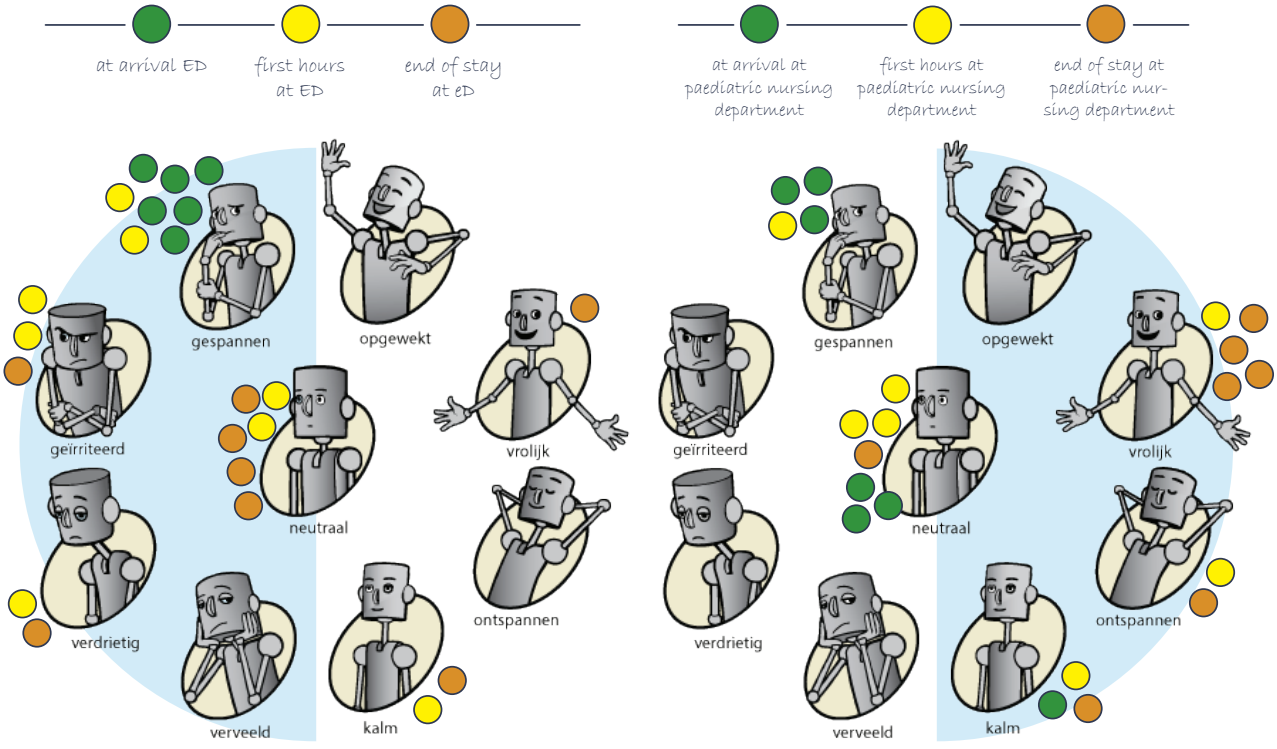


Figure 33 *The emotions of the child patient evaluated on different moments throughout the acute admission. The emotions at the ED were mostly on the negative side of the emotion circle, whereas at the paediatric nursing department the emotions were mostly on the positive side of the circle.*

Parents' emotions

The emotions of the parents during this journey were also tracked, however the method proved more difficulties than the method used to research the child emotions. In Appendix 20 a calculation of the mean, mode, and median of the data of the parent's emotions can be found. A visualization of the emotions (Figure 34) shows 5 areas of interest when comparing the ED to the paediatric nursing department. (1) An increase in calmness, (2) a decrease in uncertainty, (3) a decrease in anxiety, (4) a decrease in tension, and (5) an increase in sadness. The increase in sadness at the paediatric nursing department is striking. However, when looking at the data per patient individually, no increase is seen for feeling sad, therefore the visual representation of the mode for sadness seems inaccurate. All in all, it can be said that at the ED parents feel unsure, anxious, tensed, and less calm compared to the paediatric nursing department.

Figure 34 *The emotions of the parents evaluated on the ED and the Paediatric Nursing Department. The columns represent the calculated mode whereas the dots represent the individual rates. Four areas of interest where found, marked in yellow. The emotions were rated by parents for the Emergency Department and the Paediatric Nursing Department on a 1 to 5 scale, 1 being little and 5 being very.*

DESIGN RESEARCH

Innovation Opportunities

Not only were the opportunities for improvement determined, the things that are already perceived as very positive were categorized, as can be seen below.

The AMU work group asked to look into the patient experience around the possible extra transfer. In addition, recommendations specifically for the future P-AMU were also elicited, based on the insights of this research.

"They explained what was going to happen, they didn't shy away that it will hurt. They were fair and they were honest" (VUmc)

"Everything was explained well and in a calmly manner" (VUmc)

"I didn't have to describe my pain in a certain way, they gave me options to choose from which helped me to describe my pain" (VUmc)

"Everybody that came was nice and friendly" (Vumc)

"Everywhere we went I would say people are upbeat, they are friendly, positive, helpful, approachable. There is a really nice atmosphere." (VUmc)

"The nurses are very sweet and kind, they will do everything for you, and are always there for you, you can ask them anything, that is nice" (VUmc)

"How the staff is here, it is just great!" (AMC)

"It was nice when the doctors came by, a moment of receiving more information" (VUmc)

"It is not so hospital-like, very pleasantly designed, especially for children, it is a little homey" (AMC)

"This thing, for family to come whenever, having a cup of tea or coffee, none of it seems restricted" (VUmc)

"They organized an afternoon with games. He liked to play for a bit, just doing something" (AMC)

"Kinderstad was fun, especially the PlayStation" (VUmc)

Extra transfer

One of the questions that came from the AMU work group was 'how do patients feel about possibly having an extra transfer?' (Figure 35). It is hard to figure out whether patients in this specific situation would mind an extra transfer since it is a quite abstract question to ask. However, looking at the entire patient experience, it seems like child patients and parents are okay with the steps if they are informed about them and know what to expect. So, in order to make this possible extra transfer acceptable, good information needs to be provided and they should be prepared before it happens. The AMU work group already brainstormed about the idea that the ED-nurse will continue taking care of the patient at the P-AMU, so nurses work in rotations between the departments. It is desirable that the AMU-nurse, that previously was the ED-nurse, continues the care after the transfer to the paediatric nursing department and therefore guides the child patient and parents throughout the entire process.

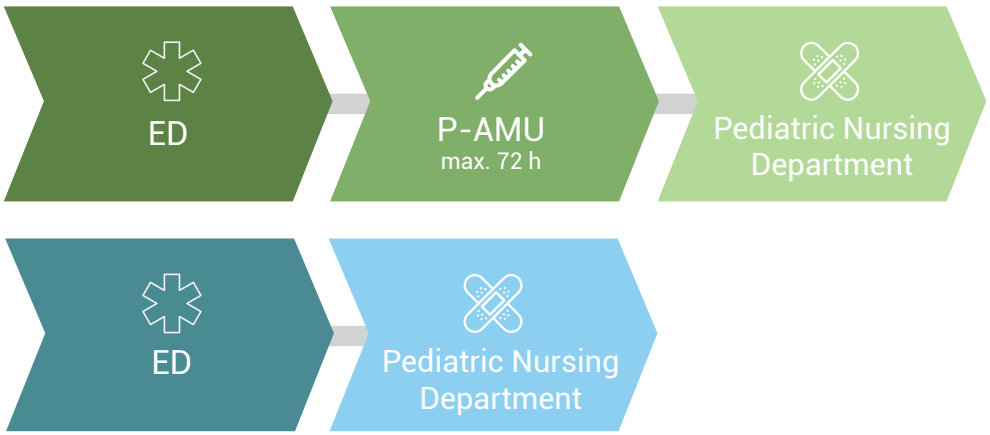


Figure 35 *The general future steps in the patient journey including the P-AMU versus the current general steps*

Recommendations for the P-AMU

The results from this research that can be beneficial for the P-AMU are listed as recommendations. These recommendations are things that are seen in rare occasions and that can be implemented more intensively, or things that patients have indicated, directly and indirectly, that could be improved. Moreover, it is important to look at the entire patient journey in order to create an integral experience, therefore improving the patient experience at the P-AMU already starts at the ED!

Communication

Figure 36 shows an overview of the recommendations for the P-AMU. There are three recommendations regarding communication; accessible information, visual, and child-focused communication. Almost all communication is verbal so child patients and parents have to process the information at that moment. They would like to be able to access the information so they can read or look at it later on again. Furthermore, examples where seen were visual communication increased the understanding of child patients. One child patient was improving very slowly. The doctor would mention certain values however those numbers didn't tell her anything. She lost faith in her recovery so her parents asked if the doctors could communicate more clearly. The doctors then made visuals of those values so the recovery became visible. Although steps were small, over time a clear progress could be seen which restored her faith in the recovery process. These recommendations on communication will also affect the uncertainty, which was found to be a main emotion in this research.

A personal environment

Two recommendations concerning the interaction with medical professionals were found. Parents and patients appreciated the little personal touches, for example their responsible doctor quickly stopping by when their shift is done and wishing the child patient a speedy recovery. In addition, child patients and parents prefer seeing a familiar face. A familiar face to them is related to trust and reliance. Both recommendations create a more personal environment.

Food

One recommendation for the AMC, which will be the location of the future P-AMU, is that parents would like to join the dinner provided by the hospital with their child. They indicated that they don't like leaving the child to get food. They also mentioned the food at the hospital was quite expensive, especially when your child has to stay for a longer period of time.

The setting

The last two recommendations were related to the setting; patients and parents appreciated a private room, and areas at the department where they can have a moment to themselves.

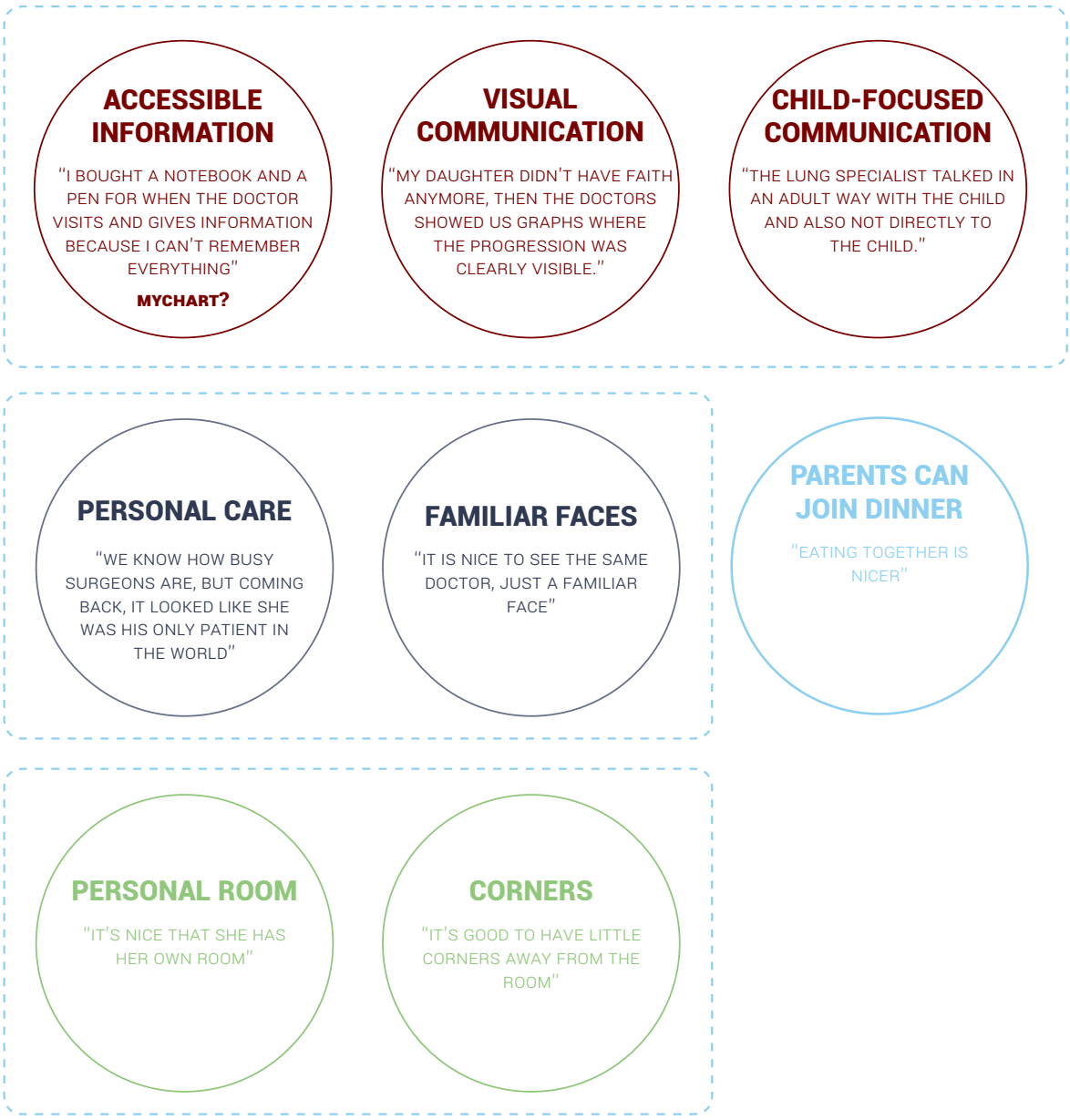


Figure 36 *Overview of the recommendations for the future P-AMU*

DESIGN RESEARCH

The last column of the patient journey includes the innovation opportunities. Here, all small factors were considered. The enlarged column with innovation opportunities can be seen in Figure 37. To make the results more reliable, the factors that were mentioned by at least half of the participants were marked in orange. The factors that are interesting from a designer's perspective were marked in yellow. Four opportunities addressed waiting time, three of them were mentioned by at least half of the participants. Furthermore, seven opportunities were related to communication, such as 'Communication plan' and 'Communicate via visual tools'. This appears to be a problem during multiple moments in the journey and therefore it is an interesting innovation opportunity for both hospitals.

There was one difference in innovation opportunities for each hospital. For the VUmc this was the troubled arrival at the ED, and for the AMC parents indicate they didn't receive food by the food service at the AMC which they would have preferred.

In the Innovation Work Plan (Appendix 21), all innovation opportunities are categorized in short term vs long term so both hospitals can work on all improvements found in this research besides the one elaborated on in this thesis.

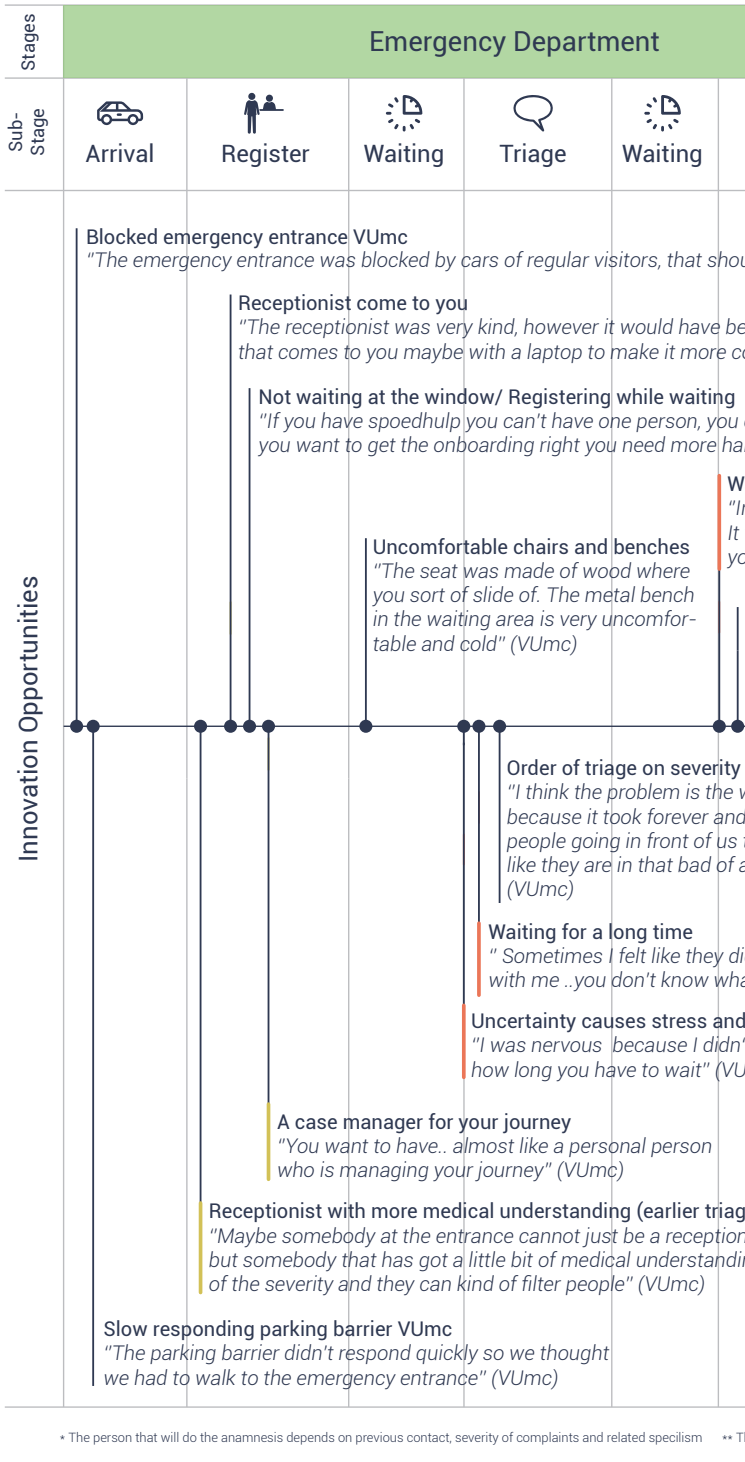
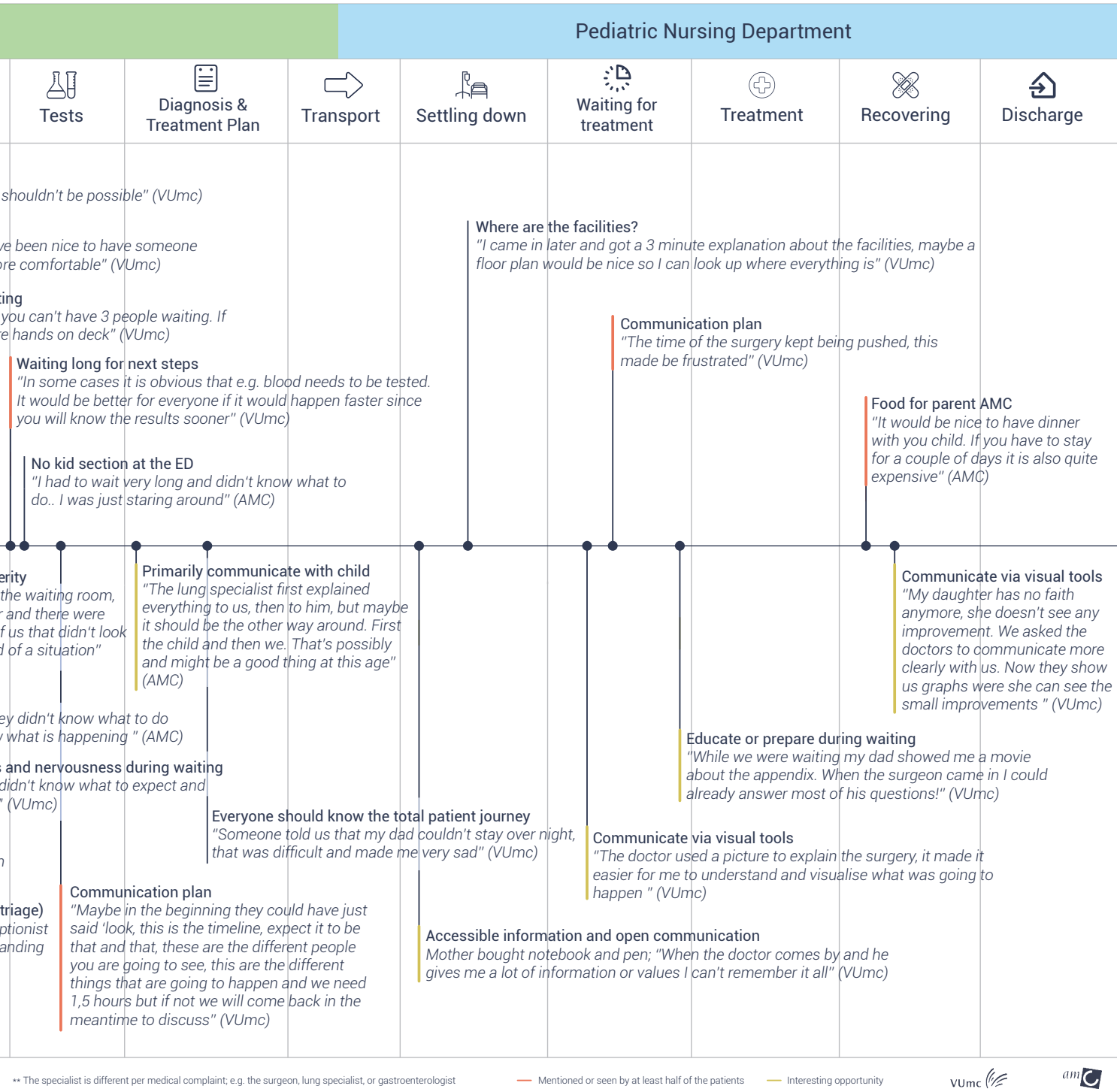


Figure 37 *The innovation opportunities of the current paediatric acute admission at the AMC and VUmc. Opportunities marked with orange are mentioned by at least 50% of the participants. Opportunities marked in yellow are interesting from a designer's perspective.*


Pediatric Nursing Department
Tests
Diagnosis & Treatment Plan
Transport
Settling down
Waiting for treatment
Treatment
Recovering
Discharge
shouldn't be possible" (VUmc)
ve been nice to have someone
re comfortable" (VUmc)
ting
you can't have 3 people waiting. If
e hands on deck" (VUmc)
Waiting long for next steps
"In some cases it is obvious that e.g. blood needs to be tested. It would be better for everyone if it would happen faster since you will know the results sooner" (VUmc)
No kid section at the ED
"I had to wait very long and didn't know what to do.. I was just staring around" (AMC)
Where are the facilities?
"I came in later and got a 3 minute explanation about the facilities, maybe a floor plan would be nice so I can look up where everything is" (VUmc)
Communication plan
"The time of the surgery kept being pushed, this made be frustrated" (VUmc)
Food for parent AMC
"It would be nice to have dinner with you child. If you have to stay for a couple of days it is also quite expensive" (AMC)
erity
the waiting room,
and there were
f us that didn't look
d of a situation"
Primarily communicate with child
"The lung specialist first explained everything to us, then to him, but maybe it should be the other way around. First the child and then we. That's possibly and might be a good thing at this age" (AMC)
Communicate via visual tools
"My daughter has no faith anymore, she doesn't see any improvement. We asked the doctors to communicate more clearly with us. Now they show us graphs were she can see the small improvements " (VUmc)
ey didn't know what to do
what is happening " (AMC)
Educate or prepare during waiting
"While we were waiting my dad showed me a movie about the appendix. When the surgeon came in I could already answer most of his questions!" (VUmc)
s and nervousness during waiting
didn't know what to expect and
" (VUmc)
Everyone should know the total patient journey
"Someone told us that my dad couldn't stay over night, that was difficult and made me very sad" (VUmc)
Communicate via visual tools
"The doctor used a picture to explain the surgery, it made it easier for me to understand and visualise what was going to happen " (VUmc)
triage)
ptionist
anding
Communication plan
"Maybe in the beginning they could have just said 'look, this is the timeline, expect it to be that and that, these are the different people you are going to see, this are the different things that are going to happen and we need 1,5 hours but if not we will come back in the meantime to discuss" (VUmc)
Accessible information and open communication
Mother bought notebook and pen; "When the doctor comes by and he gives me a lot of information or values I can't remember it all" (VUmc)
** The specialist is different per medical complaint; e.g. the surgeon, lung specialist, or gastroenterologist
Mentioned or seen by at least half of the patients
Interesting opportunity
VUmc
amc

By analyzing the frequently mentioned innovation opportunities and the ones that are interesting from a designer's perspective, the three main opportunities for were identified.

Opportunity 1
Decreasing the perception of waiting time

Opportunity 2
Redesigning the arrival experience at the ED

Opportunity 3
Improving the communication about the process to decrease the uncertainty

4.4 Discussion & Limitations

This qualitative research included 8 child patients. It was planned to include participants in prospect of their journey, meaning contacting them at the ED, to get the most accurate evaluation of the patient experience (Lallemand et al, 2015). However, in practice, 6 out of 8 participants were included in retrospect which could result in less accurate representation of the patient experience. Moreover, the variation in medical complaints of the participants required for generalization, focusing on one specific medical complaint could have resulted in different data. Finally, the method used to understand the parent's emotions appeared not to be ideal since some emotions where difficult to rate. The lower amount of data of specific parent's emotions could have shown an inaccurate picture of the real emotions.

'Improving the patient experience at the P-AMU already starts at the ED!'

CONCLUSION & INSIGHTS

It is important to look at the entire patient journey to create an integral experience, therefore improving the patient experience at the P-AMU already starts at the ED. This is true if assuming that the results of the current paediatric nursing departments will represent the future P-AMU.

Two main themes were identified in the statement cards of almost every patient; 'Unsure' and 'Bored'. There is a base level of uncertainty, caused by the medical uncertainty. The uncertainty about the process is increasing the level of uncertainty in the current situation. The main question is 'how can we prevent the level of feeling unsure to increase, keep it at least stable, or ideally decrease this level?'.

Child patients mostly experience negative emotions at the ED, whereas for the paediatric nursing department the emotions were mostly rated positively. At arrival at the ED all children felt tense, whereas at the end of their stay they felt neutral. At the arrival at paediatric nursing department the children mostly felt tense and neutral, whereas towards the end of their stay they felt cheerful. Parents feel unsure, anxious, tense, sad, and less calm at the ED compared to the paediatric nursing department.

The next chapter, regarding the conceptualization phase, will start by chosen which innovation opportunity to continue with. The recommendations provided for the future P-AMU need to be taken into account further along the design process, depending on the chosen innovation opportunity..

05 DESIGN BRIEF

In the previous chapter the PX of the current acute paediatric care was researched including expectations, behaviour, and emotions. Three main innovation opportunities were found. In the design brief a decision for one of these innovation opportunities is made and a more detailed design brief is formulated. Furthermore, the design goal, the interaction qualities and vision, and the requirements and wishes are explained. This creates a clear framework for designing, and therefore it will be the start of the conceptualization phase.

DESIGN BRIEF

5.1 Design Vision

After the literature, field, and the user research, various innovation opportunities were identified in the Patient Journey. At the end of the design research, the three main innovation opportunities were formulated. In order to develop a detailed design brief and design goal, a decision for one of the innovation opportunity has to be made.

Opportunity 1

Decreasing the perception of waiting time

Opportunity 2

Redesigning the arrival experience at the ED

Opportunity 3

Improving the communication about the process to decrease the uncertainty

The choice of the innovation opportunity was made in consultation with the heads of the paediatric departments of both AMC and VUmc. As was seen by the two main themes 'Unsure' and 'Bored' the waiting time and lack of information are the main problems. Like described by the KANO model (Figure 38) basic factors need to be present before the performance and WOW-factors will make a significant improvement. People won't let themselves get distracted by, for example, entertainment to change the perception of time, if the basic need for information is not fulfilled. Therefore, Innovation opportunity 3 *"Improving the communication about the process to decrease the uncertainty"* has to be tackled first in order to improve quality with performance factors and WOW-factors. Therefor the design vision is to 'provide the child patient and parents with information about the process before adding any form of entertainment'.

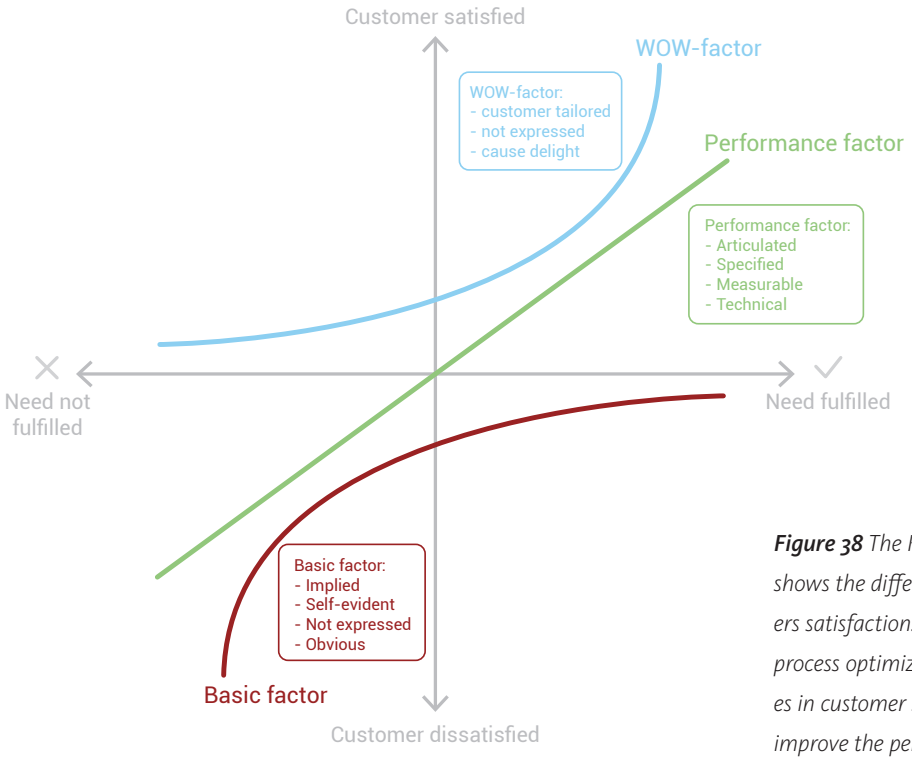


Figure 38 *The KANO-model (Sauerwein et al, 1996) shows the different factors in relation to the customers satisfaction. After a certain point basic factors, like process optimization, will not result in major increases in customer satisfaction. Then it is more efficient to improve the performance factors and WOW-factors.*

5.2 Current vs desired situation

In Figure 39 an overview of the qualities and characteristics of the current and desired situation are given,, both were categorized into the themes; children (green), parents (pink), uncertainty about the process (blue), and information (yellow). The qualities also depend on each other, for example an improved information supply will affect the level of uncertainty. Parents emotions reflect on their child, so addressing parent's emotions is also indirectly addressing the child's emotions.

5.3 Design goal

Based on the conclusions from the design research and the chosen innovation opportunity, the design goal is formulated as followed:

> *"I want child patients and parents to feel **less unsure and bored** during the acute admission, by designing a tool that improves their **communication** with the healthcare system about the acute admission process, and that puts the **children in control** in a **playful and understandable** way"*

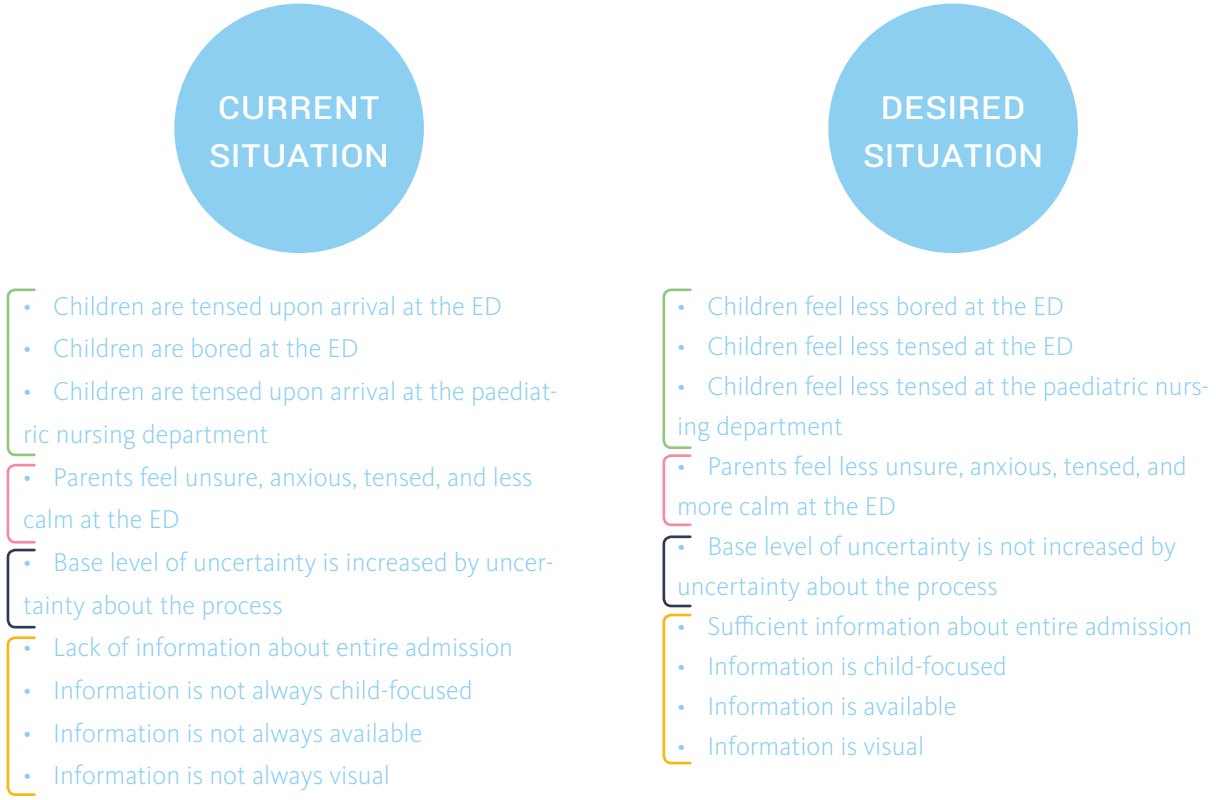


Figure 39 *Overview of the qualities and characteristics in the current and desired situation*

5.4 Interaction Qualities

The interaction qualities that fit with the desired situation are:

- Playful
- Child patients in control
- Engaging
- Guiding
- Clear

To make children feel less bored a playful and engaging interaction should be designed. The interaction should be clear and guiding as to not create more uncertainty, and make the children feel in control. Besides the children's waiting room at the ED at the AMC, no further tools are present to create a playful interaction. Children are just waiting for something to happen and are not engaged in their care and therefore the feeling of control can be enhanced. No clarity or guidance is provided yet.

5.5 Interaction vision

An interaction vision is used to learn from a situation where the interaction qualities are already experienced. By projecting this interaction onto the current design problem interesting new perspectives can be obtained. So the interaction vision represents the intended qualities of the desired interaction. The interaction vision for this design goal is formulated by means of a metaphor. The interaction should feel like playing with a LEGO kit (Figure 40). Children can't wait to get started when they see a new LEGO kit! They can decide what to build it and how to build it (*in control*). The kits have an instruction manual that visually explains them how to do it, so they are able to do it by themselves (*guiding*), however it is also a lot of fun to do it with a parent or with other kids (*engaging*)! The various little bags in the kit give them the opportunity to make additions or build different ver-

The interaction should feel like playing with a LEGO kit.

Figure 40 *The metaphor of the interaction vision; Playing with a LEGO kit*

sions so it stimulates playful freedom and creativity (*playful*). By giving them boundaries for creativity it enhances their ability to be creative (*clear*).

5.6 Requirements & Wishes

The requirements and wishes for the design are listed below:

Requirements

- Suitable for patient with various kinds of medical complaints
- Suitable and understandable for children age 6 - 16 years
- Duration of use is 0,5 - 3 hours
- Not excluding the informal caregiver(s)
- Visual communication
- Providing insight into the process of an acute admission

Wishes

- Including the informal caregiver(s)
- Making patient specific information accessible
- Optimizes the process of an acute admission
- Not increase the workload of medical professionals
- Easy to implement

06 CONCEPTUALIZATION

In the conceptualization phase all gathered insights are put together to create concept directions for the formulated design goal. A creative session was organized in order to gain a broader sense of the problem and obtain different perspectives on the situation.

In this chapter more information about the creative session, the concept directions, the final concept direction, and the iterations can be found. This led to the final design which can be found in Chapter 7.

CONCEPTUALIZATION

6.1 Creative Session

Through the research performed thus far, a design goal was defined based on the insights of the current and desired situation. A 2,5-hour creative session was organized to generate and collect ideas in a broader sense with different perspectives. In total, five Industrial Design students and graduates with a master's degree in Strategic Design and Design for Interaction participated in the creative session. In preparation of this creative session the books 'Creative Facilitation' by Marc Tassoul and 'Professioneel Wyberen' by Jan Buijs & Han van der Meer were studied.

Problem Analysis

A presentation about the topic and performed research was given to inform the participants about the project. After the presentation, the group defined the 5W's & 1H (Who, What, Where, When, Why, How), this technique is used to make sure everyone has the same understanding of the problem and the context. It was nice that the participants shared their personal hospital experiences with each other. Next, a technique called 'Wishful Thinking' was applied; together we discuss how the ideal situation would look like. Interestingly, in the ideal situation there is a balance between no waiting time and being relaxed. Interestingly enough, the ideal situation would also has a little bit of waiting time so people can have a moment to for example process the received information, or get comfortable with the steps that will be taken.

Ideation

The ideation phase starts with emphasizing rules for the creative processes; the 'Postpone Judgement' and 'Quality through Quantity' (Tassoul, 2006), furthermore you can hitchhike on each other's ideas, and dare to think of the absurd. This will create an environment where everyone feels comfortable to share their ideas. To enhance this atmosphere of trust, curiosity, and security, and to start the creative thinking the group played 'Pictionary'.

Then the participants had a short free brainstorming session to get all their initial ideas and thoughts out of their heads and on paper, an inventorising technique called 'Shedding the known' (Tassoul, 2006). These ideas were briefly discussed and elaborated upon with the group.
In the next part of the session a combination of 'Brainwriting' and 'How To's' (H2's) was performed (Figure 41). With H2's you explicitly ask for ways to reach a specific goal (Tassoul, 2006). Six specific H2 questions that trigger the participants were formulated on a piece of paper. Every participants starts with one sheet of paper, after 2 minutes the participants switch papers with the person to the right. This is done until at least every participant has had every H2 and everyone has written down everything they wanted to. All the ideas are discussed and elaborated upon with the group.

Selection and detailing

During the ideation over 100 ideas were generated. Every participant received four dots and pasted them next to the best, most interesting, or most innovative ideas of their choice. Five ideas got an even amount of votes. With the group we discussed which ideas could be combined and could create the most impact to end up with the two best ideas. The group was divided into two to each work out the ideas further (Figure 42). The interaction vision 'playing with LEGO' was also introduced to the group so they could implement the interaction qualities into their ideas.

Figure 41 *Ideation using H2's during the creative session*

Figure 42 *Detailing the chosen ideas during the creative session*

Insights

Interesting insights were acquired during this creative session. The most important insight was that patients are missing a fixed point, which could be a person, product, or service, to fall back on, to hold on to, and that guides them through the journey. Normally a child would rely on their parent(s), however in this situation the parent(s) cannot always give them the information or support they need. Furthermore, it is necessary to define a smaller age-range per idea, and to determine in how much pain a child patient is in to see what he/she can and wants to do in such a situation. Distraction, entertainment, and relaxation were terms that were repetitively mentioned during the session. Overall, the creative session provided a broaden perspective on the design goal.

6.2 Concept directions

Combining the outcomes of field and user research, insights of the creative sessions, individual ideation combined with feedback from the medical professionals, as well as cross comparing findings against the literature, the following three concept directions were created:

1. Peer-to-Peer or Patient to Patient Platform
A digital platform where children tell and show each other what will happen during an acute admission
Opportunity: 'Expectation Management'

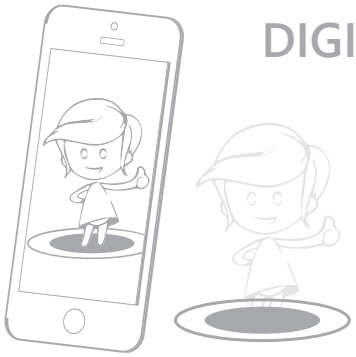
2. Digital Buddy
A personally created digital buddy that will guide them through their journey.
Opportunity: 'Fixed Guidance'

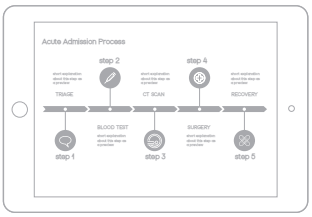
3. 'Mijn Paspoort'
A personal booklet for the child patient that will function as a communication and information tool.
Opportunity: 'Communication & Information'

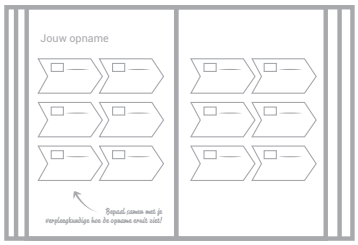
Each concept will be explained in more detail in the next few pages. For each concept three aspects were determined; an age-range, use related to the level of pain, and whether it's useful and engaging for child patients that are familiar or unfamiliar with the healthcare system.

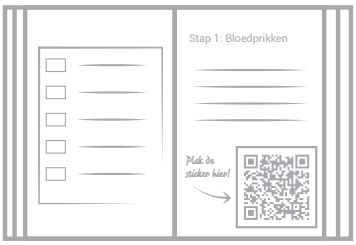
Patient-to-Patient Platform

DIGITAL BUDDY









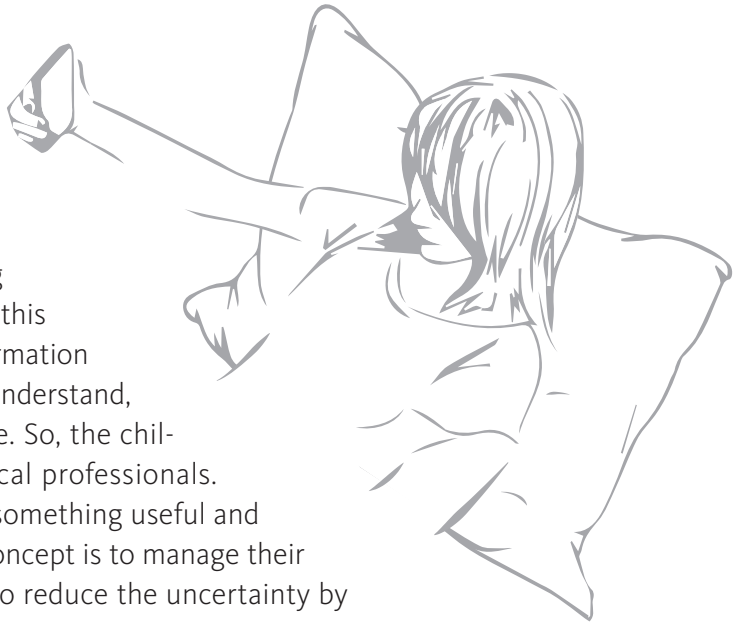
mijn paspoort

age: 9 -15 years

(un)familiar: both

pain: all levels

Patient-to-Patient Platform



This is a digital platform where children can show each other what will happen during an acute admission by making videos about their own medical journey. In this way, the child patients will receive the information that the are looking for, in a way they will understand, and in the context of personal experience. So, the children are the experts instead of the medical professionals. Making videos will give the child patients something useful and fun to do while waiting. The focus of this concept is to manage their expectations through the use of this app to reduce the uncertainty by using the child patients' perspective.

Who can better tell you what to expect than someone your age who has experienced it already

Patient-to-Patient platform	
Focus	Expectation management from the patient's perspective
Added values	• Patients are seen as the experts • In-context information by and for children • Browse through videos to find the right information whenever you want to • See who are the medical professionals involved in the patient's treatment • Distraction by means of making videos • Rewards for patients when participating • Useful feedback for the hospital can be generated for future improvements
Challenges	• Do patients like to make videos of themselves in this situation to help others? • How to make sure there is useful content for every patient? • How to handle confidentiality? • Will this be a positive contribution or is it counterproductive when patients that look very ill are shown to children at just enter the ED? • A filter is needed to remove inappropriate/disturbing videos or parts of videos

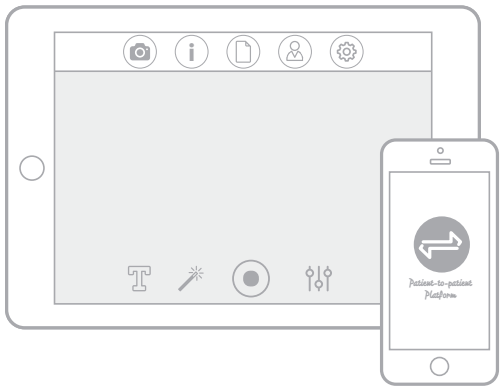
Table 5 *Overview of the focus, added value, and challenges of the 'Patient-to-Patient Platform' concept*

By joining the platform they also join the community of children in the hospital; belonging to a group can make things a little less scary. If a new child patient registers at the ED, other child patients can 'welcome' him/her to the community. Since the platform will consist of user generated content this needs to be triggered in the right way. For example "Can you show me how the room you are in now looks like?" can be a trigger to generate content about the environment.

By making a personal profile (age, medical complaint, etc) the platform can give the child patient suggestions for movies that relate most to their situation. Child patient are triggered to share something about their situation by notifications of the system. They can use filters, add animations, sound effects, and text to their movie or picture. Facial filters are going to be an important feature so child patients are able to hide the way they look if it makes them uncomfortable. If they are not comfortable with making a movie they can take a picture and/or write down what they have experienced.

'Who to expect' is also a part of expectation management. That's why child patients can see who is part of their treatment team. A picture and description of every professional is shown.
Child patients can also read general information about the various steps in their journey. Uploaded videos can be linked to these steps.

Why would the child patients participate? Their should be some kind of reward. The more videos or updates you post the more of an expert you become. Patients can like videos of others and reply to the posts. Contests can be organized where prizes can be earned, like choosing which movie will be played at the hospital theater. In Table 5 an overview of the focus, added value, and challenges is given.



Watch and make videos and read stories about experiences of other child patients

Information about the steps in your acute admission process

See who are the medical professionals involved in the your treatment

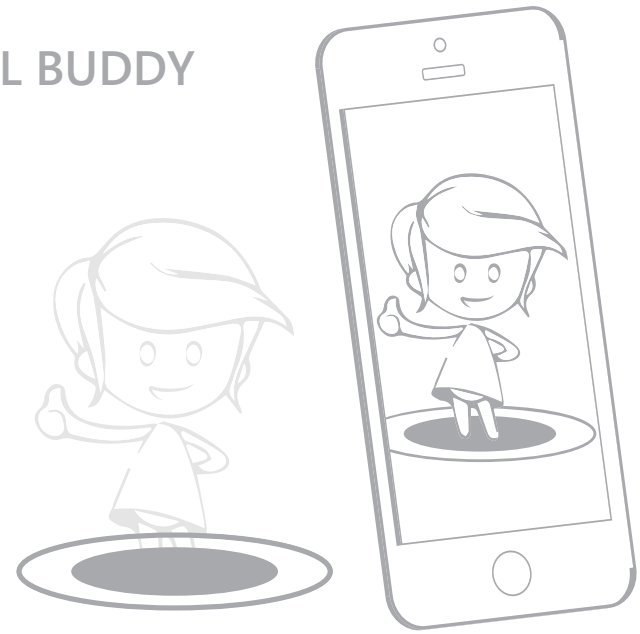
CONCEPTUALIZATION

age: 6 -10 years

(un)familiar: unfamiliar

pain: all levels

DIGITAL BUDDY



Buddy is a digital host that will guide the child patients through their journey to provide fixed guidance and support that one can always fall back on (NL: 'houvast'). Normally a child would rely on his parents, however in this situation they also can't fulfill their needs. The digital buddy is linked to EPIC to give real-time notifications so child patients receive the right information at the right moment. For example when a doctor orders a blood test in EPIC, Buddy will notify the child patient and inform them about what will happen and when it will happen.

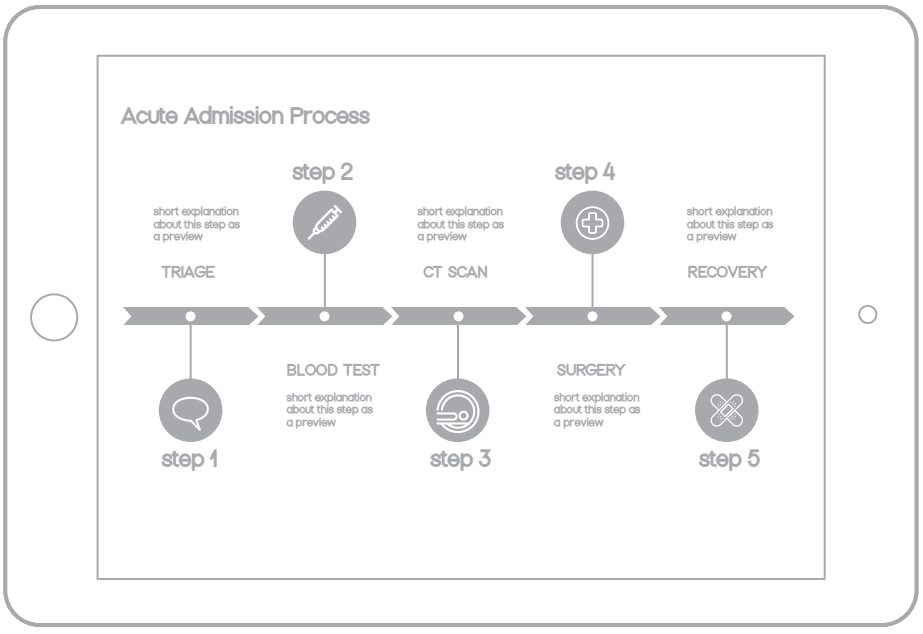
While the parent is registering the child, he/she can download the app and created his personalized buddy. Augmented Reality (AR) trigger point stickers are placed in every room. By scanning them with the app their buddy comes to life!

Digital Buddy	
Focus	Provide fixed guidance to fall back on (NL: ''Houvast')
Added values	• Real-time updates/ live tracking to provide the right information at right moment • Quick and simple notifications with an option for more information if preferred • Read information about the step whenever you want to • Get answers to your questions right away • Useful feedback for the hospital can be generated for future improvements
Challenges	• Is it possible to make a link with EPIC? • Is the AR component adding enough value to make it worth the investment? • How can we extend the duration of useful interaction

Table 6 *Overview of the focus, added value, and challenges of 'Digital Buddy' concept*

Buddy prepares the child for the next step that's approaching, by a short explanation and giving an option to receive more information, as seen below. Child patients can always ask buddy a question by typing it in the application. Buddy will refer you to the right information that is understandable for children. In the application, an overview of the steps of a patient's journey, including explanation in text and visuals, will also be provided based on the orders in EPIC. Nevertheless, if no orders are made, Buddy can make a link to the journey of other patients with similar symptoms to predict the steps. Before showing this to the child patient the medical professional needs to give his/her permission to share the results in order to validate the accuracy of the provided information.

In Table 6 an overview of the focus, added value, and challenges of this concept is given.



CONCEPTUALIZATION

age: 6 -10 years

(un)familiar: unfamiliar

pain: low-moderate

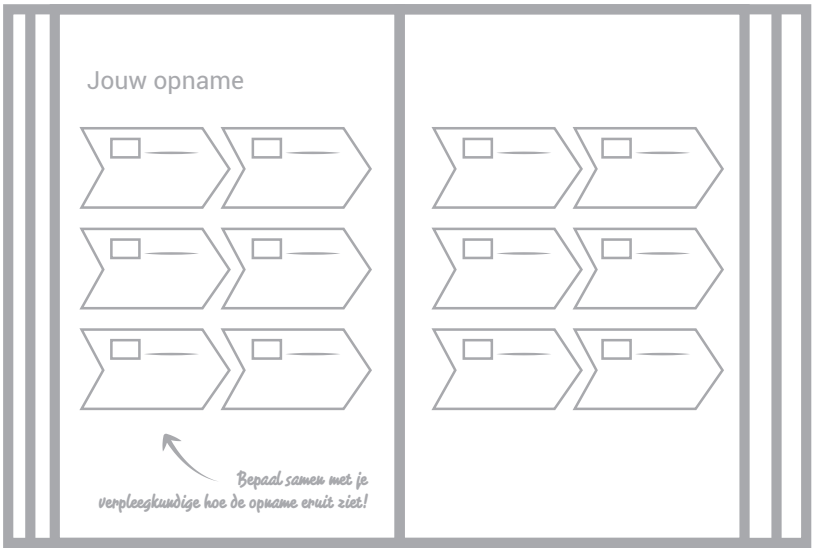
mijn paspoort

'Mijn Paspoort' is a personal paper booklet that gives a complete overview of the acute admission process. It also gives additional information via QR-stickers and it will also function as a communication tool with the nurses.

While the parents register their child, the child patient receives the booklet and starts filling in the personal section. If he/she has finished and still has to wait the puzzles and exercises in the booklet will give some distraction and entertainment.

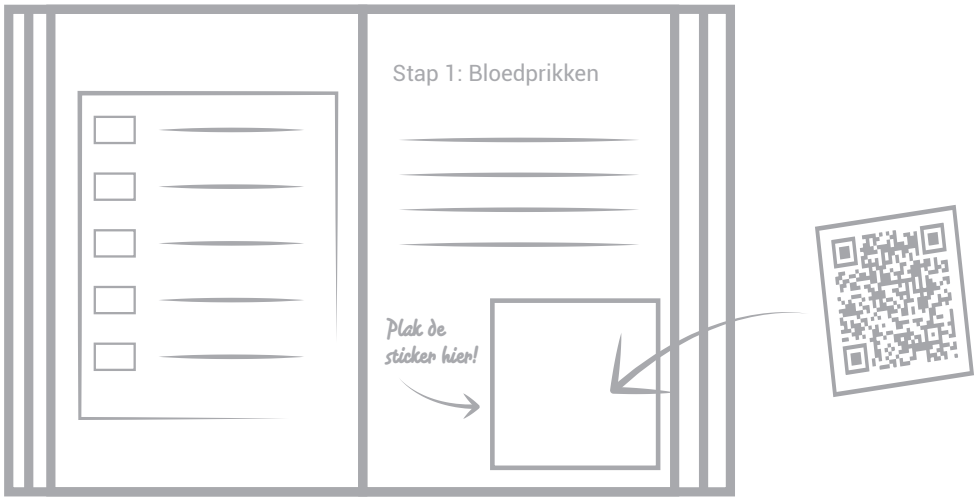
The patient journey template sits at the beginning of the booklet and can be used by the nurses to identify the steps in the specific patient's journey. They can also use this as a tool to discuss the 5Ws & 1H (Who, What, When, Where, Why, How) together with the child and parents. In this way, "Mijn Paspoort" acts as a guidance and communication tool for the nurse, so they know which information to provide to the patient.

Every medical professional will give the child a QR-sticker for a specific step. The sticker links to a website with more information, pictures and videos of



Mijn Paspoort	
Focus	Overview of the complete acute admission process from beginning to end
Added values	• Information provided at the moment the next step is approaching • Communication tool with nurses • Supplementation of admission process overview by writing down medical test results • Distraction by means of puzzles • Ease of implementation
Challenges	• A successful implementation depends on a change in organization culture → Will all nurses and doctors participate by giving the respective QR-stickers at the right moment? • How to make sure that the patients receive the QR-stickers at the right moment? • Child patients have to be able to write in the booklet (inability – due to symptoms)

Table 7 *Overview of the focus, added value, and challenges of 'Mijn Paspoort' concept*



this step or procedure. In this way child patients can learn about the steps and prepare for the procedures. The information can 'sink in' before they see the doctor, which will change the way the child patient interacts with the doctor the moment before the procedure will start.

To complete the overview of the process, medical test results can be written down in the booklet with the correlating procedure. In this way they don't have to remember everything and they can look back at it whenever they need to.

To make it more fun, bonus QR-stickers can be earned after accomplishments, e.g. laying still during the MRI-scan. These bonus QR's link to entertaining videos or games. In Table 7 an overview of the focus, added value, and challenges of this concept is given.

6.3 Final Concept Direction

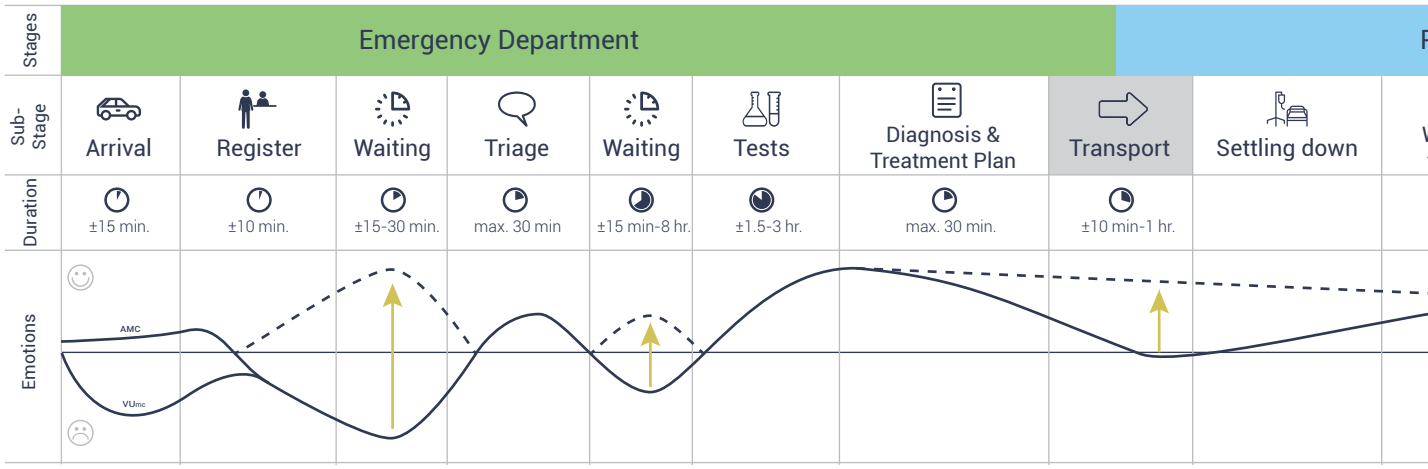
To decide which concept to develop further in this thesis, the requirements and wishes stated in the design brief (Chapter 5.6) and some extra defined key factors were visualized (Figure 44). In order to make a well-rounded decision, feedback from all stakeholders involved was needed. The three concepts were presented to an ED-doctor (VUmc), the Patient Experience officer (VKC), and five acutely admitted child patients (Table 8) to gather useful feedback. It should be noted that most child patients were teenagers and that not all concepts were designed for their age range. In Appendix 22 the posters with sketches about the concepts that were presented to the stakeholders can be seen. Using sketches invites people to think along and give feedback.

Participants	Hospital	Age	Gender
Participant 1	AMC	15	Boy
Participant 2	AMC	14	Boy
Participant 3	VUmc	13	Girl
Participant 4	VUmc	8	Boy
Participant 5	VUmc	13	Boy

Table 8 *Overview of child patients involved in feedback about the concepts*

All concepts were found to potentially improve the patient experience, but which concept can create the biggest effect (Figure 43)? This was the foremost question to answer. Looking at Figure 44 the Patient-to-Patient Platform showed the best results. Nevertheless, there is one crucial question that will make or break this idea. Do child patients like to make videos when they are admitted at the hospital? There was only one patient that loved this idea. This was not surprising since his passion was vlogging, and making and editing movies. He would love the be a part of setting up a platform like this. Other patients mentioned that they don't like to show themselves when they look sick and that it made them feel embarrassed and insecure. On the contrary, looking at videos of other child patients was something they really liked and appreciated.

" If a doctor or nurse tells you it won't hurt, you won't believe it anyway. With the video other children can be proof that it's true" – 13-years-old boy at VUmc



The ED-doctor thought most children would be too sick and physically not able to make a video. Another child patient mentioned that it matters whether you are in the hospital for one day versus a week. If you are admitted for a very short time you are less likely to invest in a platform.

I asked all child patients to make a top 3 out of the concepts. Giving their first choice three points, their second choice two points, and their last choice one point, a score was generated. In the end, the children like the 'Digital Buddy' most. What they really liked is that it can give real time feedback, so they have a better idea of what to expect, and that it can follow or guide them along their medical journey. They also liked the informal and playful way of receiving information.

From an organizational point of view, both professionals agreed that the 'Digital Buddy' would be the ideal solution, but that it would not be a viable short-term option. Therefore, they like 'Mijn Paspoort' because it could be implemented next week, so to speak. They also both indirectly mentioned an iterative innovation process where a concept is implemented relatively quick and you learn from the feedback and improve it along the way. All 3 concepts focused on the decrease of uncertainty of the process, and therefore all concepts will affect the 3 effects described in Figure 43. 'Digital Buddy' is expected to create the biggest effect on the patient experience.

All in all, the decision was made to choose the 'Digital Buddy' and include seeing the treatment team and the in-context videos of the 'Patient-to-Patient Platform' concept. These videos could be made by so-called child patient ambassadors who would really like to help others by making videos. Another important aspect for further development of this idea is to take into account long-term and short-term solutions about implementation this concept.

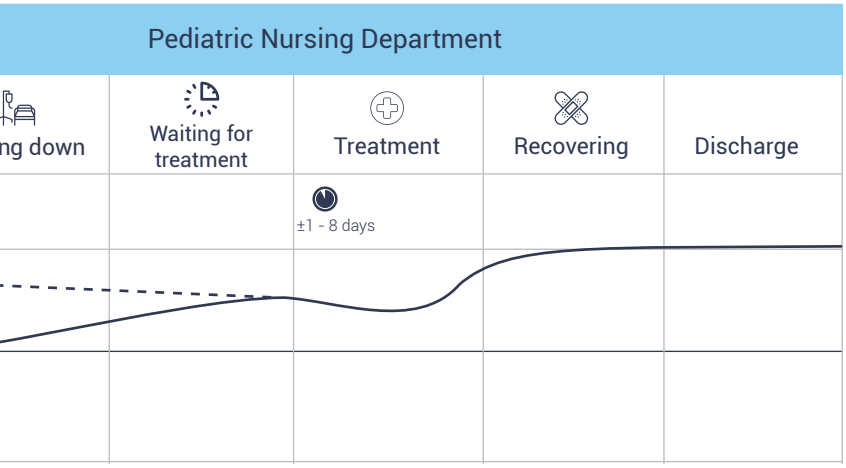


Figure 43 *The three most important effects on patient's emotions that the concept needs to create to improve the patient experience ; all three concepts include all effects.*

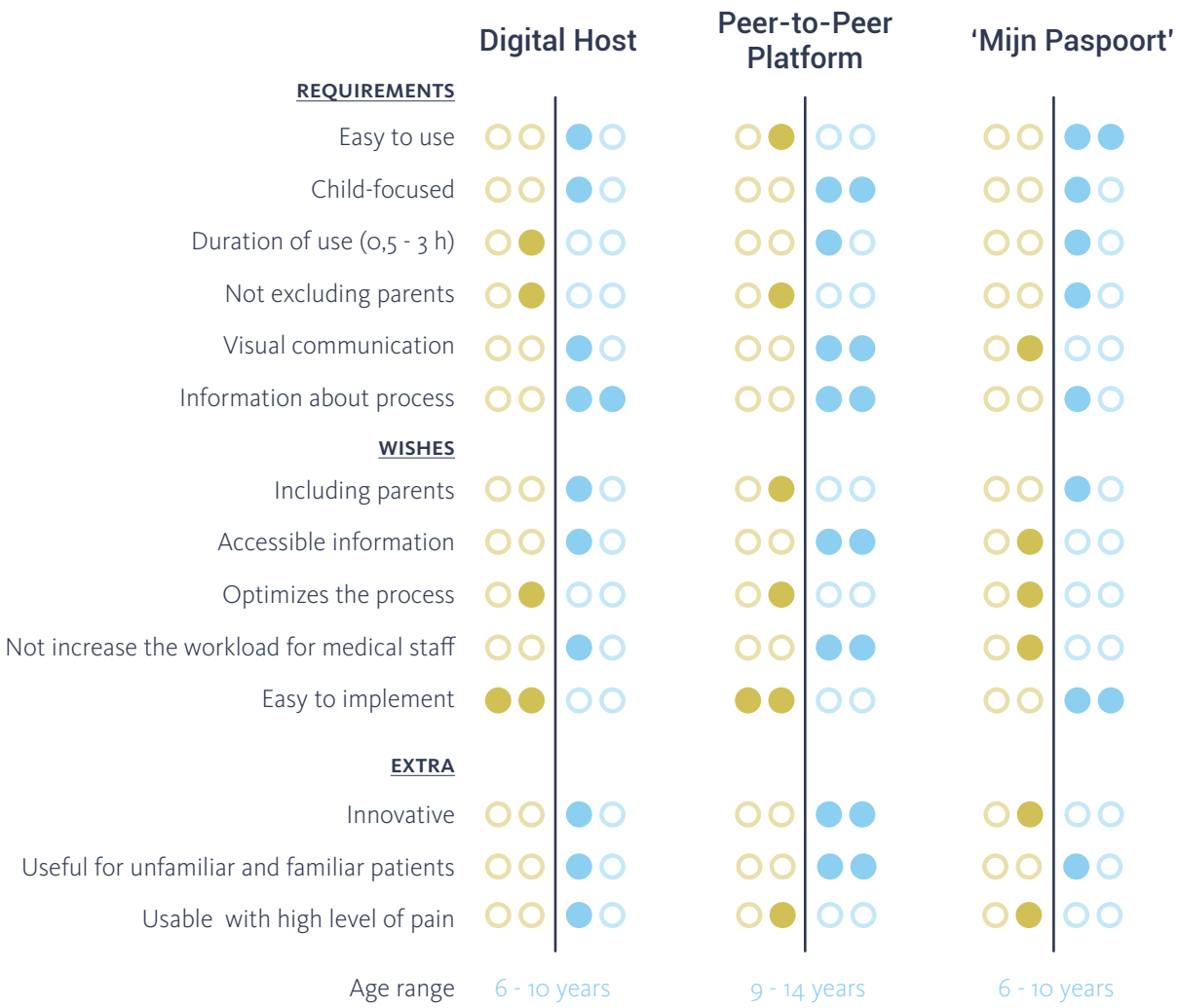


Figure 44 *A visualization comparing the concepts on the requirements and wishes (Harris Profile) stated in the design brief, and some extra important factors to decide which concept to develop further in this thesis. Requirements were marked as negative on the left, the yellow circles, or marked as positive on the right, the blue circles.*

6.4 Extended List of Requirements

Once the concept direction of 'Digital Buddy' was chosen a more detailed design was created. In order to do this, the list of requirements and wishes, first proposed in Chapter 5, was completed.

Main functions of design

- Creating a personal 'Buddy'
- Providing an overview of admission process
- Access to information about steps in the process
- Insight into the treatment team
- Real-time notifications on upcoming actions
- Ability to ask questions to your Buddy

Requirements

General:

- Provide information about the complete acute admission process
- Provide information about each step in the acute admission process
- Focusing on the moments of waiting
- Duration of use 15 minutes - 3 hours per waiting moment
- Available and accessible at any moment in the hospital
- Information is suitable and understandable for children age 8 - 13 years
- Not excluding the informal caregiver(s)
- Suitable for patient with various kinds of medical complaints
- Information is provided in a visual way

Waiting before triage:

- Indication waiting time
- Information about triage
- General information about ED

Waiting before tests:

- Indication waiting time
- Information about tests
- Picture and description about who is coming to take the test
- Notification when the tests will take place

Waiting after tests:

- Indication waiting time
- Explanation on test results
- In formation about what will happen next
- Preparation admission P-AMU/ Paediatric nursing department

Waiting for treatment:

- Indication waiting time
- Insights in test results
- Information about treatment procedure
- Notification when treatment is planned (or when delayed)
- Information about facilities and activities at the P-AMU/ paediatric nursing ward

Waiting for discharge:

- Indication of discharge (if possible)
- Clear discharge criteria
- Accessibility to patient information
- Overview of who is visiting and at what time
- Info on what next/ tips and tricks for at home

Wishes

- Useful for familiar child patients
- Including the informal caregiver(s)
- Making patient specific information accessible (e.g. link with MijnDossier)
- Optimizes the process of an acute admission
- Not increasing the workload of medical professionals
- Easy to implement

6.5 Iterations

To develop the chosen concept direction further, multiple design iterations were performed. By iterating on the design over time, it is tested, evaluated, and improved before delivering the final design. In this way, the biggest flaws are adjusted, and you make sure the design solves the design goal. In the iteration cycles the design is look back upon by examining the desirability, viability, and feasibility to create the most valuable design (Figure 45).

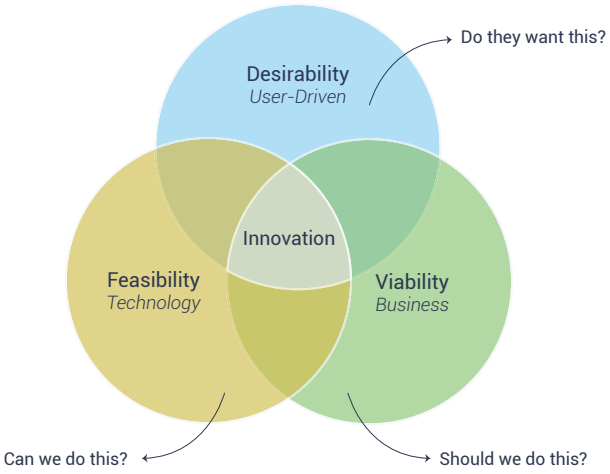


Figure 45 *During iteration, the design is evaluated on viability, feasibility, and desirability to create to most valuable innovation*

Iterations 1 : Viability and Feasibility

In the first iteration cycle, viability and feasibility are the focus of the evaluation with multiple organization professionals. When choosing the concept direction, 'Digital Buddy', the organization's stakeholders have indicated that implementation might be challenging and it will take a long time for it to be realized. Since the VKC is the client for this project and the design is mainly focusing on the ED, financing the design at the VKC might be difficult. To figure out the viability and feasibility of this design, an evaluation was done with an e-Health project manager, an ED-doctor in training, and a UX designer. During this iteration cycle the design was printed on paper and explained to organization's professional. This included the four most important functions; (1) making a personal avatar, (2) a general overview of acute admission process, (3) specific information about a step, and (4) a personal notification (Figure 48). After the screens were explained to the professional, he or she had the opportunity to give feedback.

eHealth project manager at the VKC

The 'ZorgPunt App' is an application that was initially developed for the neonatology department to improve the communication with the parents. The app provides an extended amount of information for the parents, a diary functionality where one can also enter data and create graphs about weight, growth, and breast milk, and a chat function where nurses can send texts and pictures to parents. They are now looking into implementing this app at various departments. Using this app as a base might be beneficial for the actualization of this design. To get a more detailed perspective on this, feedback on the design was asked from the e-Health project manager at the VKC (Figure 46). She really liked the design and the way it looks. She thinks it could really be an added value for child patients. However, she doesn't see a clear connection with the existing 'ZorgPunt App' since the ZorgPunt App is more focused on the parents instead of the children, and on the admission instead of the steps leading up to an admission. It is also not possible to add functionalities to the ZorgPunt App because this is not included in the investment for this app. Furthermore, she questions whether there is still budget left that can be used for the implementation of this design. Again, also she stresses the fact that a link with

EPIC or MijnDossier is difficult and will put implementation on the long-term because of issues with privacy and confidentiality. Her last concern is that the development team of the ZorgPunt App might not have all the capabilities to build this design as proposed. To create the content for this design you might need a dedicated team of medical professionals. She experienced difficulties with this since medical professionals have to do this next to their daily responsibilities. Moreover, you need to communicate very clearly what content you expect from them. To find funding for this design, an innovation competition within AMC/VUmc could be very promising.

ED-doctor in training at the AMC

For feedback from the medical perspective, the design was evaluated with an ED-doctor in training at the AMC (NL: SEH AIOS) (Figure 47). He really liked that it is an automated and real-time app because of the link with EPIC. Implementation with EPIC might be difficult, nevertheless making the workload as small as possible is very important in a chaotic department like the ED. However, they do make time for things like a 'Dapperheidsdiploma' (Braveness diploma) at the ED. He confirms that in EPIC both the responsible person for triage at a specific day and the people on the treatment team are registered. If the link with EPIC is too difficult, medical professionals can also add themselves to a patient's treatment team or the child and parent can add the medical professionals to their team themselves. He points out that the overview of the acute admission creates the impression that everyone will be admitted. A distinction is needed between the children that are discharged after the ED and the ones that need to be admitted. Furthermore, it would be beneficial if the waiting time would be more visual. He also mentions that the perception of waiting time is very important, so maybe the patients can receive some sort of planning. He gives an example of a case where doctors did multiple tests in 6 hours at the ED; within 6 hours the medical staff knew everything about the patient's medical conditions. However, the patient filed a complaint because he thought the process took too long.

Figure 46 *Evaluation by e-Health project manager of the VKC during the first iteration*

Figure 47 *Evaluation by ED-doctor in training at AMC during the first iteration*

CONCEPTUALIZATION

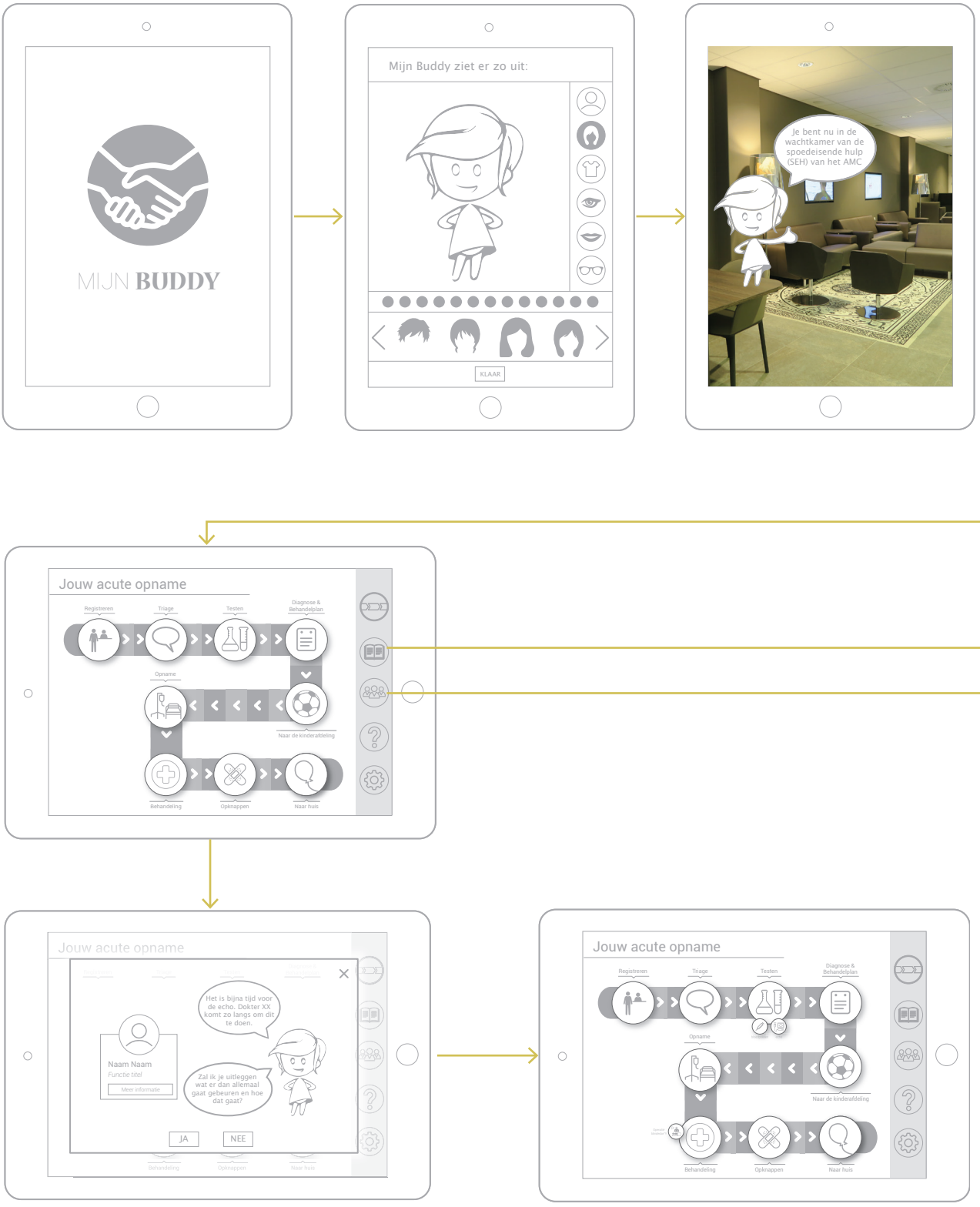


Figure 48 *Wireframe design iteration 1*


Er komt zometeen een verpleegkundige die jou gaat triëren
Zal ik je uitleggen wat er dan allemaal gaat gebeuren en hoe dat gaat?
JA
NEE
Registreren
Triage
Testen
Wat is 'triage'?
Bij de triage kijkt een verpleegkundige hoe het me je gaat en hoe erg je pijn is. Ze zal je allerlei vragen stellen over wat er aan de hand is. Ook doet ze kleine testjes zoals naar je hart luisteren. Ze geeft iedereen een kleurtje om zo de volgorde te bepalen wie als eerste wordt gezien door de dokter. Het kan dus zijn dat iemand na jou is binnengekomen maar eerder wordt geholpen.
Waar is de 'triage'?
De triage vindt plaats in de triagekamer, dit is het kleine kamertje tegenover de balie. Klik hieronder om een kijkje te nemen in de kamer.
Triagekamer bekijken
Wie doet de 'triage'?
De triage wordt gedaan door de verpleegkundige van de spoedeisende hulp. Nadat de verpleegkundige met jou heeft gesproken, bespreekt ze met de spoedeiserende hulp arts wat ze precies gaan doen. Vandaag doet XX de triage:
triage
Dit is de triagekamer, kijk maar eens goed rond! Klik op de informatie icoontjes voor meer uitleg
360
MijnDossier
Persoonlijk profiel
Naam Naam
Uitslagen
Bloedprikken 19-04-2018
Echo 19-04-2018
CT-scan 07-11-2016
Meer uitslagen
Actuele klachten
Buikpijn 19-04-2018
Hoesten 23-09-2017
Vermoeidheid 07-11-2016
Meer klachten
Medicijnen
Paracetamol 19-04-2018
Lisinopril 23-09-2017
Morfinesulfaat 07-11-2016
Meer medicijnen
Mijn behandelteam
Naam Naam
Functie titel
Meer informatie
Naam Naam
Functie titel
Meer informatie
Naam Naam
Functie titel
Meer informatie
Naam Naam
Functie titel
Meer informatie
Typ hier je vraag in en ik probeer je vraag zo goed mogelijk te beantwoorden

UX designer from Stichting Hoi Dokter at Fonk

For feedback about the design itself and to get more information about feasibility and implementation, the design was evaluated with a UX designer from Stichting Hoi Dokter at Fonk (Figure 49). They are already collaborating with the AMC and VUmc on developing applications. The goal of Stichting Hoi Dokter is to help families and young children (0-12 year old) to prepare for the medical treatment. When it comes to this design, she thinks it is a good design based on clear research findings. She does have some advice and critical notes. First of all, keep the design as small as possible; later on you can expand it. Another piece of advice is to look more into developmental psychology of 6 to 10 years old. For example, the word 'triage' is quite difficult to understand, and 6 years old are just completing their reading skills. You could also ask for the age during the onboarding so the content in the app will adapt to the right age. Ideally, you want to unite child and parent so everyone is well informed. A landscape orientation of the screen invites for collaboration between child and parent. Additionally, it is good to think about the device that the patients will use. A tablet is a 'we-device' whereas a phone is more for individual use. She also mentioned that it is good to check whether for example the MRI scanner looks the same at the ED as at the paediatric nursing department. Next to that, patients often already have an idea of what to expect or which procedures will follow. When they have to wait long they could maybe scroll through a list of procedures to look up the information themselves. Making an avatar works well for children, this was also found in their personal research when developing the Hoi Dokter app. This was especially the case when it is not too human-like, they can still relate with getting to personally or emotionally attached. Finally, it is debatable whether the link with MijnDossier really helps achieving the design goal. Furthermore, is medical data like test results something that needs to be communicated to the children or would it be better to update the parents about this? Moreover, sometimes you receive the results before seeing the medical professional. People start to google to understand the results which instigates all kinds of emotions.

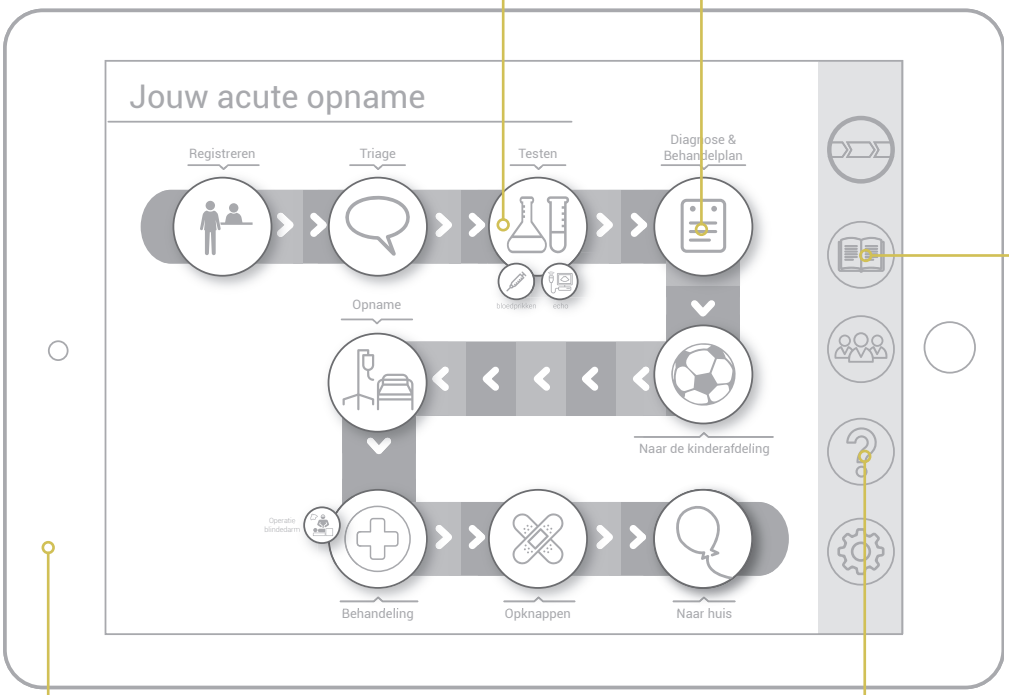
Learnings & Design implications

The feedback from the organization's professionals was taken into consideration for further improvements of this design. An overview of the learnings and design implications of this iteration can be seen in Figure 50.

Figure 49 *Evaluation by UX designer from Stichting Hoi Dokter at Fonk during the first iteration*

The waiting time should be more visual. The perception of waiting time is very important; if you know how long you have to wait it is often perceived as less

Not all patients will be admitted before going home. Therefore a distinction needs to be made between the ED and the paediatric nursing department so the journey fits all cases.

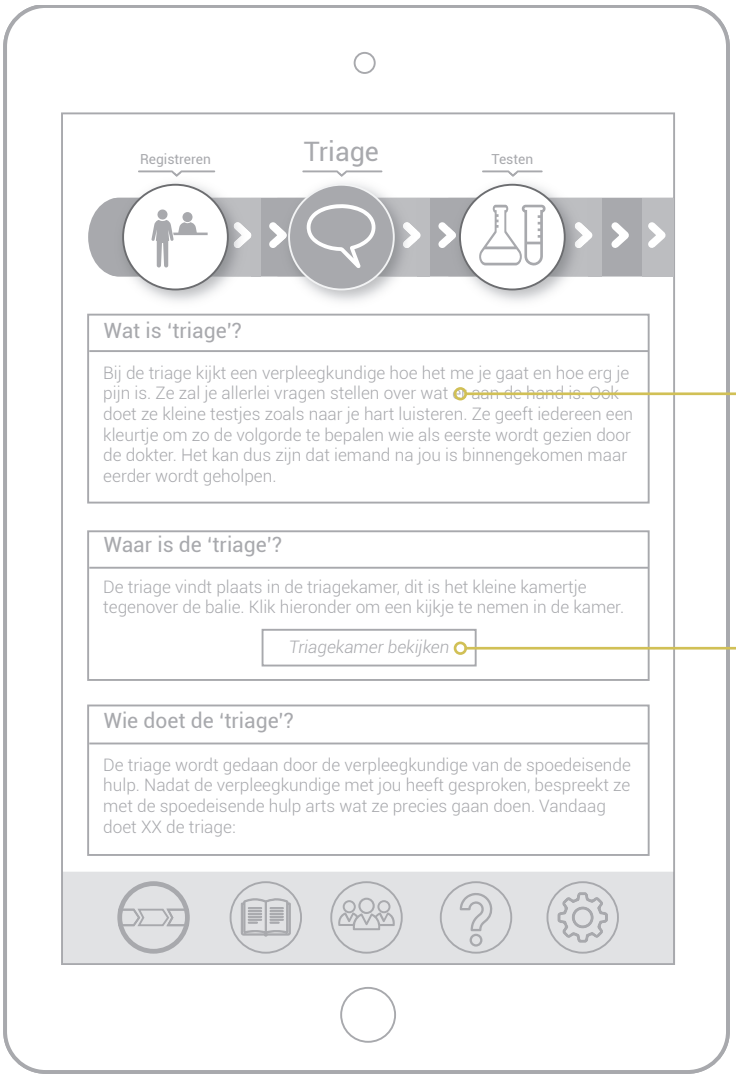


Instead of, or in addition to, the question/answer function of the 'Mijn Buddy' application, a list of information about procedures should be available so patient can look up information beforehand.

The 'Mijn Buddy' application's main goal is to prepare child patients so they know what to expect. The information provided via the link with MijnDossier doesn't contribute to this goal since it gives results of the procedures afterwards. Furthermore, information like test results might better be communicated to the parents instead of the child patient. Lastly, a child version of MijnDossier needs to be created so child patients understand the provided information. Implementing the link most likely will hugely increase the implementation costs and time.

The designer stipulates and recommends usage of the app on tablets. This means that a number of tablets need to be available at the ED for child patients.

Figure 50 *Learnings and design implication of feedback of the organization's professionals in the first iteration*



A landscape orientation of the screen stimulates collaboration between parent and child. On the one side you have information in text for the parent, and on the other side you have a visualization for the child. The child needs the information from the parent to understand the visual. This, of course, depends on the age of the child

When implementation this design it's important to check whether for example the MRI-scanner at the ED is similar to the one in the other departments of the hospital.

Figure 50 *Learnings and design implications from feedback of the organization's professionals in the first iteration*

Iteration 2: Desirability

The focus of the second iteration was to evaluate the desirability of the design. During the design research the desirability of the design was already proven and will be evaluated again with child patients in this iteration cycle. The feedback from the first iteration was used to improve the design. The improved design was printed on paper and explained to the child patient and parent. Figure 52 shows an overview of the screens that were presented. After the explanation the they were asked for feedback. In this iteration three child patients, the designer (graphic and UX) from the EmmaKids website, a childcare worker (NL: pedagogisch medewerker), and the PR representative from the EmmaKids website were included. All children (7- ,10-, and 13-year olds) were acutely admitted via the ED at the AMC.

Child patient and parents

The 7-year old child patient and his mother were very positive about the design and about the purpose of improving the communication. They felt that this would have helped them on their own journey. The mother indicated that she wanted to make her son less anxious and to do so he needed to know every step that was going to happen. However, she didn't know either so she couldn't tell him. So, she liked the fact that, together with your child, you can go over the process. The option to see a schedule of the day is not necessary, the steps are sufficient. Children aged 8-9 might be able to do that on their own, but she admits her son needs her help. One aspect she really like was to see the treatment team.

"We see so many people, doctors, assistants, doctors in training, etc. If you want to ask one of them a question you often forgot the name, so being able to look at the treatment team with pictures is very nice."

So, it's not only useful for preparing the children but it's also informative for the parents. The visual style is appealing to kids, especially with the 360-degree pictures.

The 10-year old child patient and his mom were very excited about the design. The boy (Figure 51) really liked that you could make your own avatar. They pricked him in his finger, he would have liked to know how it would go beforehand and how the room would look like. Especially at the ED he would like to learn more about how things go so you know what will happen. Even though they have to go to the hospital regularly they still would like to use this app to get more information and learn about what is going to happen. The 360-degree pictures really got him excited! You know where you are going to and what you will

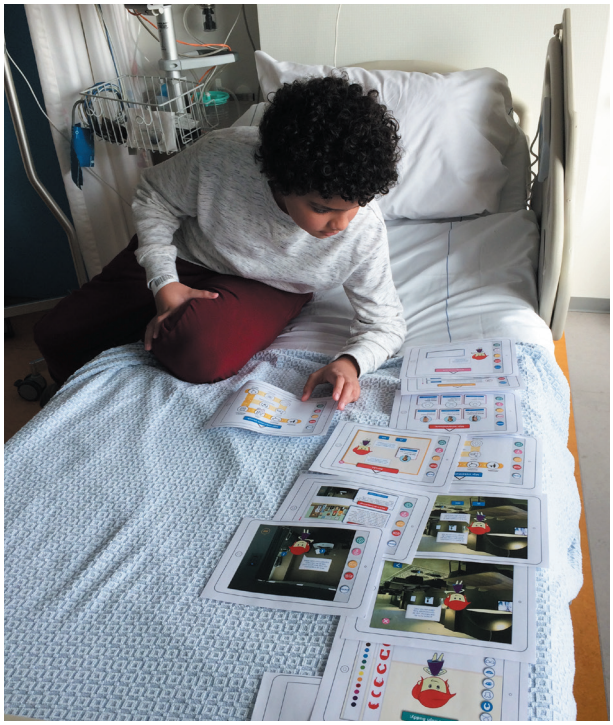


Figure 51 *A 10-year old acutely admitted child patient giving feedback on the design in the second iteration*

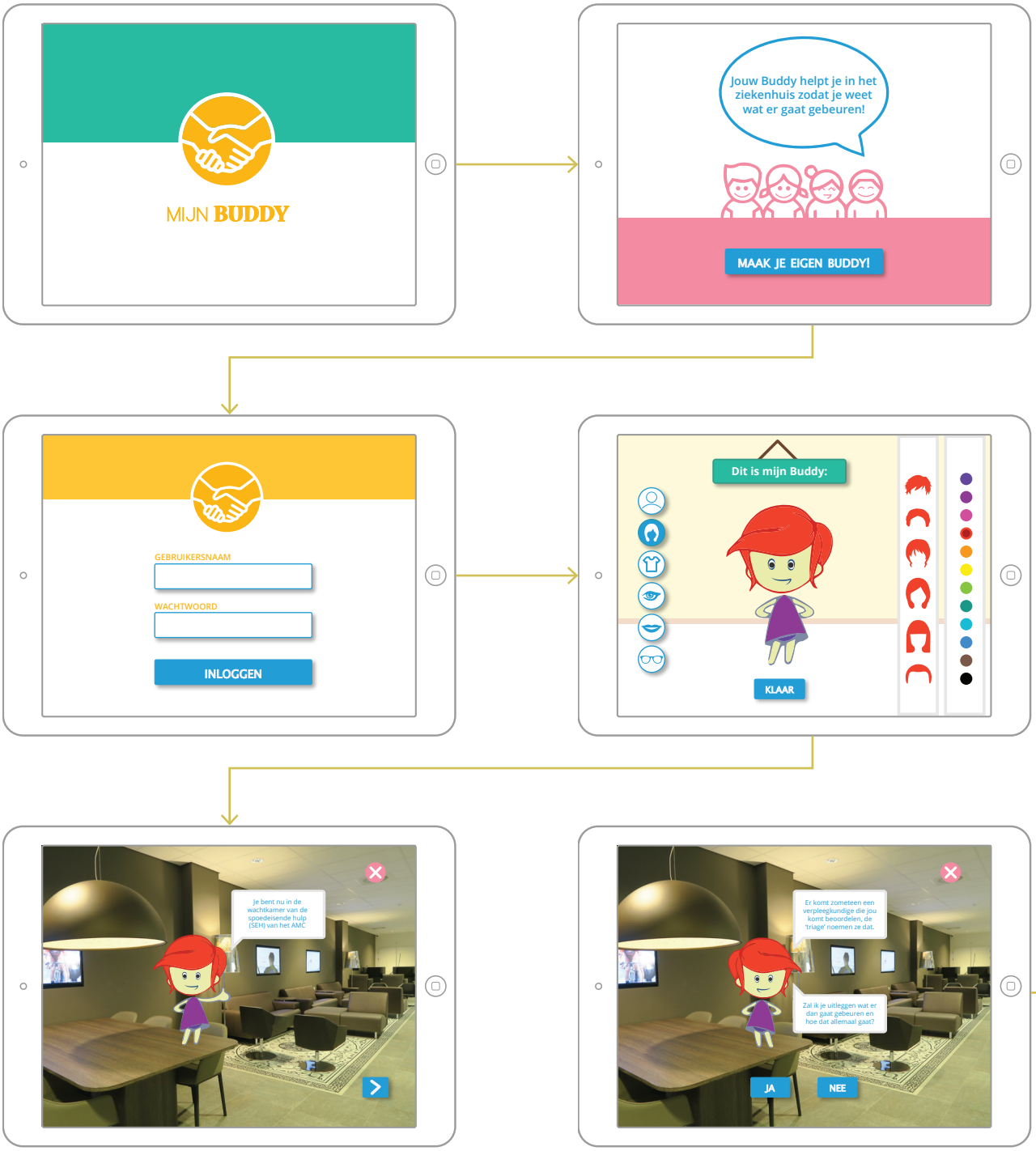
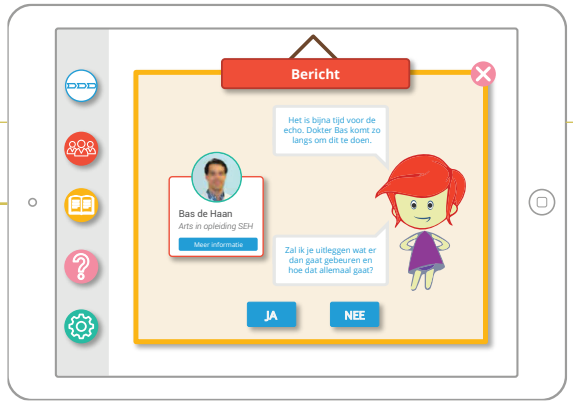
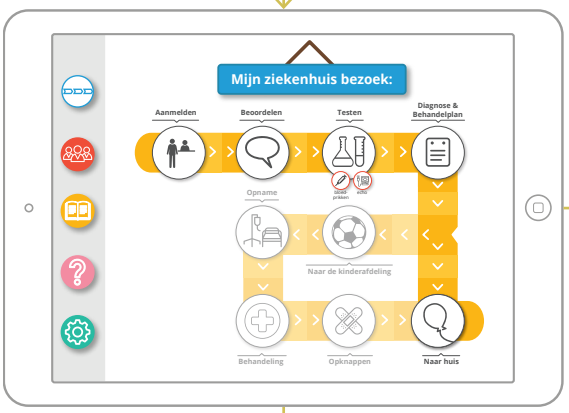
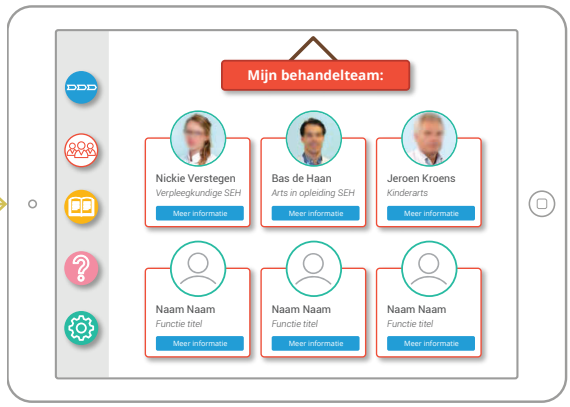


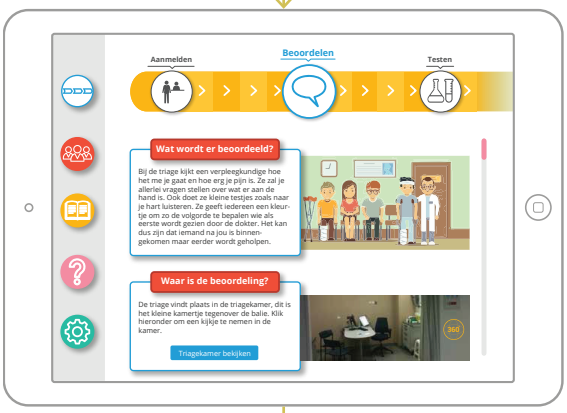
Figure 52 *Wireframe design iteration 2*

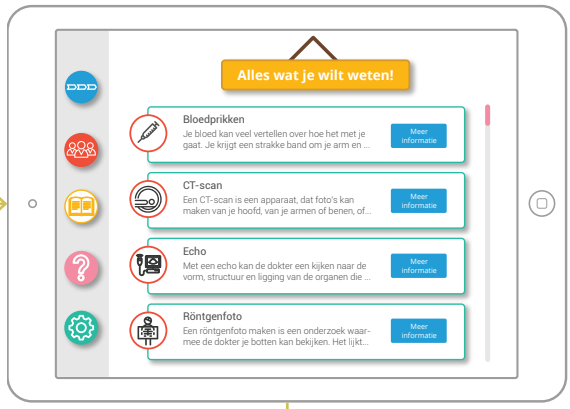

Mijn ziekenhuis bezoek:
Aanmelden
Beoordelen
Testen
Diagnose & Behandelplan
Opname
Naar de kinderafdeling
Behandeling
Opknappen
Naar huis

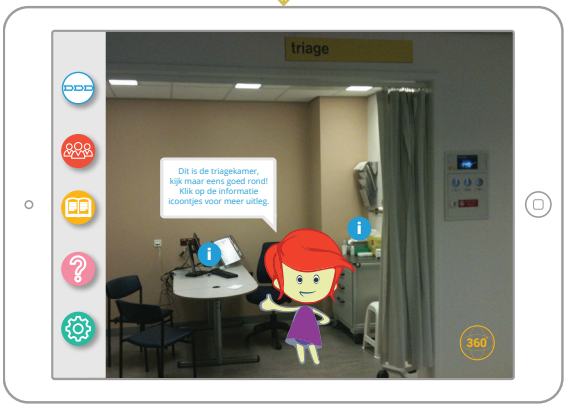

Bericht
Het is bijna tijd voor de echo. Dokter Bas komt zo langs om dit te doen.
Bas de Haan
Arts in opleiding SEH
Meer informatie
Zal ik je uitleggen wat er dan gaat gebeuren en hoe dat allemaal gaat?
JA
NEE


Mijn ziekenhuis bezoek:
Aanmelden
Beoordelen
Testen
Diagnose & Behandelplan
Opname
Naar de kinderafdeling
Behandeling
Opknappen
Naar huis


Mijn behandelteam:
Nickie Verstegen
Verpleegkundige SEH
Meer informatie
Bas de Haan
Arts in opleiding SEH
Meer informatie
Jeroen Kroens
Kinderarts
Meer informatie
Naam Naam
Functie titel
Meer informatie
Naam Naam
Functie titel
Meer informatie
Naam Naam
Functie titel
Meer informatie


Aanmelden
Beoordelen
Testen
Wat wordt er beoordeeld?
Bij de triage kijkt een verpleegkundige hoe het me je gaat en hoe erg je pijn is. Ze zal je allerlei vragen stellen over wat er aan de hand is. Ook doet ze kleine testjes zoals naar je hart luisteren. Ze geeft iedereen een kleurtje om zo de volgorde te bepalen wie als eerste wordt gezien door de dokter. Het kan dus zijn dat iemand na jou is binnengekomen maar eerder wordt geholpen.
Waar is de beoordeling?
De triage vindt plaats in de triagekamer, dit is het kleine kamertje tegenover de balie. Klik hieronder om een kijkje te nemen in de kamer.
Triagekamer bekijken


Alles wat je wilt weten!
Bloedprikken
Je bloed kan veel vertellen over hoe het met je gaat. Je krijgt een strakke band om je arm en ...
Meer informatie
CT-scan
Een CT-scan is een apparaat, dat foto's kan maken van je hoofd, van je armen of benen, of...
Meer informatie
Echo
Met een echo kan de dokter een kijken naar de vorm, structuur en ligging van de organen die ...
Meer informatie
Röntgenfoto
Een röntgenfoto maken is een onderzoek waarmee de dokter je botten kan bekijken. Het lijkt...
Meer informatie


triage
Dit is de triagekamer, kijk maar eens goed rond! Klik op de informatie icoontjes voor meer uitleg.
360


Vraag maar raak
Typ hier je vraag in en dan probeer ik je vraag zo goed mogelijk te beantwoorden

see, and you can explore yourself instead of just looking at a picture or video. The icon used for the journey in the navigation bar was not clear. Also, 'diagnose & behandelplan' was a little bit difficult. The treatment team had a clear added value to them. You see so many medical professionals and you can't just remember all of them. It is important to have the picture so you know which face to remember. Besides the name, picture, and title, we don't really need more information. The boy indicated that he would like to use it alone but also together with his mother when they both want to know more information.

The 13-year old child patient thought the app was nicely designed. He has to go to the hospital very frequently so he knows how things go around here. He mentions "If you are waiting at the ED you are always wondering what is happening behind those doors, with this app you can get 'behind the scene' information which is cool". He also states that he is always very curious so he liked that he can get more information about appliances in the 360-degree pictures. Sometimes he doesn't feel like talking to the doctor, so if he can already get most of the information through this app and indicate that you've seen it would be nice at some moments. He sees other children and parents struggling to find their way, so maybe there can also be a way finding functionality, like a Google maps for the hospital. He thinks that for younger children it might be nice to give you Buddy a name to make it more personal, for him just Buddy is fine. The book icon wasn't clear at first, but the rest was easy to understand. The fact that this is all digital and fun is very convenient.

Graphic and UX designer from Internal & External Communication at AMC

The EmmaKids website has recently been redesigned. The graphic and UX designer (Figure 53) who was involved was asked for feedback. This design is justified by the findings of the design research, which he thinks is very good. However, there are some technical challenges to the design, like where does the information of the treatment team come from. It is good to talk this through with someone that has more knowledge about these technical links. The tablet-first approach is a good choice, especially when designing for children and with the amount of information you want to get across. The graphic style is still a little rough, it has some inconsistencies like the screen title has the same styling as the clickable buttons or the boxes with text and a call to action like 'meer informatie'. Typography also varies across the screens, make standards and use those in all the screens. Furthermore, I would use more icons with for example the buttons.

Figure 53 *Graphic and UX designer from AMC's communication department gave feedback on the design in the second iteration*

Childcare worker and PR of EmmaKids website

The childcare worker and the PR of EmmaKids website work together on the journeys and provided information in the journey on the website. The also took part in creating 'Whizzie Weet de Weg'. They were very excited about this design. If this could be real-time it would be amazing and really innovative. Together we looked at the acute admission journey and the existing journeys on the website. It is good to realign these so for example an icon is not used for different functions which is confusing. Furthermore, they indicate that children like to learn, so a word like 'triage' shouldn't necessarily be avoided since they will encounter this in the real-life situation. However, it should be explained in a way they can understand it. Care Service is the program that all teenagers will get an iPad attached to the bed. This app could be content that fits with this initiative and might even provide a couple iPads for the children at the ED. They would like to see this app being further developed, however if for whatever reason this doesn't happen, they would like to add the acute admission journey to the other journeys on the website.

Application specialist AMC/VUmc (EVA/EPIC) & part of Digital Patient Journey Lab

The application specialist has an extended amount of knowledge and experience in developing applications that have a link with the EPIC. Furthermore, he is part of the Digital Patient Journey Lab, which is a team that is mapping various patient journeys. Together with the communication department they try to improve the communication and provision of information for patients. There were five questions regarding the technical feasibility on the following topics; (1) real-time data, (2) showing the treatment team, (3) orders from doctors in EPIC, (4) indication waiting time, and (5) costs and implementation time.

1. Real-time data

In MijnDossier you receive lab results 7 to 21 days later than the test, so the question arises whether real-time data to an external system is possible. Moreover, the delay in feedback is a conscious decision, real-time data from EPIC is absolutely feasible.

2. Showing the treatment team

EPIC already registers a patient's treatment team by adding names to the patient's profile. However, the system doesn't include pictures and first-names. There are ways to fix this for example by using My Earth where a medical professional can build a personal profile also including hobbies etc.

3. Orders from doctors in EPIC

It's possible for the app to request EPIC to send back incoming orders, like an order for a blood test. The app system should be built in a way that when order A comes in it has to show icon X (+ information). There are many different kinds of orders, so you should decide how many icons you have to make. You can also make one icon for the category of imaging tests like X-ray, MRI, CT, etc.

4. Indication waiting time

First of all, he doesn't know the ED application of EPIC thoroughly. However, all patients at the ED are registered in EPIC. As far as he knows there is not a categorization in EPIC for the ED that differentiates patients that are still waiting and patients that already have being seen by a doctor. This could be 'discovered' by whether they have a medical professional added to their treatment team or for children by information from 'Mijn Buddy'. If the child is further along the journey it means they are not waiting anymore.

5. Costs and implementation time

The 'Mijn Buddy' requires a read-only link with EPIC, or in other words, it's a one-way only communication. This means the app does not send data back to the EPIC system. This makes it easier to implement the 'Mijn Buddy'. Implementation time would be minimum of one year if the organization decides to act on it right away. Currently we are working on a connection with MediMapp. It might be possible to use this link in your advantage. A combination of MediMapp and 'Mijn Buddy' is another possibility. 'Mijn Buddy' can be the children's version of MediMapp since MediMapp doesn't hold on to a fixed graphical layout or style. When it comes to content, it is best if the AMC possess the rights of the content. In this way the content can be hosted on the Content Management System (CMS) of the website, so if there is a renovation and pictures need to change we don't have to go back to the developing party that will ask more money to update the content. Furthermore, there are strict rules concerning privacy to prove you are really the said patient. Currently DigiD is used for authentication on private devices. However, if it's used on public devices a nurse can for example scan a barcode generate by EPIC to link the app to the patient. For a smooth implementation you need an app developer with experience communicating with an EPD, the ICT to setup the service, someone from with the company who is willing to lead this project, and a sponsor. The earlier mentioned €50.000 sounds quite high to him, especially without the link with an EPD.

Learnings & Design implications

The feedback from the organization's professionals was taken into consideration for further improvements of this design. An overview of the learnings and design implications of this iteration can be seen in Figure 54.

CONCLUSION & INSIGHTS

In the conceptualization phase all gathered insights were put together to create concept directions for the formulated design goal. A creative session was organized to gain a broader sense of the problem and obtain different perspectives on how to improve the patient experience. Three concept directions were created, the 'Patient-to-Patient Platform', the 'Digital Buddy', and 'Mijn Paspoort'. These concepts were discussed with both professionals and child patients to make a well-rounded decision. Ultimately, the decision was made to choose the 'Digital Buddy'. In the two design iterations, the concept was continuously improved by receiving feedback from child patients, ED-doctors in training, an e-Health manager, childcare workers, UX designers, and an applications specialist. These iterations led to the final design of this concept, which will be presented in the next chapter.

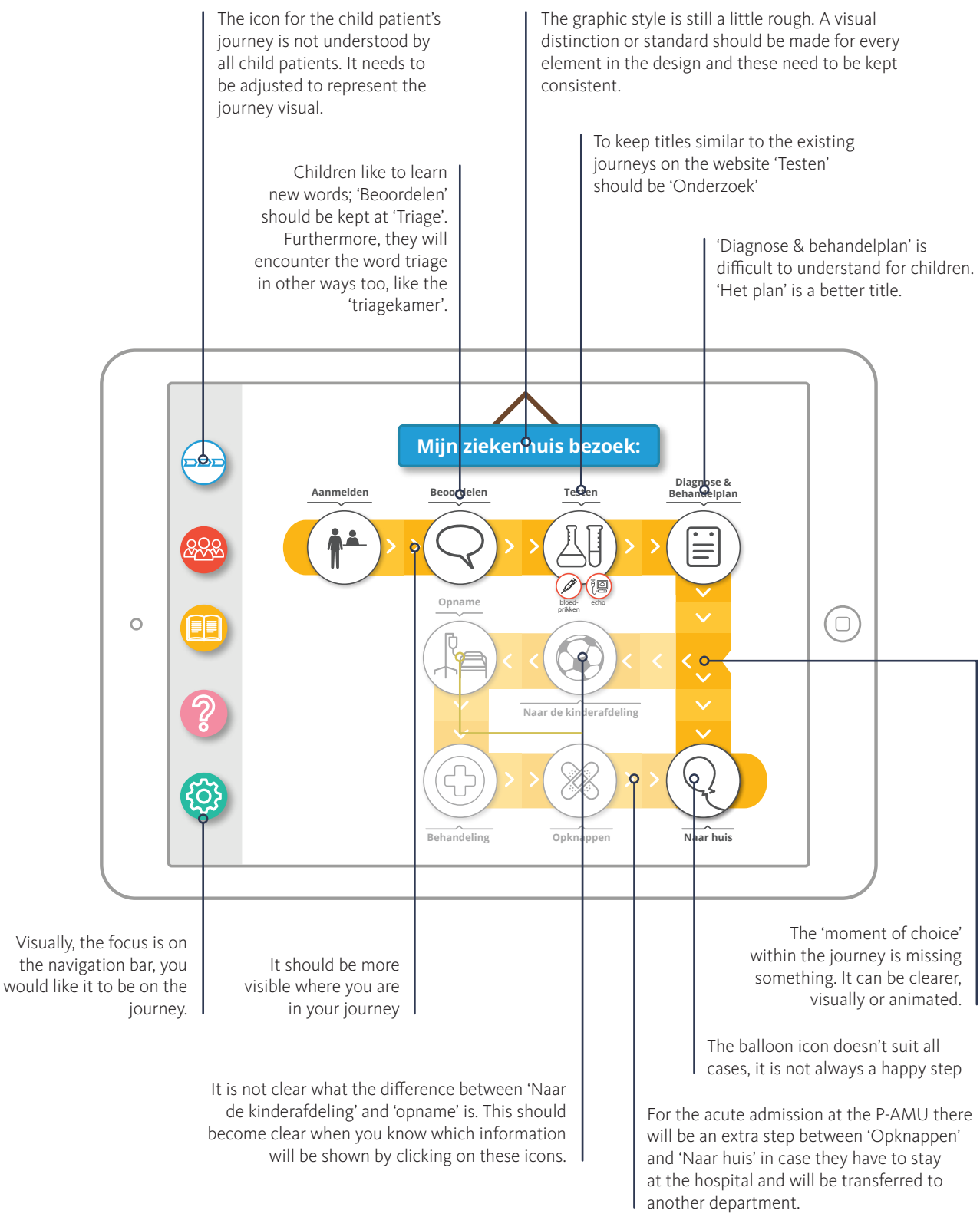
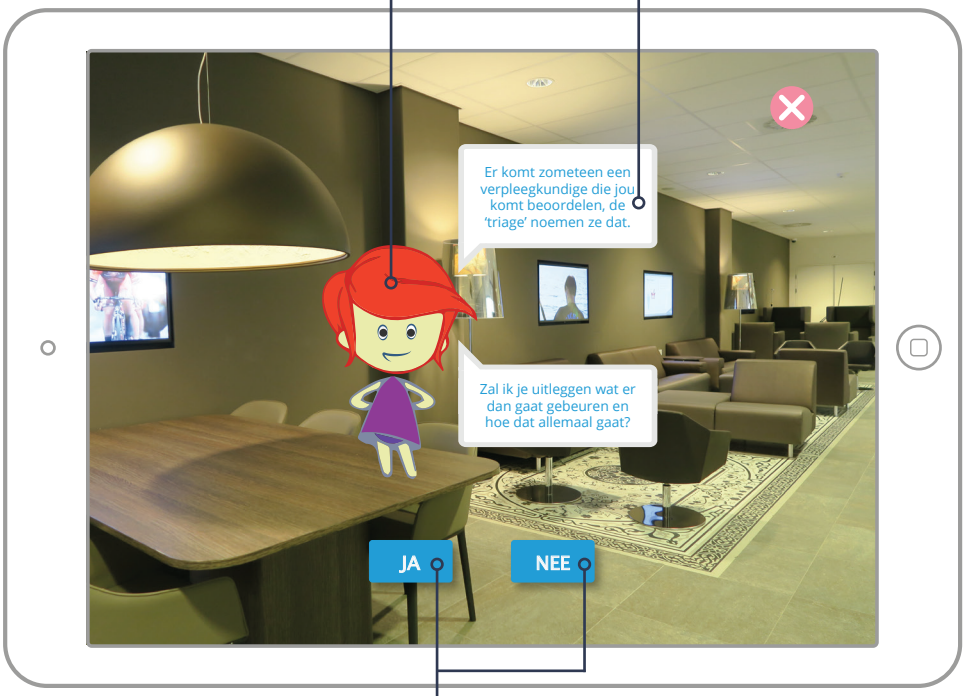


Figure 54 *Learnings and design implications of the feedback of the desirability in the second iteration*

After you made the avatar there is no option to go back. A possibility to change the avatar should be available. Placing it in settings is too hidden for children.

The frequency or timing of these messages should be determined or a 'next' button should be added.



The 'Ja' and 'Nee' buttons look the same; text, color, shadow, however they trigger different interactions. Therefore, a distinction needs to be made in the visual style which can be done by using an icon.

Figure 54 *Learnings and design implications of the feedback of the desirability in the second iteration*

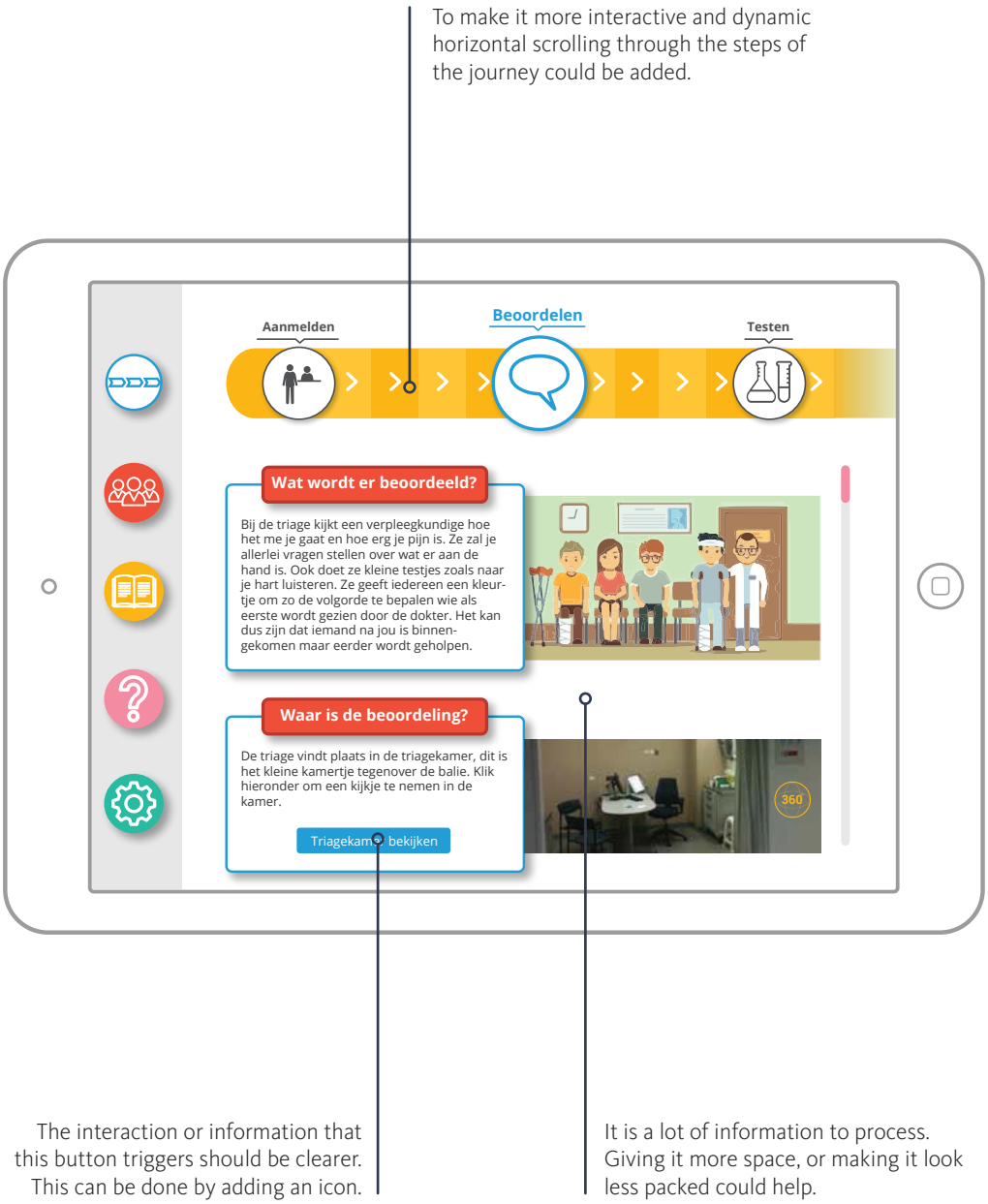


Figure 54 *Learnings and design implications of the feedback of the desirability in the second iteration*


SIEMENS
PATIENTEN
Mijn ziekenhuisbezoek:
Aanmelden
Triage
Op de SEH
Onderzoek
Het plan
Behandeling
Opname
Naar huis
Gesprek dokter
Opknappen
Omdat jij spoed bent kom je tussen de gepland operaties door. Dat is dus best lastig.
Op dit moment staat jc operatie om 10:15u gepland maar dat kan iets later worden.

07 FINAL DESIGN

Insights gained during the literature, field, and design research were translated into various concept directions. In the previous chapter one of those concept directions was chosen and after several iterations a final concept design was chosen. This chapter presents the final design of 'Mijn Buddy and describes it based on its functions, design, use in context, and possible implementation.

FINAL DESIGN

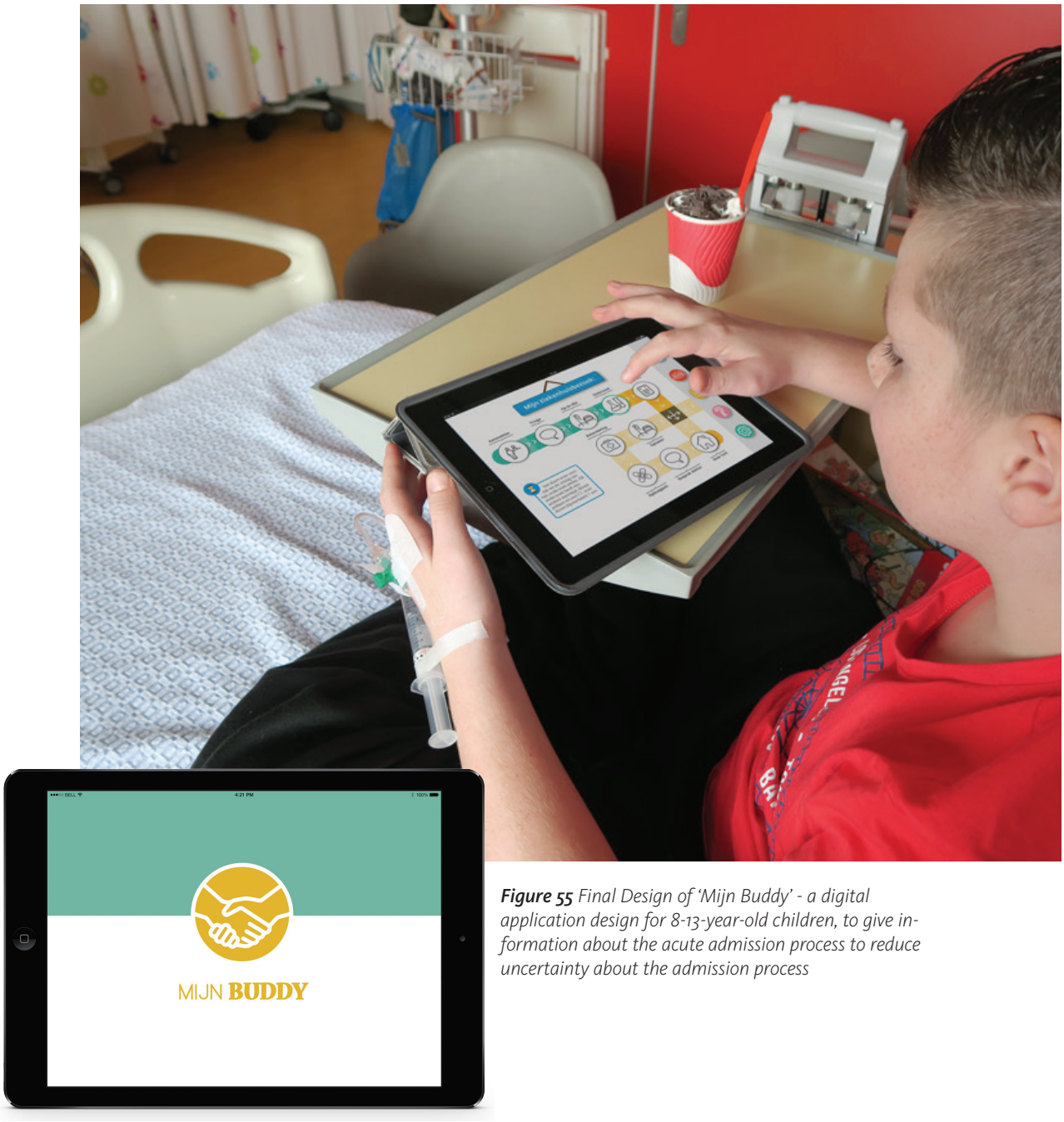


Figure 55 *Final Design of 'Mijn Buddy' - a digital application design for 8-13-year-old children, to give information about the acute admission process to reduce uncertainty about the admission process*

7.1 The 'Mijn Buddy' application

The 'Mijn Buddy' application helps 8-13-year-old child patients by giving an overview of the journey of an acute admission (Figure 55). The children can create their own buddy, or avatar, that will guide them through their journey in the hospital. This starts on arrival at the ED, all the way until the moment they are discharged. The application is connected to EPIC, the electronic patient record system, so the journey can be personalized along the way. When a medical professional puts an order in the system such as requesting a blood test, the 'Mijn Buddy' application will provide information about a blood test in a playful and understandable way. 'Mijn Buddy' puts child patients in control so they actively participate instead of letting their treatment happen exclusively around them. By using this application child patients as well as their parents, will have a better idea of what to expect, which will lead to a decrease in the uncertainty about the acute admission process, ultimately leading to a better patient experience.

*"Mijn Buddy **improves the communication** of child patients and their parents with the healthcare system about the acute admission process, while putting the **children in control** in a **playful** and **understandable** way, which will lead to child patients and parents feel **less unsure and bored** during the acute admission".*

The core principles of 'Mijn Buddy' are:

1. Managing expectations by giving an overview of the general acute admission process and personalizing it along the way
2. Giving the child patient the feeling of control by providing information about every step in the journey in an understandable and playful way
3. Providing fixed guidance by means of a personal 'Buddy' that guides child patients, and parents, during the acute admission
4. Providing an indication on waiting time and therefore change the perception and expectations associated with time.

One of the main principles of the application is expectation management. In the design research, problems with expectation management were mainly seen with unfamiliar child patients; children that don't visit the hospital regularly. A higher level of uncertainty about the process was perceived in those cases. However, in the acute care both familiar and unfamiliar child patient are acutely admitted. 'Mijn Buddy' can provide useful information to familiar patients such as insights in the treatment team, a time indication, and a tool for them to educate themselves on, for example tests and treatments. Moreover, within the planned/non-acute clinical care there are also unfamiliar child patients with little knowledge about how things go at a hospital. In the future, 'Mijn Buddy' has the potential to provide a personalized journey, including the relevant information, to every child patient, planned and acute, in the hospital to manage expectations and enhance the patient experience.

This minimal viable version of the application is a read-only design. 'Mijn Buddy' only retrieves information from the EPIC system and doesn't send information back. In the future, when this minimal viable version is elaborately tested and has proven its added value, extensions that might need two-way-communication such as an integrated patient feedback function addressing patient satisfaction or experience, pain level measurements, or the ability to see test results shown in a way that's understandable for children can be implemented.

7.2 Stakeholders benefits

The 'Mijn Buddy' application benefits the various stakeholders in different ways and on different terms. In the short term it mainly benefits the acutely admitted child patients and their parents, as well as professionals. Many medical professionals such as ED-doctors, ED-nurses, triage-nurse, and paediatricians are included in the acute journey. It often also depends on the specific illness which medical professionals are involved in the treatment. In the long run, the hospital can benefit from future additions. The benefits per stakeholder are described below.

Acutely admitted child patient

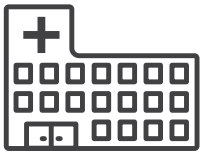
By using the application, the child patient feels less unsure and bored during their acute admission process. 'Mijn Buddy' improves the provision of information to align their expectations to better match with reality. The personal created avatar provides fixed guidance and helps the child patient to prepare for the steps that are coming, making them feel engaged and in control. This will eventually result in a higher patient satisfaction.

Parent/ caregiver

Not only child patients, but also their parents or caregivers, will experience less uncertainty during the acute admission process by the use of 'Mijn Buddy'. In an acute situation, children often have many questions which they will ask their parents. Together with 'Mijn Buddy' the parents are able to help their child find answers to all their questions, as well as some questions the parents might also have. Being able to prepare and reassure their child will make them feel more calm and satisfied. The emotions of parents often reflect on their children; therefore it will eventually result in a higher patient satisfaction.

Medical professional

'Mijn Buddy' will support medical professionals in the provision of information. Research showed that 40–80% of medical information provided by medical professionals is forgotten immediately (Kessels, 2003). The application leads to better informed patients since they can go over the information again, before and after seeing the medical professional. Communicating with a better informed and more reassured child patient changes the dynamic between the medical professional and child patient and could create a less overwhelming and more comfortable atmosphere. Furthermore, the application better aligns patient's expectations with reality, which will reduce anxiety, frustration and resistance. Frustration and resistance are common concerning transfers to other hospitals, if 'Mijn Buddy' prepares child patients and parents for this possibility, this can save the medical professionals time on a daily basis.



Hospital

This application provides the hospital with a new way of communicating with their child patients. The main benefits for the hospital is that 'Mijn Buddy' will lead to more satisfied patients. This will likely result in a higher CQi and will give them a competitive advantage compared to other hospitals. Furthermore, it will continuously optimize the provision of information to their patients, for example, by adding content in the database for frequently used search terms by child patients. With the possibility to extend the functionalities of 'Mijn Buddy' in the future, such as adding patient satisfaction questionnaires, a better understanding of their patients, their journeys, and opportunities to improve the provided care can be derived from the data from the application.

7.3 Context of use

The 'Mijn Buddy' application guides child patients through their entire acute admission journey. The design is based on the patient journey of the acute admission, derived from the design research, which consists of ten steps. The last two steps: 'conversation with doctor' and 'discharge' are combined in this user scenario. The nine touchpoints are elaborated on in the user scenario of the 'Mijn Buddy' depicted on the next pages, which describes the application in use. A touchpoint is a moment in time where the interaction with the application takes place. The user scenario differs per child patient, however the application will adjust to their personal journey. To illustrate this use and to make the scenario more specific, an example of an acute admission for appendicitis is used.

FINAL DESIGN

1. Arriving at the ED

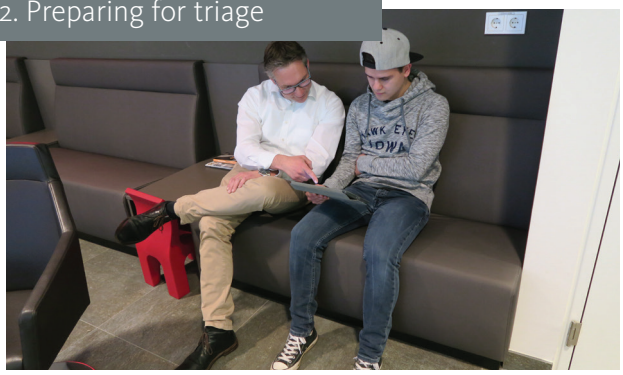
Arrival at the ED
Child and parent arrive at the ED together and walk towards the registration desk.

Register at the desk
The parent registers the child at the desk and provides the necessary personal information.

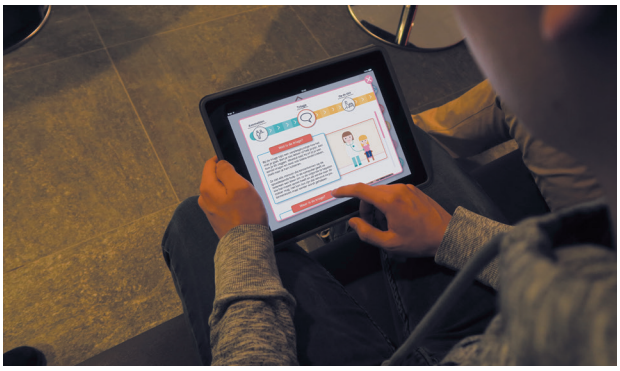
Receptionist connects app
The receptionist connects the application to the patient's profile by scanning a unique QR-code generated in EPIC

Child receives tablet
The child receives a tablet with the 'Mijn Buddy' application. A disclaimer has to be signed by the parent stating no liability for the accuracy of the information shown in the app is provided.

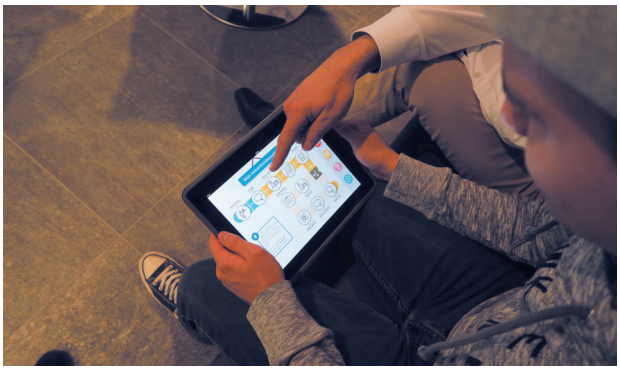
2. Preparing for triage



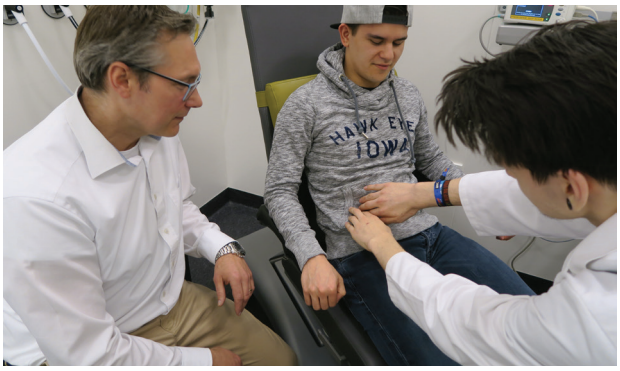
Child and parent wait for triage
Child and parent have to wait until it's their turn for triage. In the meantime the child can create a personal buddy, username, and password. A brief explanation of the registration is given.



Child patient information about triage
If the child so wishes, information about what a triage is and who will conduct the triage today is given. The triage room can also be explored.



Child patient explores acute admission journey
The child sees the acute admission journey and explores the various steps while waiting for the triage-nurse.



Triage takes place
The name of the child is called and together, parent and child go into the triage room. The triage-nurse perform the triage.

3. Preparing for admission ED

Child and parent wait to see the doctor
After the triage, the child and parent wait in this area to be seen by a doctor.

Child receives information about ED
While in the waiting room the child can alread gets a sneak peek of what's happening behind the doors. If desired, more information about what the ED is, what happens there, how it works, and who works at the ED is provided.

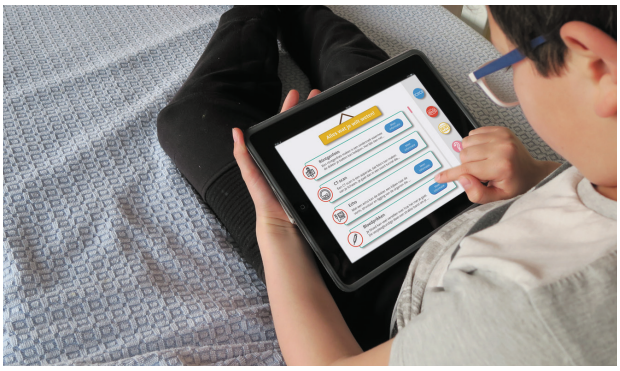
Child scrolls through 'Hospital book'
There is a list of medical test and treatments the child scrolls through to educate themselves or prepare on what they think might happen.

Child receives update on treatment team
If a medical professional is added to their treatment in EPIC, the child receives an update of this so they know who to expect.

FINAL DESIGN

4. Preparing for medical tests

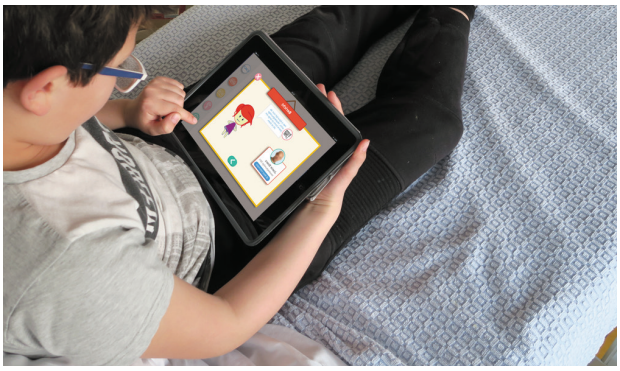
Child is moved to the ED and seen by a doctor
The doctor calls in the child and parent and performs an anamnesis to decide on further steps. He tells the child, a blood test and an ultrasound have to be taken.



Child looks up information about the blood test
The doctor mentioned that a blood test had to be taken. The child looks in the 'hospital book' to find more information about it.

Doctor orders medical tests in EPIC
The doctor puts an order(s) in the EPIC system to request a certain medical test(s), in this case a blood test and an ultrasound.

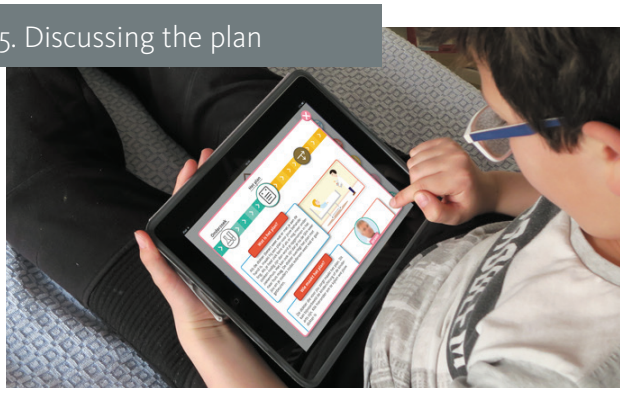
Nurse explains what will happen and takes the blood test
The ED-nurse explains the procedure of a blood test to the child and performs the blood test.



Child receives update on ultrasound
The child receives an update about the ultrasound. If desired, the child can read more information about what the test is, how it is performed, where it takes place, and which medical professional will perform the test.

Ultrasound is made
The radiologist comes to take an ultrasound of the child's stomach

5. Discussing the plan



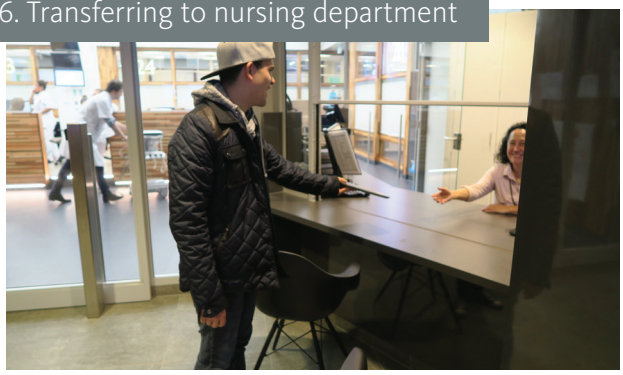
Child reads info about his treatment plan
While waiting for the doctor to come back with the test results, the child reads what the next step will be.

Child explores the paediatric nursing department
While waiting, the child already explores the nursing department via the application.

Doctor puts the diagnosis & treatment into EPIC
After the doctor has visited the child and parent and discussed the diagnosis and treatment plan, she gives a 'go' in the EPIC system to send of the 'diagnosis label' to the patient.

Child receives information about the diagnosis
The child reads information about the diagnosis again after the doctor leaves. This information, such as the meaning, causes, and future prospective, is tailored to his understanding.

6. Transferring to nursing department



Child hands the tablet back in
When the child is transferred from the ED to the paediatric nursing department he, or the parent, hands in the tablet at the ED desk. Data on the tablet is then erased.

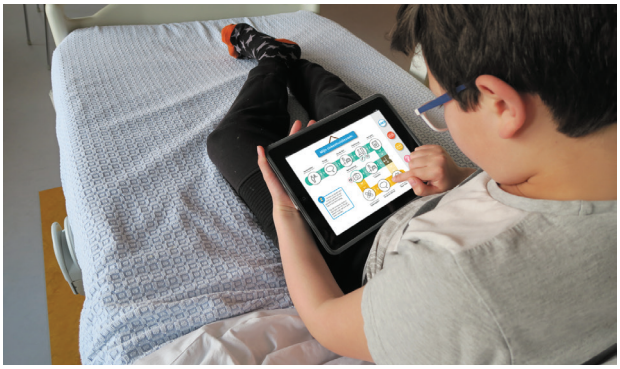
Child is transferred
The nurse takes the child to the paediatric nursing department, where he waits for the treatment.

FINAL DESIGN

7. Preparing for treatment

Nurse helps the child settle down and get comfortable
The child logs in on the app again via the tablet attached to the bed or their personal device (tablet). The nurse connects the device by scanning a unique QR-code generated in EPIC. An introduction movie of Maarten is presented who will show you around at the paediatric nursing department.

Child receives update about treatment information
After the doctor discusses the diagnosis and treatment plan, a 'go' to send this information to the application about the placed orders in EPIC is given. So the child patient can read information about the specific treatment, in this case an appendectomy.



Child receives update about treatment time
In the journey the child finds information about the timing of the treatment.

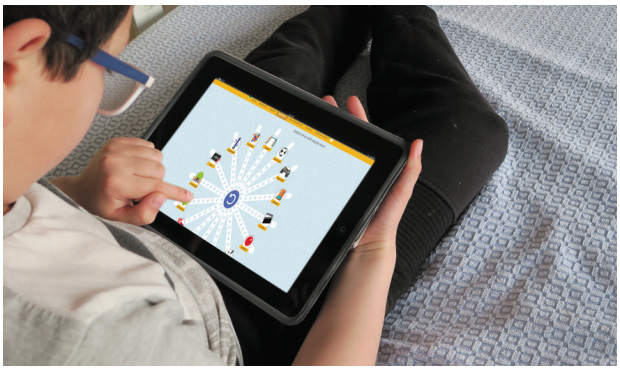
Child waits until it's time for the treatment
The child and parent wait until the treatment takes place. In this case they are waiting for an available spot for an appendectomy.

Child is transfered to treatment room
The nurse takes the child and parent to the treatment room.

Treatment is performed
The child has the treatment, in this case the appendectomy.

8. Recovering after treatment

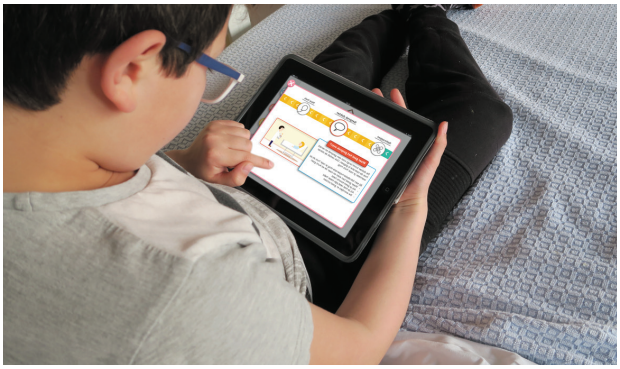
Child is taken back to the nursing department
The nurse takes the child back to the nursing department and takes care of him while he rests and recovers from the treatment.



Child explores the activities that he can join
While waiting the child patient continues to explore the nursing department

9. Preparing for discharge

Doctor visits to tell about treatment
After the treatment, the doctor visits the child and parent to tell them how the treatment went and to see how he is doing. The doctor also explains what the recovery will look like.



Child looks at discharge criteria
If possible, the child reads up on the clear discharge criteria in the application.

Doctor comes by for discharge
When the doctor is reassured the patient is ready to go back home, a last visit is paid. Tips to take into account are given to ensure a speedy recovery.

Child can go home
The child and parent leave the hospital. Data on the public tablet is erased. If the app was used on a personal device, the application becomes unusable outside the hospital.

7.4 Design

The design is based on the insights of research, the various iterations in the conceptualization phase, and is derived from the extended list of requirements and wishes (Chapter 6.4). This section presents the final design, including the design, its functions, the content, the technical support, and the appropriate privacy and regulation requirements.

The overall design of 'Mijn Buddy' is following the main principle: "*Improving the communication between child patient and the healthcare system about the acute admission process*". Therefore, the design is informative and educative, where information is presented in an understandable and playful way.

Overview of the acute admission journey

Figure 56 presents the main screen of 'Mijn Buddy' and is based on the general patient journey derived from design research. It is important to note that the journey, and therefore this main screen, adjusts to the patient's situation over time (Figure 57). Furthermore, the individual steps will be personalized to the patient's situation, as can be seen in Figure 58. This is accomplished via the link with EPIC. The icon that is highlighted in the journey and where the green path stops is the next step ahead. In this way the child patient can look into what, who, where, and when to expect things to happen. Not all steps need to be personalized, the steps test, the plan, treatment, and conversation with doctor are the steps however needing to be personalized (Figure 59).

Figure 56 *Main screen provides overview of acute admission, time indication, and navigation bar to other functionalities.*

Figure 57 *The main screen adjusts to the individual's situation over time*

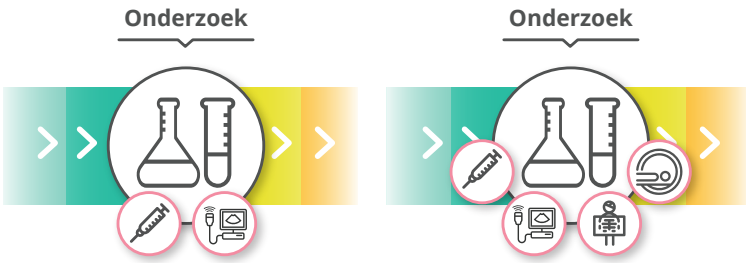


Figure 58 *Steps personalize to the patient's situation over time*

Figure 59 *The steps, circled in purple, personalize to the patient's situation over time. The 'moment of choice' is circled in blue.*

FINAL DESIGN

The first part of the journey, that takes place at the ED, will be a concern for all child patients at the ED. The 'moment of choice' is an important step in the journey because not all children will be admitted, but will go back home (Figure 59). This is why, in the beginning, the journey after the 'moment of choice' is more transparent to indicate that a specific pathway cannot be suggested at this moment in time, the difference can be seen in Figure 57.

Through each step in the journey, a time indication is given. When waiting for the triage the indication shows the number of people that are in line, rather than a specific time indication since that is very hard to predict. However, depicting a number of people, and seeing a decrease in people, will still affect the perception of waiting time. For scheduled treatments and visits a specific time or time range is given. This data can be pulled from EPIC.

It is important to note that 'Mijn Buddy' doesn't imply sole communication via the app instead of the medical professionals. A collaboration between medical professionals and 'Mijn Buddy' is important and will enhance the communication to the child patient, especially in cases when things go differently than depicted in the app. This is likely to happen at a hectic department like the ED.

The navigation bar at the right of the screen provides easy and clear navigation through the functions of the app, these will be explained below.

Insight in treatment team

Figure 60 shows the overview of all medical professionals involved in the care. The professional is depicted with a picture, full name, and job title. If the professional prefers to show no picture, then an avatar can be made, as also can be seen in figure 60. He or she can also decide how their name is shown, first name, last name, or both. The data comes from 'My Earth', a personal profile module in EPIC. Currently, the data in EPIC doesn't include pictures of medical professional. However, this can be added in the personal profile. The button for more information gives an explanation of the medical professional's job and responsibilities.

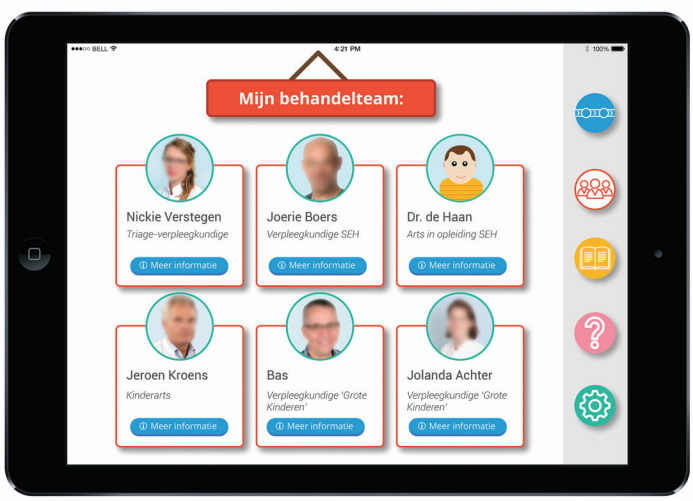


Figure 60 *Insight in treatment team: overview of all medical professionals that are involved in the care. The medical professional can decide what is shown.*

The ‘Hospital Book’

In the Hospital Book an overview of all medical test and treatments can be found (Figure 61). When child patients expect a specific procedure to happen, or if they want to learn more about medical test and procedures they can scroll through this list. This list is added since the personalized information will become visible in the journey after the child patient has seen the medical professional and he or she has put an order in EPIC. In this way, child patients can prepare beforehand.

Figure 61 *Hospital Book: an overview of all medical test and treatments*

Medical test or treatment information

When clicking on the ‘more information’ button in the Hospital Book, or on the icon in the journey for a specific medical test or treatment, visual information about the what, why, where, and who is shown (Figure 62 & 63). Every box consists of text and an animation, and if possible is combined with a movie. Ideally every step has a in-context video, however this depends on the available content. Child patients are also able to explore the room of the specific step in a 360-degree perspective (Figure 64). There are info-icons placed in the room at machines and equipment. In this way children can learn about what it is and they know what to expect.

Figure 62 *Information about the medical test; addressing the ‘what and why’ and ‘where’*

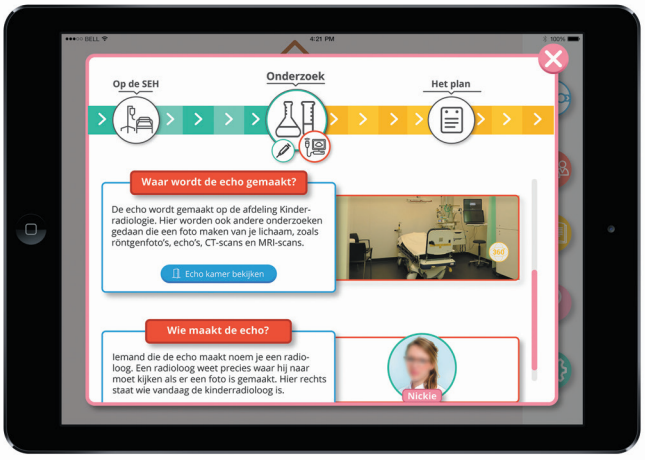


Figure 63 *Information about the medical test; addressing the ‘where’ and ‘who’*

Through the connection with EPIC specific medial professionals are added. They either added themselves to the treatment team in EPIC, and therefore also in ‘Mijn Buddy’, or ‘Mijn Buddy’ looks at the medical professional working the specific shift. For example ‘Mijn Buddy’ can look up in EPIC which two triage-nurses are responsible for a certain shift.

Buddy to the rescue

Children are able to ask Buddy questions related to the hospital, or a medical test or treatment (Figure 65). If they can't find the information in the app, they are able to type in what they are looking for. This has the same functionalities as the virtual assistant on the EmmaKids website. However the content database needs to be extended to cover the entire spectrum of paediatric healthcare, so also including the ED.

Real-time updates

When the application receives information from EPIC an update is given to the child. Updates can be: a medical professional got added to the treatment team (Figure 66), a medical test, treatment, or an diagnosis. Also updates via the EmmaKids website are given, for example which movies is playing at the theater or other planned activities.

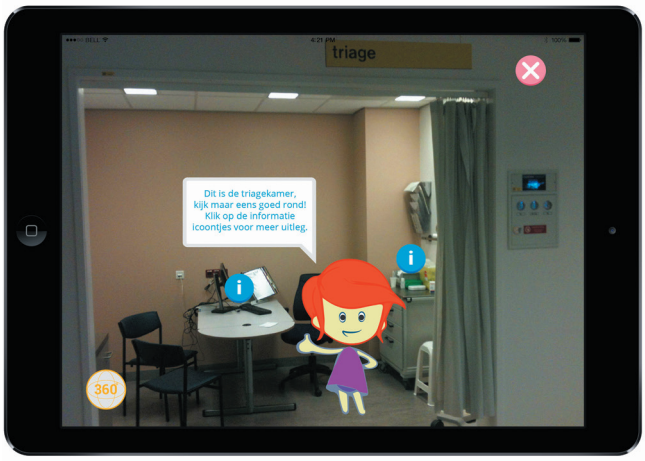


Figure 64 *Explore the room of the specific step in 360-degrees*

Figure 65 *Ask Buddy questions about the hospital, a medical test or treatment*

Figure 66 *Real-time updates like an addition to the treatment team*

Visual Design

The general acute admission journey was graphically aligned with the journeys presented on the EmmaKids website. This decision was made as it is important to keep communicating consistently, and in the same way and style. The color palette used in the design is based on the colors from the EmmaKids website. The three mainly used colors (yellow, blue, orange/red) were picked and the other matching three colors were added to the color palette (pink, green, grey). Furthermore, the screen includes illustrated animations. The application is designed for use on a tablet, in the landscape position. This decision was made since a design on a tablet is most suitable for the amount of information that is offered on the screen. It is also easy to use for children, and the landscape orientation invites collaboration between child and parent.

Content

In the presented final design, the app links to the corresponding information requested. However, this content still needs to be created, including text and animation. These need to be created for all steps included in the various types of acute admissions. This requires time, effort, and dedication. However, the Emma Children's Hospital already has multiple sources of information for their child patients. The new EmmaKids website already shows some general patient journeys and also contains descriptions, movies, and pictures about the divisions, facilities, rooms, and activities for the paediatric nursing departments. It also has 'Whizzie Weet de Weg' which has a limited number of medical tests, like an CT-scan, intended for children. Furthermore, the website has a 'virtual assistant'; via a search bar that you can search for the information you want. However, the content needs to be extended to cover the full spectrum of the patient journey of an acute admission. It should also contain a database of topics related to the ED, such as triage. This content will be hosted from the content management system (CMS) so content can easily be linked and edited. Moreover, the content will not only be provided in written text but also in audio form. This is important since child patients might lack energy to read or have problem reading. This is an important design feature to make sure the application is available to as many child patients as possible

Technical support

'Mijn Buddy' provides real-time updates that are achieved by the link with EPIC. EPIC is the digital patient record system where all actions with regards to healthcare are noted. 'Mijn Buddy' can retrieve which triage-nurses are working at which hours of the day, names of the medical professionals involved in the treatment team, orders that medical professionals make, number of other people waiting at the ED, when treatments are planned, etc. With the data sourced from EPIC 'Mijn Buddy' knows where you are in your journey. For example, when a room number of the nursing department is linked to your patient record, it can be assumed you will be admitted into the nursing department, or when notes are taken by the triage-nurse the system knows the triage has been completed.

Privacy and regulation

It is important to note that parents have to sign a disclaimer stating no rights can be undermined an no liability regarding the information shown in the application is provided. This is also needed in order for medical professionals to do their job and provide the best care, even if that means it doesn't follow the general patient journey. It is very important to regulate when what informa-

tion is shown to the patient. Patients should have consulted with a medical professional first before personalized information is provided for use in the app. For example, a child patient shouldn't receive an update about surgery if this is completely new information to him. This can be prevented by letting medical professionals give a 'go' before sending information to 'Mijn Buddy. This is also achieved by creating information stops in the journey at triage and the diagnosis and treatment plan. Sometimes medical professionals place orders even before the patient is seen at the ED, or sometimes a wrong order is placed. By using a stop, no orders are visible before the triage has been completed, and no treatment updates are given before the diagnosis and treatment plan is discussed with the patient. Furthermore, no reasonings for orders are shown, only the test itself, for example 'Mijn Buddy' will only know a blood test has to be taken and not the reason why a medical professional has ordered it. Finally, the application will only work on the AMC network and is linked through a uniquely generated QR-code in EPIC that only medical professionals have access to.

Future process including P-AMU

The 'Mijn Buddy' application uses the acute admission process that was derived from the design research. However, the acute admission journey will look different when the future P-AMU is implemented (Figure 68). Even though the process of the P-AMU looked clean in Chapter 2.4, this isn't the case when comparing the acute admission journey with an without the implementation of the P-AMU. A second 'moment of choice' has to be integrated when child patients are discharged from the P-AMU or transfered to the paediatric nursing department.

Figure 68 *The acute admission process journey when the future P-AMU is implemented*

7.5 Screen flow & interactions

In this section an overview is given on the connection between the different screens and the interactions per screen. Figure 69 presents the main wireframe including the main functions. Since the 'Mijn Buddy' application works along the timeline of an acute admission the following screen flows are shown per touchpoint, these touchpoints follow the steps in the acute admission process and were defined in the user scenario (Chapter 7.3).

After elaborating on the wireframes per touchpoint, each individual screen is elaborated on to describe the interactions that take place. Figure 68 shows the hand gestures for the interactions. Screens that link to external content on the EmmaKids website will not be included. Furthermore, some screens telling a story, only the final screen with all interactions is shown. The journey and details about a step will only elaborated on once.

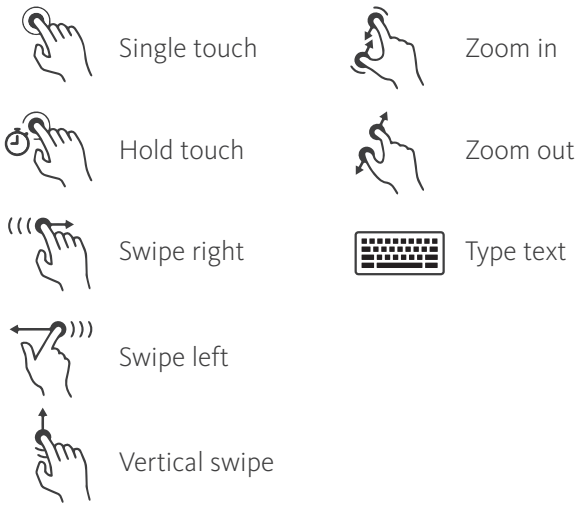


Figure 69 *Hand gestures for interaction*

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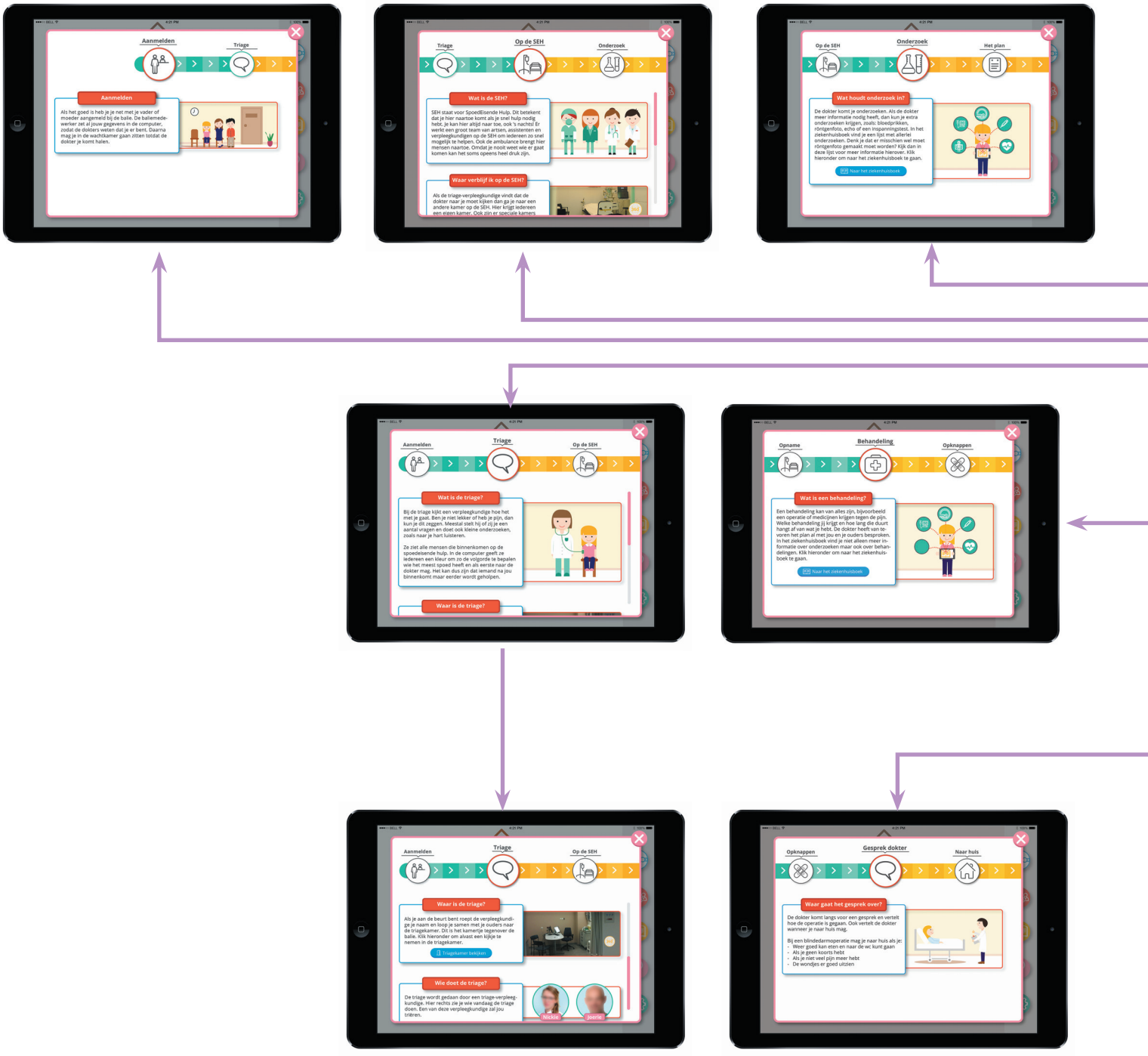
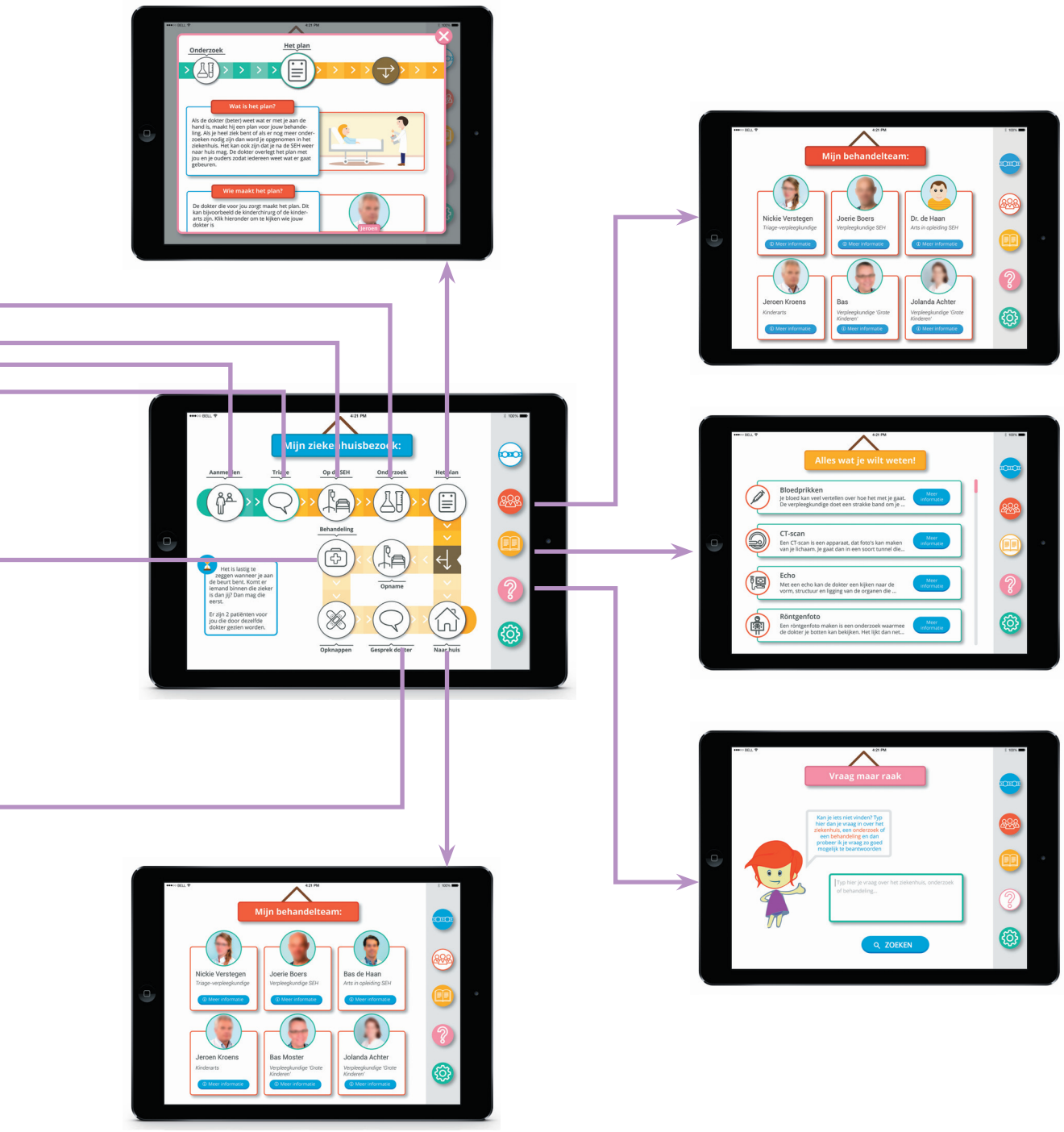


Figure 67 *Main wireframe including the main functions and general information about the steps (external links are excluded)*

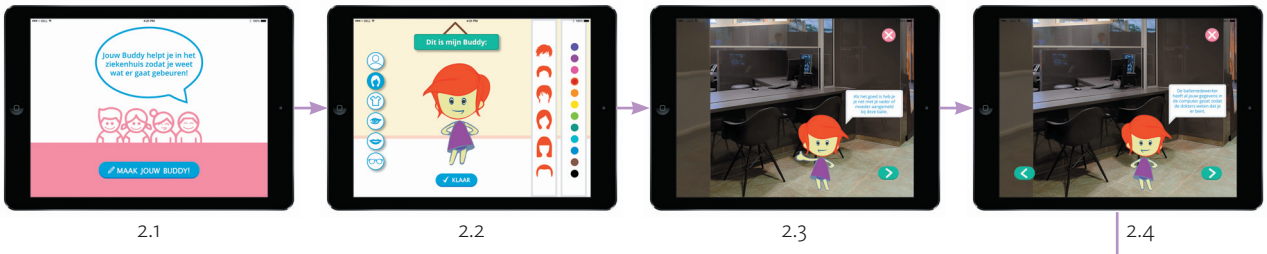

Onderzoek
Het plan
Wat is het plan?
Als de dokter (beter) weet wat er met je aan de hand is, maakt hij een plan voor jouw behandeling. Als je heel ziek bent of als er nog meer onderzoeken nodig zijn dan word je opgenomen in het ziekenhuis. Het kan ook zijn dat je na de SEH weer naar huis mag. De dokter overlegt het plan met jou en je ouders zodat iedereen weet wat er gaat gebeuren.
Wie maakt het plan?
De dokter die voor jou zorgt maakt het plan. Dit kan bijvoorbeeld de kinderchirurg of de kinderarts zijn. Klik hieronder om te kijken wie jouw dokter is
Jeroen
Mijn behandelteam:
Nickie Verstegen
Triage-verpleegkundige
Joerie Boers
Verpleegkundige SEH
Dr. de Haan
Arts in opleiding SEH
Jeroen Kroens
Kinderarts
Bas
Verpleegkundige 'Grote Kinderen'
Jolanda Achter
Verpleegkundige 'Grote Kinderen'
Meer informatie
Behandeling
Opname
Opknappen
Gesprek dokter
Naar huis
Het is lastig te zeggen wanneer je aan de beurt bent. Komt er iemand binnen die zieker is dan jij? Dan mag die eerst.
Er zijn 2 patiënten voor jou die door dezelfde dokter gezien worden.
Alles wat je wilt weten!
Bloedprikken
Je bloed kan veel vertellen over hoe het met je gaat. De verpleegkundige doet een strakke band om je ...
CT-scan
Een CT-scan is een apparaat, dat foto's kan maken van je lichaam. Je gaat dan in een soort tunnel die...
Echo
Met een echo kan de dokter een kijken naar de vorm, structuur en ligging van de organen die ...
Röntgenfoto
Een röntgenfoto maken is een onderzoek waarmee de dokter je botten kan bekijken. Het lijkt dan net...
Meer informatie
Vraag maar raak
Kan je iets niet vinden? Typ hier dan je vraag in over het ziekenhuis, een onderzoek of een behandeling en dan probeer ik je vraag zo goed mogelijk te beantwoorden
Typ hier je vraag over het ziekenhuis, onderzoek of behandeling...
ZOEKEN
Mijn behandelteam:
Nickie Verstegen
Triage-verpleegkundige
Joerie Boers
Verpleegkundige SEH
Bas de Haan
Arts in opleiding SEH
Jeroen Kroens
Kinderarts
Bas Moster
Verpleegkundige 'Grote Kinderen'
Jolanda Achter
Verpleegkundige 'Grote Kinderen'
Meer informatie

FINAL DESIGN

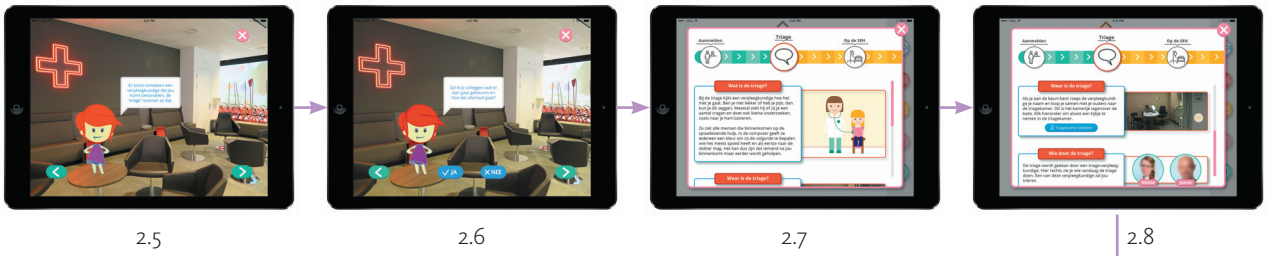
1. Arriving at the ED

1.1 1.2 1.3

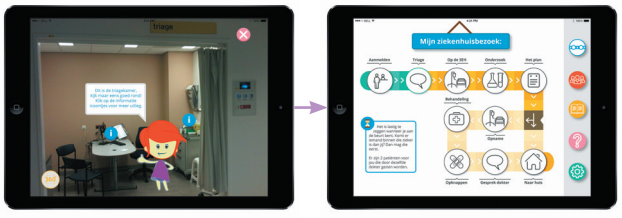
2. Preparing for triage



2.1 2.2 2.3 2.4



2.5 2.6 2.7 2.8

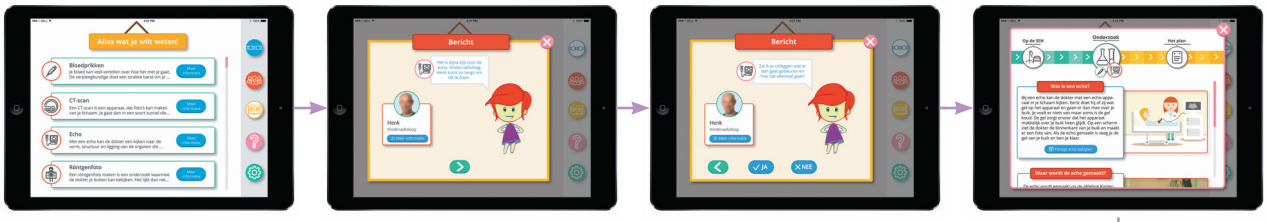


2.9 2.10

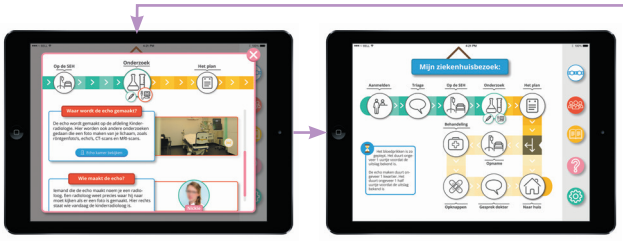
3. Preparing for admission ED

3.1 3.2 3.3 3.4

4. Preparing for medical tests



4.1 4.2 4.3 4.4



4.5 4.6

5. Discussing the plan

5.1 5.2 5.3

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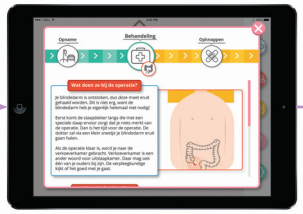
6. Transferring to nursing department

6.1

7. Preparing for treatment

7.1



7.2

7.3

8. Recovering after treatment

8.1

8.2

9. Preparing for discharge

9.1

9.2

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1.1

After 5 seconds this screen automatically continues to the next screen

1.2

Hold the tablet an point camera towards QR-code on computer screen

1.3

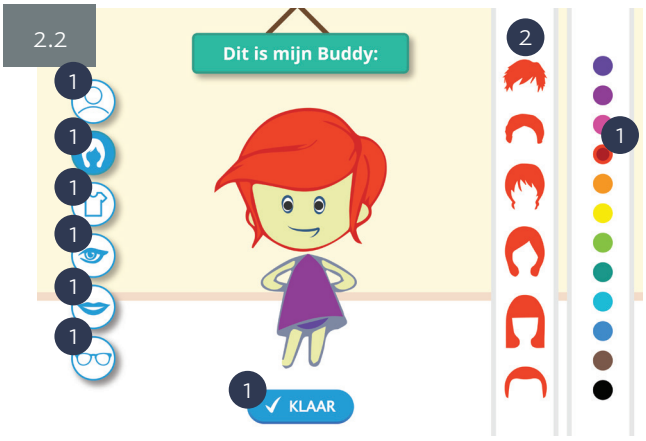
1 Type username and password, confirm password

2 Click to log in

2.1

1 Click to make your personal buddy

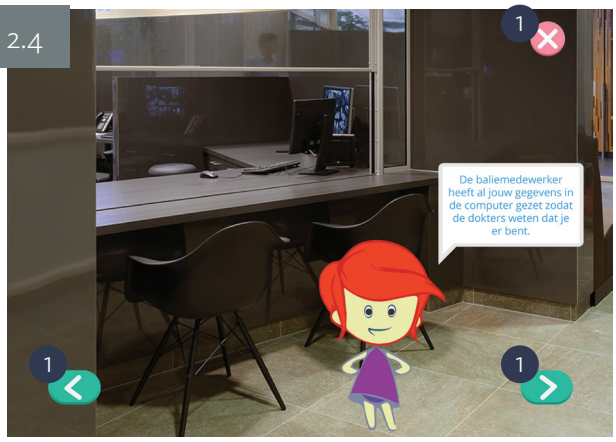
2.2



1 Click to select elements of avatar, when satisfied click done to start the journey

2 Swipe up and down to scroll through set of elements

2.4



1 Click to back, go to next, or exit to go to journey overview

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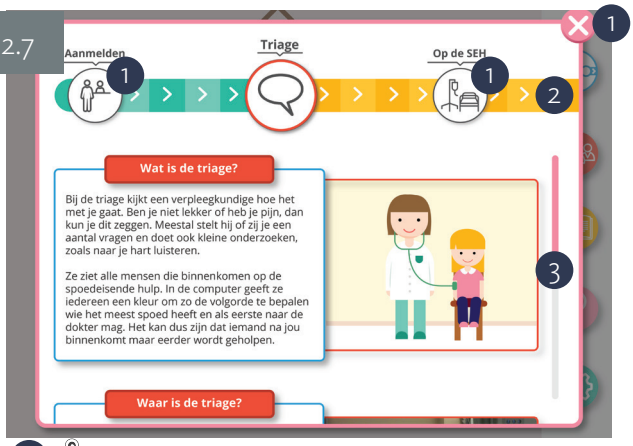
2.6

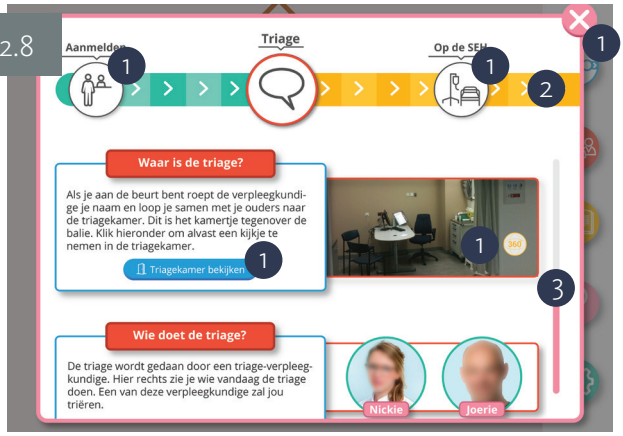
1 Click to go back, next, or exit. Click 'Ja' to go to 2.7
Click 'No' to go to 2.10

2.7



1 Click to go to other steps or to exit and go back to overview
2 Swipe left to move further in the journey
3 Vertical swipe to go to 2.8

2.8



1 Click to go to other steps, to exit, or go to 2.9
2 Swipe left to move further in the journey
3 Vertical swipe to go to 2.7

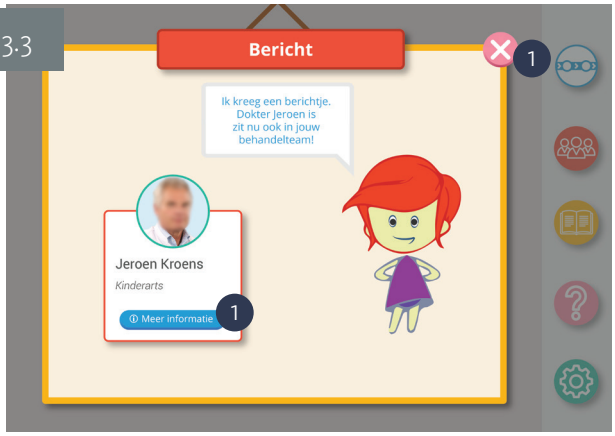
2.9

1 Click to see information about object or to exit and go back to 2.8

2.10

1 Click to see information about the step, or to go to 'treatment team', 'Hospital Book', 'Question', or 'Settings'

3.3



1 Click to exit or get more information on the doctor

4.1

1 Click to go get more information about the test or treatment

2 Vertical swipe to scroll in list

Not all screens were elaborated on. Similar interactions can be found on these categories of these screens:

- 1.3/ 6.1
- 2.6/ 4.3
- 2.10/ 3.1/ 4.6/ 5.1/ 7.1/ 8.1/ 9.1
- 2.7/ 2.8/ 3.2/ 4.4/ 4.5/ 5.2/ 7.3

An important interaction at screens 2.10/ 3.1/ 4.6/ 5.1/ 7.1/ 8.1/ 9.1 to enhancing the feeling of moving to the next step in the journey is that the pathway will slowly change from yellow to green fill with green. Furthermore, the next step ahead will be emphasized on by making it slightly bigger in size en by letting in blink (animation where icon gradually get bigger and smaller).

7.6 Costs & Implementation

In this thesis the minimal viable version of 'Mijn Buddy' is presented. In the concept direction of the 'Digital Buddy', it included augmented reality, however, the gained values by adding AR compared to the costs are not viable at this moment. Therefore, this is not included in the final design. The design agency Fonk has experience in setting up an application like this. They were asked to give a rough estimation of the costs of developing this app (Table 9). The cost for 'Mijn Buddy' were estimated at €50.000.

During the project another possibility came up. The AMC is currently looking into the cooperation with MediMapp. MediMapp is a digital interactive guide for planned clinical care that also takes into account the patient journey, and has a link with the EPD. They have already built the software with a connection with an EPD and they don't persist on using their own graphical layout. This creates a possibility for 'Mijn Buddy'. To combine the existing software of MediMapp with the graphical layout presented in this thesis, a child version of MediMapp can be created. In this way the time to market will be considerably shorter and it will very likely decrease the implementation costs.

Furthermore, to launch the application for all acute cases would take a long time to develop and implement. Therefore, the 3 most common acute admission can serve as a pilot. All content is created that correlates with those admissions and the effect of 'Mijn Buddy' can be elaborately tested. During this testing phase, iterative cycles should be used where developing and testing are parallel processes. During the pilot test, content can be created to extend 'Mijn Buddy' to more and more acute admissions.

Figure 70 shows the implementation road. However, this is depended on many factors. This roadmap was based on sufficient financial funding, the collaboration with MediMapp, and a dedicated full-time team including visual designers, content creators, developers, user experience designers,

Programming Including project management, implementation of animations, sounds, and 360-degree pictures.	**€23.000**
Optional Augmented Reality (AR) Link with EPIC	 €5.000 €5.000
Designing Including project management, visual design, further development of UX, and illustrations	**€20.000**
Total (excl. AR, link EPIC) **Total** (incl. AR, excl. EPIC) **Total** (excl. AR, incl. link EPIC) **Total** (incl. AR, link EPIC)	€43.000 €48.000 €50.000 €55.000

Table 9 *Overview of estimate costs of the development of 'Mijn buddy'*

user interaction designers, childcare workers, EmmaKids PR representatives, communication department, etc.

It is recommended to start a pilot test with 'Mijn Buddy' including the 3 most common acute admissions. In this way, usability and implementation problems can be redesigned, and the value of design can be proved.

Once the value of the design has been proved, it can be applied on all acute admissions. Parallel to the first pilot test, content creation for all acute admission is created.

In the future 'Mijn Buddy' has the potential to provide a personalized journey to every child patient in the hospital, regardless whether they are acute or planned. Patient journeys for other admissions should be finalized. The existing journeys on the EmmaKids website can be used as a starting point. Content related to those journeys should also be created. In the most ideal case a full implementation of 'Mijn Buddy' for all paediatric admission is realized by end of 2021.

Even further in the future, extensions to the functionalities can be made such as adding patient feedback surveys, pain level measurement, and a child version of 'Mijn Dossier'.

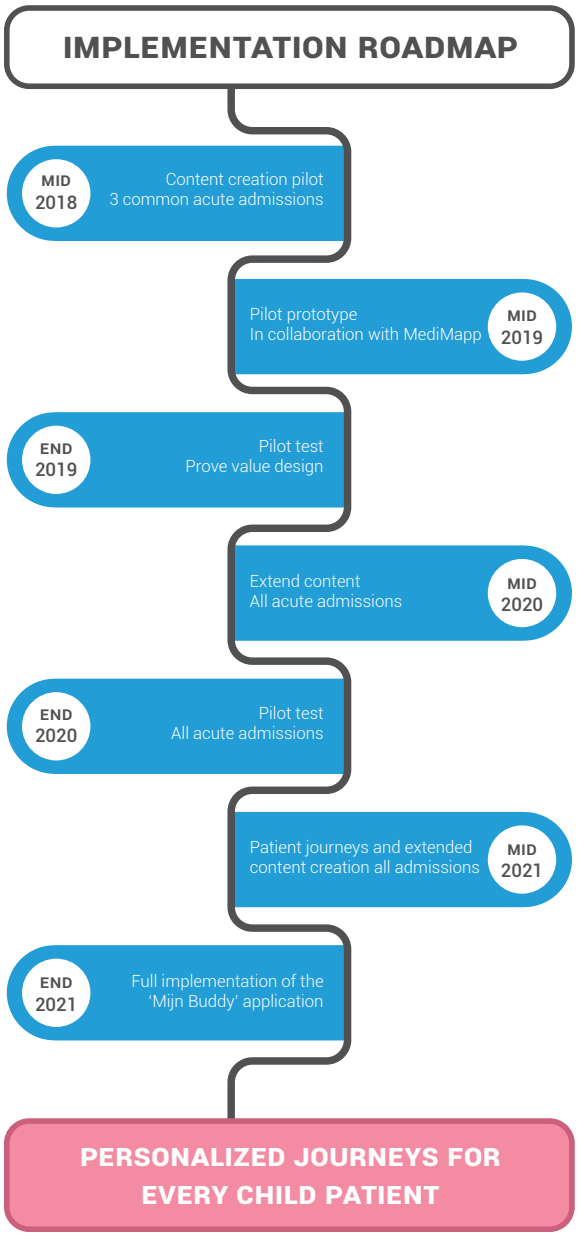


Figure 70 *Implementation Roadmap*


Mijn ziekenhuisbezoek:
Het plan
Onderzoek
Op de SEH
Triage
Aanmelden
Behandeling
Opname
Naar huis
Gesprek dokter
Opknappen
Het is lastig te zeggen wanneer je aan de beurt bent. Komt er iemand binnen die ziek is dan jij? Dan mag die eerst.
Er zijn 2 patiënten voor jou die door dezelfde dokter gezien worden.

08 EVALUATION STUDY

In the design brief (chapter 5) a design goal was formulated.
"*I want child patients and parents to feel* ***less unsure and bored*** *during the acute admission, by designing a tool that* ***improves their communication*** *with the healthcare system about the acute admission process, and that puts the* ***children in control*** *in a* ***playful*** *and* ***understandable*** *way*".
During the conceptualization phase, decisions were made by the designer to fulfill the design goal. In the evaluation study, described in this chapter, the design will be assessed to meet the design goal. The evaluation study is comprised of two parts: (1) does the suggested design improve communication with the healthcare system, and (2) does it reduce uncertainty about the admission process. The evaluation study included both child patients and parents, regular children in their home environment, ED-doctors and paediatricians.

EVALUATION STUDY

To determine if 'Mijn Buddy' fulfils the design goal, an evaluation study was conducted, which consisted of two parts (Figure 71).

8.1 Aim

The aim of the first part of this evaluation study is to see in what way the design influences the communication between medical professional and child patient, and to see if it improves the communication with the overall healthcare system. The second part of the study is to evaluate whether the design reduces the uncertainty about the admission process in a playful and understandable way. Both studies are needed to assess if the design meets the design goal stated in the Design Brief (Chapter 5.2).

Research Questions

The results of the design research have shown that child patients, and parents, are unsure about the process and don't know what to expect through their hospital journey. The 'Mijn Buddy' app has been designed to improve the provision of information. The research questions are formulated as followed:

Part one - medical professional related:

1. How does 'Mijn Buddy' affect the medical professionals' daily work?
2. How does 'Mijn Buddy' influence the communication between child patient and medical professional?

Part two - patient related:

3. Does 'Mijn Buddy' reduces the uncertainty about the process of an acute admission?
4. Does 'Mijn Buddy' provide information in a playful way?
5. Does 'Mijn Buddy' provide comprehensive information in an understandable way to children?

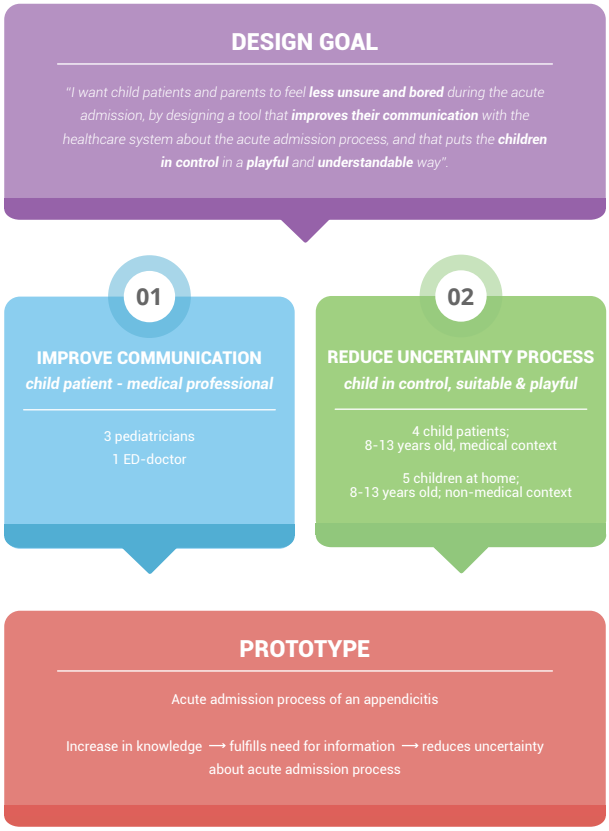


Figure 71 *The overview of the evaluation study consisting of two parts; assessing the improvement of the communication with medical professionals, and evaluating the decrease of uncertainty about the process in a playful and understandable way.*

8.2 Method

Prototype

For this evaluation study an interactive prototype of the 'Mijn Buddy' app was developed using the InVision program. Since an acute admission embraces many different kinds of illnesses, the journey was developed for an acute admission for an appendicitis. This journey was chosen since it is a fairly easy one with little complexities which makes it manageable for children to understand it quite quickly within the duration of the test; averaging approximately 20 minutes. The textual content in the interactive prototype was checked with the head childcare worker and the PR repre-

sentative of the EmmaKids website, to make sure it suited children aged 8-13 years old.

Participants

For the first part of the evaluation study three paediatricians and one ED-doctor, all employed at the AMC, were included and asked for feedback. For the second part of the evaluation study four child patients and five children in their home environments were included. All participants were able to read, were Dutch-speaking, and had no previous experience with an acute admission for appendicitis. The child patients were three boys and one girl aged 8, 10, 11 and 14 years old. They were approached while being admitted at the hospital at a suitable time. Beforehand, the researcher asked permission from the responsible nurse of the child patient. When parents were present, they were asked for permission beforehand as well. The children in their home environments were four boys and one girl aged 9, 10 (2x), and 13 (2x) years old, respectively. An appointment with the parents was made to conduct the test.

Research procedure

Part one - medical professional related:
The medical professionals were asked for feedback in an evaluative conversation during their shift at the hospital (Figure 72). The researcher gave an elaborate explanation of the goal and a walkthrough of the prototype. They were asked about the pros and cons of the use of this app, how they think it would influence their work, and how it would influence the communication between child patient and medical professional.

Part two - child patient related:
During the evaluation study with children and child patients, storytelling was used to enact an acute admission for an appendicitis. Before the researcher started the story, the participants were asked to fill in a form (see Appendices 24 & 25) asking 'How much do you know about an acute admission for appendicitis?'. Then they were asked for permission to film the test and for pictures to be taken of them while using the prototype. The test for child patients would take place in their hospital rooms (Figure 73). The other children evaluated the design at home (Figure 74).

Before the prototype was handed over to the child, a short and simple explanation of the goal of the design was given (improved provision of information; help children at the hospital), and the goal of this evaluation study (assessing the design on fulfilling design goal; assess if children like and understand the design) was given. After that, the

Figure 72 *Two paediatricians and an ED-doctor during and after the walk-through and evaluative conversations about the design*

researcher took the children along a story starting by: 'Imagine you are having a lot of pain in your stomach and your mom and dad take you to the emergency department...'. For the full research procedure see Appendix 26. The children were given questions along the story. They used the prototype to find the answers to these questions.

After they gone over the steps within the journey, the participants were asked again 'How much do you now know about an acute admission for appendicitis?'. They were also asked whether they liked using the application and if they thought it was easy to use. The last question asked whether they would like to use the 'Mijn Buddy' app in case they ever had to go to the hospital themselves.

Data Analysis

Part one - medical professional related:
During the evaluative conversations with the medical professionals notes were taken. Afterwards, a summary of the evaluative conversations was written as per each conversation and the data was categorized per theme. The most remarkable quotes mentioned during these conversations were also included.

Part two - child patient related:
The use of the prototype was filmed and notes were taken. On the film only hand movements were recorded to keep the data anonymous. The data from the form used in part two with the child patients was analyzed by counting the scores. The 'Mijn Buddy' app has been designed to improve the child patient's provision of infor-

Figure 73 *Two child patients during the evaluation study of the design*

Figure 74 *Two children at their homes during the evaluation study of the design*

mation. It can be assumed that when patients are well-informed, they know (or have a better idea of) what to expect and therefore feel less unsure about the process. Therefore, the decrease of uncertainty was determined by whether an increase in knowledge was measured. Playfulness was assessed by whether the participants liked to use the app and from observing the interaction of the children with the prototype.

Whether or not the app is understandable for 8 till 13-year-old children was evaluated by asking the participants whether they thought the app was easy to use and from observing their interactions with the prototype. The data from the film was analyzed per task, including the corresponding screens. For each task the duration and incorrect clicks were abstractly noted. The researcher interpreted this data to state whether and why a task took longer than expected and whether or why incorrect clicks were made.

8.3 Results

The results for the two parts of the evaluation study are given below.

Part one - medical professional related:
Overall, the medical professionals were very positive about the design and the idea behind it. They recognize the child patients' need for more information about their journey within the hospital. The data is presented below, as per each category.

Advantages for medical professionals
According to the medical professionals, the main advantage of the use of 'Mijn Buddy' by child patients is that it provides more clarity to the child patient and their family about which steps are ahead. Not always do child patients and even parents dare to indicate when they don't understand something. When they are informed beforehand, via this app, they can ask more specific questions when the doctor visits. The increase in clarity can also be described as better aligned expectations with reality. Because of this improved expectation management, the medical professionals foresee multiple benefits such as anxiety reduction, reduced frustration and resistance, and a higher patient satisfaction. On one hand they don't necessarily see a time-saving advantage due to the provision of information via the app, since they are obligated to give the patients the information. However, according to the ED-doctor 'in a stressful situation like at the ED only 30% of the provided information lingers'. If they can read information before or again after seeing the doctor, more information will be taken in by child patients and parents.

On the other hand, they do see a time-saving advantage because of the reduction of frustration and resistance, particularly when patients need to be transferred to another hospital. One of the paediatricians explains that it currently takes a lot of extra time; ''The reason I was 45-minutes late for this appointment was because I needed reassure a patient and mainly the parents as they were very frustrated since they couldn't be admitted here and needed to be transferred to another hospital".

Furthermore, they see a clear added value in showing the treatment team and especially who the head practitioner is. ''The current patient feedback already shows the need for insights in the treatment team, there is especially a lot of confusion about who the head practitioner is", one of the paediatricians mentioned. Lastly, when they go and visit the child patients they

already see them on their phones all the time, so they think 'Mijn Buddy' fits the target group well. Sometimes during visits, it is even difficult to make them put away the phone for even a small amount of time.

Disadvantages medical professionals

The two main concerns that the medical professionals see are more work, as in clicks or pop-ups in EPIC, and more pressure caused by the raised expectations. The clicks in EPIC might be needed as an extra security for sending information to the child patient. However, developers are building in more and more clicks in the system which is creating more work for the medical professionals.

Most likely the parents will pin themselves down to the information provided in this app since that's the only clear guidance they receive. Nevertheless, sometimes things will go differently, which is common at a division that handles acute and unpredictable cases. The ideal admission is described in the journey 'Mijn Buddy'. Making sure things are executed following this journey could create more pressure for the medical staff, and it might even create patient dissatisfaction if it is not lived up to.

Sometimes orders in EPIC are placed even before the patient has arrived at the ED to make the process more efficient at arrival. Therefore, there should be some sort of regulation or limitation for the information flow to the child patient. You don't want the child patient to see the information before seeing a doctor, or in the worst-case scenario, see the wrong information. Lastly, if the iPads are provided by at the ED there should be a regulation to make sure they won't get stolen or taken to other places outside of the ED.

Recommendations for design

During the walkthrough, the medical professionals came up with some further recommendations for the design. These are listed below.

- Approximately 50% of the patients doesn't speak Dutch, therefore this application should be available in various languages, where Dutch, English, and French should be developed first
- There should be more ethnic diversity in the illustrations of the app
- A possible transfer should be added as third option to the 'moment of choice' in the journey (Figure 75)
- Nurses are often named by their first name whereas doctors are usually named by their last name, this is also done to avoid confusion about a person's job, the app should reflect this.
- There should be a regulation or limitation for the information flow to the patient to make sure information is not provided preliminary.
- The treatment team should also include the co-assistant and doctor's assistant. This is an academic hospital so the patients will first see a co-assistant, then the doctor's assistant, and then eventually the doctor.
- When a child patient needs to have surgery,

Figure 75 *Adding a possible transfer to the moment of choice to reduce resistance and frustration*

'Mijn Buddy' can also give an update with addition information about fasting before surgery
- 'Opknappen' not everyone does recover, maybe another word suits better
- 'Bloedafname' instead of 'bloedprikken', this sounds less frightening

Part two - child patient related:
The results from part two of the evaluation study are divided into two categories; data per task and the outcomes from the form. Little differentiation between the participants were observed, similar problems were found for almost all participants.

Task 1: Information while waiting
The children were asked what information they would like to know when they are waiting at the waiting room of the ED. Subjects they mentioned where cause of pain, steps that will happen next, and since the researcher mentioned appendicitis in the explanation they would like to know the causes of appendicitis.

Task 2: Finding information about triage
Getting to the information regarding triage in the app wasn't difficult since 'Mijn Buddy' is asks whether you want more information about the triage. All children were able to answer what triage is, what the room looks like, and who will preform the triage fairly quick. All most all children needed help finding out how long it takes before it's their turn. This is caused by the fact that this information can be found at the journey, and not in the triage information. Furthermore, not all children were aware of the fact that they were scrolling between the first and second page. This was most likely caused by the shortcoming of a fluent interaction of the prototype. Another explanation could be that the visual style of the elements on both pages were similar.

Task 3: Finding information about a blood test
All most all children found the information via 'Onderzoek' in the journey instead of via the book icon in the menu. Most children first clicked on 'Op de SEH' since it was the next step in the journey. In the story this step was mentioned as completed and the task about the blood test was about the following step in the journey. This was not always clear for the children. All children clicked 'Onderzoek' next, as it is the next step in the journey.

Task 4: Finding information about an ultrasound
Since Buddy asks in the update whether you want more information about the ultrasound, all children easily found the corresponding information. No problems were identified when the participants were finding out what an ultrasound is and where it would be. In the update ''Mijn Buddy' already shows who preform the ultrasound. Some children remembered it from the update whereas others found the name in the information about the ultrasound. Most children had difficulties finding out how long it would take before they would have the results of the ultrasound. When the researcher mentioned the question about time with the triage, all children knew where to go to.

Task 5: Finding information about treatment team
Interestingly, most children were mentioning or looking for previous seen names of medical professionals, like the triage-nurse or the radiologist. This demonstrates that children are not aware of the different medical roles of the people involved in their journey. Eight out of nine participants needed extra help finding the treatment team icon in the menu. Once they saw the treatment team they were able to quickly give the name of the paediatrician.

Task 6: Finding information about the surgery

Most children clicked on 'Behandeling' right away, they indicated that the colors in the journey made it clear. Some clicked on 'Opname' since they first associate surgery with the word admission instead of treatment. Once they found the information about the surgery, no problems were identified with finding out what will happen during the surgery, where it would be, and how many people are involved. When the researcher asked about what time the surgery would be, all children now knew where to look for the information. Evidently, a strong learning curve was seen during this evaluation study.

Task 7: Finding information about the conversation with the doctor

Half of the children clicked on the right icon right away, whereas the other children clicked on 'Opknappen' since it was the first step after surgery. This button didn't work yet so they figured out quickly that they need to go one step further. Once they found the information about the conversation, no problems were identified with finding out what they will discuss and what time the doctor will visit.

Knowledge about admission for appendicitis - form

In Figure 76 the results from the form are shown for the questions about their knowledge of an admission for appendicitis before and after using 'Mijn Buddy'. A clear increase in knowledge is shown, were the knowledge before use is rated 'very little' whereas after use the knowledge was reviewed as 'a lot'. No differentiations in the results were found based on age, gender, or environment (hospital versus home).

Use of 'Mijn Buddy' - form

The use of 'Mijn Buddy' was divided in two factors; level of fun and difficulty. Each factor was questioned in the form.

Fun of use

Overall, all children reviewed 'Mijn Buddy' as fun to use (Figure 77). The journey was perceived as clear and the illustrations and information was identified as fun. They like the educational aspect of the app, teaching them about procedures, test, and the hospital in general. Several children also mentioned they like the fact that it is digital and is used on a tablet since this is convenient and also what they are used to nowadays. No differentiations in the results were found based on age, gender, or environment (hospital versus home).

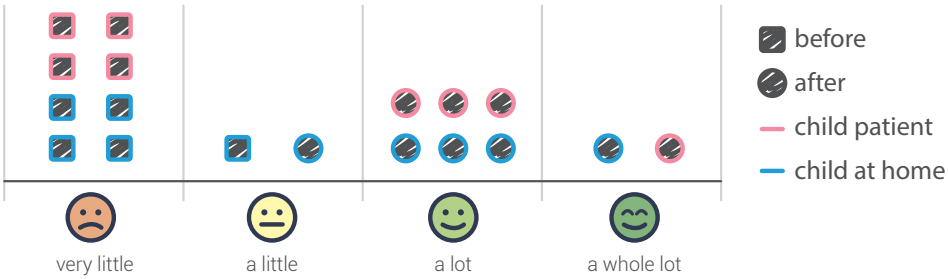


Figure 76 *Results from the form on the questions 'How much do you know about an admissions for appendicitis?' before and after use.*

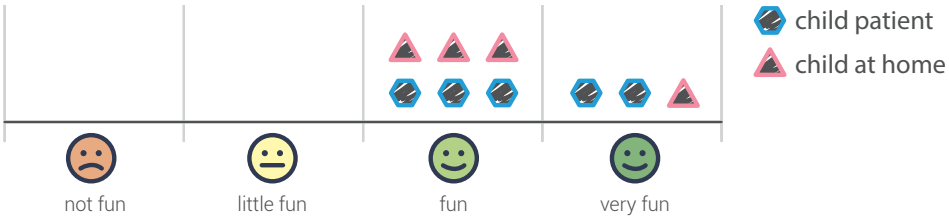


Figure 77 *Results from the form on the questions 'How much do you know about an admissions for appendicitis?' before and after use.*

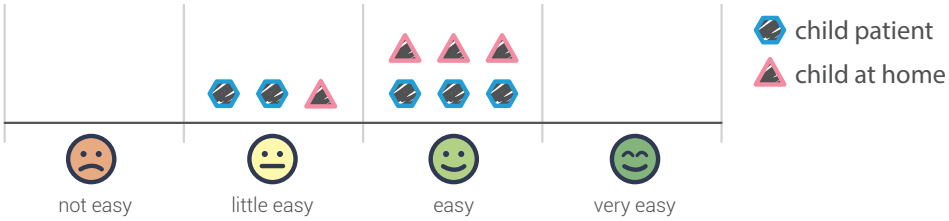


Figure 78 *Results from the form on the questions 'Did you think it was easy to use the 'Mijn Buddy' app?'.*

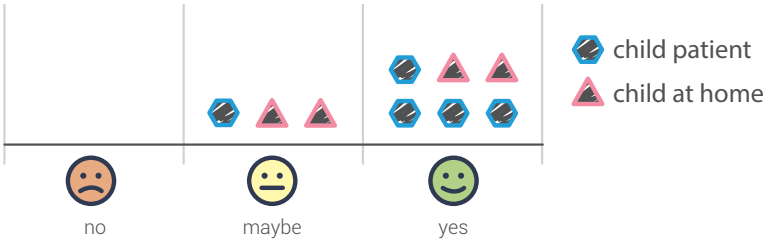


Figure 79 *Results from the form on the questions 'If you would have to be admitted in the future, would you like to use the 'Mijn Buddy' app?'.*

Easy of use

Most children found 'Mijn Buddy' easy to use (Figure 78). One third of the participants scored the app 'little easy' to use, this included the two youngest participants (8 and 9 years old). One of them indicated that some hospital terms were difficult to understand. Furthermore, it sometimes was difficult to find the information the first time, but the next time they know where to look. It was noted that, especially for the younger ones, there was quite a lot of text which requires effort and focus. Lastly, the various information boxes per step were not always seen, this could have been caused by the shortcoming of the interaction of the prototype or by the visual style being similar per box. No differentiations in the results were found based on gender or environment (hospital versus home).

Likeliness of use

Most children indicated that they would like to use the app when they have to be admitted in the hospital in the future (Figure 79). They find it very convenient that it gives an indication on how long you have to wait, what time certain steps take place, and which doctor you will see. The child patient that scored 'maybe' explained that she wasn't sure whether she would have enough energy to use the app. Furthermore she already knows how things go around the hospital since she is more often acutely admitted. The children at home that weren't sure about the use of the app in their own situation both indicated that they have been in the hospital a couple times before. If they have to go for similar reasons they aren't sure of the use of the app, however for other reasons they would like to use the app. No differentiations in the results were found based on age, gender.

8.4 Conclusion

During the evaluation study both medical professionals, child patients, and children provided positive feedback about the 'Mijn Buddy' application. The use of 'Mijn Buddy' affects medical professionals' daily work since the child patient and family's expectations are better aligned with reality, which will cause anxiety reduction, less frustration and resistance, and a higher patient satisfaction. 'Mijn Buddy' will better inform patients, which can save time on a daily basis for medical professionals. The insights in the treatment team, especially showing the head practitioner, will reduces confusion and provides clarity to patients and family about which doctor to address. It could create more work for medical professionals when extra clicks in EPIC are needed to ensure a safe and accurate information flow. Medical professionals are obligated to still provide the information, however, communicating with an informed and somewhat reassured child patient could create a more relaxed and comfortable atmosphere.

An increase in knowledge about the acute admission for appendicitis was demonstrated through testing. Previous research has shown that uncertainty in the process occurs and patients want more information about the process. So, it assumed that by the increase of knowledge the 'Mijn Buddy' decreases the uncertainty about the process.

All children rated the 'Mijn Buddy' as 'fun' or 'very fun'. Therefore, we can assume 'Mijn Buddy' provides information in a playful way. The observations during use showed that the playfulness in the interaction could be improved by creating more dynamic content instead of static illustrations and text.

'Mijn Buddy' was reviewed as easy to use by two third of the participants. It was evident that any problems that occurred were in finding the information, not the information itself. Therefore, we can assume 'Mijn Buddy' provides comprehensive information in an understandable way. The way-finding within the app could be enhanced. Both medical professionals and child patients agree that 'Mijn Buddy', used on a digital device, fits the target group of 8-13-year-old children.

8.5 Discussion

This test included nine children and four medical professionals. The small sample size could cause less conclusive results, leading to misinterpreting the outcomes of the research. In order to statistically prove the validity and the benefits of 'Mijn Buddy' an A/B- or t-test is needed where one group of patients with appendicitis will use 'Mijn Buddy' and the other group won't. This method is common within the medical field and therefore will also create more support and acceptance of the design.

Secondly, the level of fidelity of the prototype could have influenced the outcomes of the research since some interactions aren't prototyped as proposed in the final design (Chapter 7), due to limited time within this project.

Moreover, despite the researcher's efforts to create an open and honest atmosphere, the children might have given the 'right answer' instead of responding honestly. This could have influenced the outcomes of the research.

Furthermore, the participants in this study did not have any personal experience with an admis-

sion for appendicitis, therefore storytelling was used to simulate the situation. However, when one actually experiences appendicitis other factors play part, like anxiety and stress that weren't necessarily present during simulation. This could have influenced the results found in this research.

In this test the children went over most of the information about the admission in approximately 20 minutes, whereas in real life it could take a couple hours to go through entire process. This could have caused an overload of information which could have influenced the results. Lastly, in this test the results only apply to an admission for appendicitis. However, there many different kinds of acute admissions, which can be more complex and less straightforward. Whether the results in this research can also be applied to other acute admissions needs to be further investigated.

09 CONCLUSIONS & RECOMMENDATION

In this project an example is given of how design research and design solutions can be used within healthcare to improve the patient experience. Involving child patients, their parents, and medical professionals throughout the project ensured that the design stayed close to their needs, wishes, and capabilities. This final chapter contains the most important conclusions about this project and recommendations for further development and additional research of 'Mijn Buddy'.

CONCLUSIONS & RECOMMENDATIONS

9.1 Conclusion

'Mijn Buddy' is a digital application, designed for children aged 8-13 years old, that provides insights into the acute admission process, so they know what, who, where, and when to expect things to happen during their medical journey. Literature research also showed the importance of expectation management as being a strong influencer on the patient experience. Instead of solely focusing on the future P-AMU, or current paediatric nursing department, design research showed that in order to improve the patient experience at the P-AMU it is necessary to address the problems found at the ED during the acute admission process.

Via the link with EPIC, 'Mijn Buddy' adjusts and personalizes to the child patient's situation and is able to function within the dynamic and ever-changing environment at the ED. 'Mijn Buddy' also fits within the VKC's mission, since it puts the child patients in control, so they actively participate instead of letting it all happen. Moreover, it also suits well within the three VKC values (Open, Sensitive, Innovative) because it is an innovative solution that focuses on child patients' and parent's needs, and that stimulates a more open and transparent way of communicating as it gives a clear overview of the admission process.

The desired interaction qualities determined in Chapter 5.4 were applied in the design of 'Mijn Buddy'. By providing information in a *clear* and *guiding* way, it *engages* child patients and their parent in the care, and will make them feel more *in control*. The information is provided in a understandable and *playful* way. The playfulness can be enhanced in future developments by basing it less on text and more on visuals, animation, and movies.

In the evaluative user research an interactive prototype showed an increase in knowledge about the acute admission for an appendicitis, and therefore it is expected that it reduces the uncertainty about said admission process. Furthermore, child patients reviewed 'Mijn Buddy' as easy and fun to use and indicated that they would like to use 'Mijn Buddy' if they had to go to the hospital themselves in the future. 'Mijn Buddy' not only provides added value to children, but to parents as well as they find it useful in self education while enhancing dialogue with medical professionals. It is evident that 'Mijn Buddy' will lead to child patients and parents feel less unsure during the acute admission and will therefore enhance the patient experience. More research is needed to justify these results with other, more complicated, acute admissions besides appendicitis.

According to medical professionals included in the evaluation study, expectations that are better aligned with reality will reduce anxiety, frustration and resistance, and create a higher patient satisfaction. Especially when it comes to transfers to other hospitals it can safe them time on a daily basis. Even when child patients use 'Mijn Buddy', medical professionals are still obligated to provide information. Nevertheless, only 30% of the provided information by medical professionals lingers in a stressful and hectic environment like the ED. So 'Mijn Buddy' leads to better informed patients since they can go over the information again. Communicating with a better informed and more reassured child patient changes the dynamic between medical professional and child patient and could create a more comfortable and less overwhelming atmosphere. This can be verified during the pilot test.

The 'Mijn Buddy' application addresses the two critical influences 'expectation management' and 'communication & information' of PX as proposed by the PX framework, presented in Chapter 3.2. The application provides sufficient information so child patients and parents know what to expect. The information is suitable for the ages 8-13 years old and it improves the overall communication since the child patients and parents are better informed, they can read the information again at any time. By addressing the two critical influences of PX it is likely to assume that 'Mijn Buddy' will decrease anxiety and stress, and increase the feeling of security. It stimulates the feeling of being in control and involved. All in all, 'Mijn Buddy' will improve the PX.

Although 'Mijn Buddy' wasn't designed to decrease boredom, it does give child patient a useful activity to do while waiting. Therefore, it indirectly addresses boredom, and fulfils the design goal. In the future, 'Mijn Buddy' has the potential to provide a personalized journey, including relevant information of that journey, to every child patient whether planned or acute, in the hospital to manage expectations and enhance the patient experience.

9.2 Recommendations

In this project a design was proposed to improve the patient experience for acute paediatric admissions. However, there are still some steps that need to be taken before this final concept design is ready for implementation and use. Additional research and further development of 'Mijn Buddy' are needed for a successful implementation.

Additional research of 'Mijn Buddy'

During the qualitative user research, only a small fraction of the variety of acute admissions emerged when compared to the many other kinds of acute cases. To evaluate 'Mijn Buddy', an interactive prototype for an acute admission for appendicitis was used. However, 'Mijn Buddy' needs to be further tested with other acute admissions.

Moreover, an elaborate pilot test should be conducted in real situations where 'Mijn Buddy' is used from the arrival at the hospital to discharge to fully prove the added value and increase in patient experience. To statistically proof the value of the design, an t-test or A/B-test is needed where one group of patients with appendicitis will use 'Mijn Buddy' and the other group won't. This method is common within the medical field and therefore will also create more support and acceptance of the design within the medical field. Once 'Mijn Buddy' is developed further and is ready for a pilot test, explorations on improving the usability of the design also need to be done.

Further development of 'Mijn Buddy'

The final concept design proposed in this thesis still needs to be further developed before implementation is possible.

CONCLUSIONS & RECOMMENDATIONS

Generating content blocks

The main component in the development of 'Mijn Buddy' will be in gathering the information and designing the illustrations and animations of the app. The template of the general journey in 'Mijn Buddy' is created in this project and content 'blocks' are added to personalize the journey. These relevant blocks for an appendicitis admission were generated. However, this represents only a small fraction of the total blocks that are needed to adjust to all acute cases. When a complete list of medical tests and treatments is accumulated, icons need to be developed for each of them. Depending on the amount of medical test and treatments, an icon can be used for a specific categorization that combines similar tests or treatments, for example an MRI-scan and a CT-scan can have the same icon.

When pictures are used in the app to show context, it needs to be checked as to whether an MRI-scanner at the ED looks similar to the one a child patient will see when admitted at the paediatric nursing department, to make sure it fits their experience.

Finally, it is recommended to host the content via the Content Management System (CMS) of the EmmaKids website. In this way, the VKC has control over the content, which means it can always be updated, and it can easily be used on the EmmaKids website simultaneously. The observations from the evaluation study showed that during use the playfulness in the interaction could be improved by creating more dynamic content. This could be partially accomplished by linking to existing video on the EmmaKids website. However, more time and research are needed to create this playful interaction.

Adding an onboarding to the design

In the evaluation study, a strong learning curve concerning where to find certain information was observed. Adding an onboarding process to the application, that shortly explains the main functionalities, will smoothen the use, making it easier to find the right information at once and will eliminate the usability problems found during the evaluation study. Nowadays, children are very much used to onboardings since they are used in many apps that they use.

Expending the age-range

The 'Mijn Buddy' application is now designed for children between 8-13 years-old. However, with small adjustment this age range can be extended so it suitable even for younger children and older children. For example, by adding celebrities as buddy, so Justin Bieber can show you around in the hospital, it will be more suitable for teenagers. When a child patient logs in to the app, it can ask for their age, so the content adjusts to what is suitable for them. In this way, 'Mijn Buddy' can help even more children.

Implementation of 'Mijn Buddy'

In order for 'Mijn Buddy' to be implemented into the market, a team of UX designers, visual designers, software developers, and content creators is needed for successful implementation. Furthermore, 'Mijn Buddy' is designed for use on an iPad since this is the most suitable for children in general, for stimulating collaboration between parent and child, and for the amount of information that is communicated. However, when someone suddenly has to go to the hospital they won't bring their own iPad. The Care Service project is providing tablets for all teenagers at the nursing department that are attached to their beds. It was discussed that it might be possible to also provide

some tablets for the children at the ED within this project. Often there are no more than 5 children at the ED at once, so 5 tablets need to be available at the ED. For a pilot test 3 tablets should be more than enough since it will only include the three most common types of acute admissions.

As described in the final design (Chapter 7.6) two options for the development of 'Mijn Buddy' are discussed. It is recommended to create a collaboration, if possible, between MediMapp and 'Mijn Buddy'. In this way the software doesn't have to be built from scratch which saves time and money, and a pilot version of 'Mijn Buddy' will be finished sooner. It is advised to first develop 'Mijn Buddy' for the three most commonly occurring acute admission types, creating the needed content and then starting a pilot with elaborate testing while simultaneous creating testing content for other acute admissions. In this way, the implementation will be in an iterative, parallel manner. This will shorten the time to market while providing an elaborate testing method (Figure 80)

Lastly, the VKC can decide whether they want to use 'Mijn Buddy' as a so-called flagship of their innovative patient-centred image or they can decide to develop it and sell the template to other hospital that can fill and adjust the content to fit their environment. In this way they it creates revenue that will can provide a return on investment.

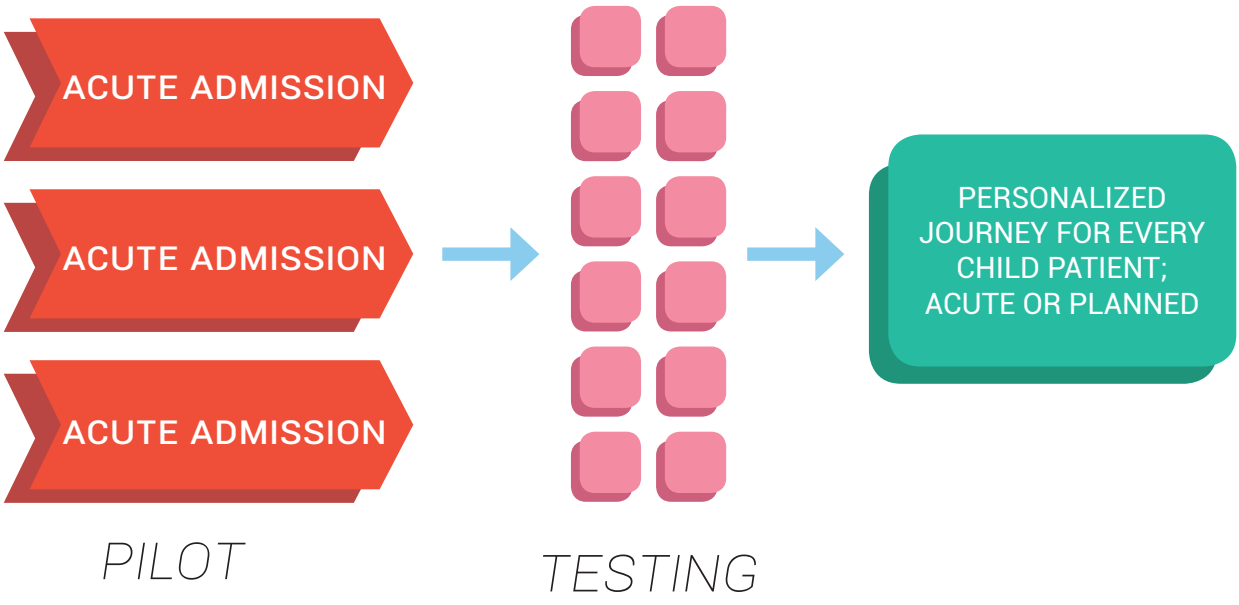


Figure 80 *Implementation plan for 'Mijn Buddy'; first develop 'Mijn Buddy' for three most occurring acute cases and perform a pilot test. In the meantime content blocks can be generated for other kinds of acute cases, to eventually provide a personalized journey for every child patient.*


“I really had to demonstrate who I was, as a designer, to everyone that crossed my path, explaining, what I do and what I can offer.”

09 PERSONAL REFLECTION

In this chapter a personal reflection on the project is given. The designer looks back at whether personal goals are achieved, what the experiences during the project are and what can be learned from them, and which new insights are gained. This provided the personal perspective on the work delivered in this project.

PERSONAL REFLECTION

Looking back at these past few months that I have been working on this graduation project I can say with confidence that I have learned a lot. I have not only refined my design skills, I have also gained experience working in a large company. Moreover, I had ample opportunity to improve my soft skills through interaction with medical professionals, patients, other experts within the organization, and by giving various presentations. This was one of my personal goals for this project. Other personal goals were to gain experience doing design research within the medical field, doing research with children, as well as figuring out whether this is a work environment I would like to continue working at in the future.

In the first weeks I was mainly occupied with getting to know the hospital and freezing the scope of the assignment. I struggled at finding my way around the hospital and connecting with the right people. The fact that I had to include various divisions at both the AMC and VUmc made it more time-consuming and difficult to get a grip on who I needed to connect with, but most importantly it made it difficult to create acceptance and support among the medical professionals. However, to be able to contribute to a new division, the AMU, sounded like a challenging and important opportunity for me. I felt extra motivated to help children in their difficult situation of being patients. While walking around in the hospital, I realized that I should feel very blessed that I had no clue how a hospital really works, what all the different divisions are, and that my loved ones are all healthy. I believe that keeping a layman-perspective helped me understand the child patients and parents' situation.

For me, as a designer, the hospital was an environment outside of my comfort zone. I really had to demonstrate who I was, as a designer, to everyone that crossed my path, explaining, what I do and what I can offer. When you mention design they first think about lightning, colors, etc., so it's important to be able to explain in one sentence what you do and what you can offer them to create acceptance and support. This really helped me discover what works best in a medical environment. The Patient Journey was a clear tool that helped create a lot of understanding, acceptance, and appreciation of my project.

This project, like any other, had its ups and downs. Observing patients and hearing their stories and experiences kept me motivated. It became really evident to me how much of an important role we as designers can have! Medical professionals might not always see the added value of it at first, but the people and the patients made it very clear to me why I needed to do this project. This instant gratification was worth the effort! A period that was very challenging to me was when I needed the approval for my research from the various METC and committees. This added a lot of extra administrative work to my project causing some delay. However, together with my personal situation, this was the perfect opportunity to practice my project management skills. I had to arrange everything myself, find my own way around the hospital, and get in contact with various divisions in both hospitals. Something I quickly learned is that medical professionals are busy! So, I always had to think 3 steps ahead to plan meetings because if I didn't I would cause delays in my own project. Furthermore, the acute admission is a difficult case to research since you can't make any plans because you simply don't know who will come in, when, and where. All the waiting during the user research was not always fun and motivating and often completely out of my control. You

can plan all you want but reality will challenge you and test your patience and flexibility.

After all this time, I can confidently say that I am happy with this experience since I learned a lot more about working independently, communicating with people with different expertise, and keeping an overview of your project progress. I also now understand that keeping all the communication lines open and constantly flowing is very important so you don't get stuck due to a communication problem. I think I could have improved this by getting back to every professional involved and showing them what I have done which I didn't do consistently. This is something you actively need to do and make time for in your planning. You need the right people on-board with the team if you don't have a dedicated medical professional within your project team. Nevertheless, managing a project and executing it at the same time is not always that easy, and it can somethings even feel contradicting!

While I continued my project and things got more tangible, more and more people got a hold of what it was and wanted to know more. I gave multiple presentations to different teams within paediatrics, the ED, and communication. I talked to many different medical professionals. I really enjoyed getting their perspective on my work. I didn't perceive their feedback as criticism, but I really respected them as an expert in their field.

In this project I tried to connect the medical, the design, and the patient perspective to come up with a design that everyone benefits from. The medical professionals really liked the creative way of doing research and were surprised of the amount of data derived from a qualitative research. The results inspired and triggered them to make improvements. I think it is wonderful to be a part of raising awareness about the patient experience and the importance of it but also about the added value of design research. My contribution gave the medical professionals an example of how to tackle patient experience and how to innovate with results from qualitative research. However, something I saw within my research which also very much applied to the execution of my project was expectation management. I struggled to give the medical professionals an idea of what to expect from my project as it is not always clear where a design project will lead to. Therefore, it was sometimes hard to keep people on-board because the outcomes weren't tangible yet and it wasn't clear what the added values for them would be.

I think apart from delivering them a design that better meets the patients' needs, creating the awareness within the medical staff was even more important and rewarding. I think this really sparked the young professional designer inside me and made it clear to me that I am ready for the real world after university!

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APPENDIX

1: P-AMU CHRISTCHURCH HOSPITAL NZ

Since there are only a handful of Acute Admission Units specialized in childcare, the Children's Acute Assessment Unit (CAA) in Christchurch Hospital New Zealand was contacted. In an email correspondence with the Charge Nurse Manager, Warren Nairn, a better understanding of their unit was provided.

The vision of the CCA is:

A seamless journey for children and their families.

Main goals of the CCA are:

- Assessment
- Diagnostic
- Commencing treatment (including conservative measures where possible)
- Education
- Risk screening
- Observation

The CCA has 9 rooms. They take referrals from GPs and their ED, so infants and children coming to the CCA have to be referred to a specialty. The dominant referrals are to Paediatric medicine, with Paediatric Surgery next and then other surgical subspecialties and some children who are under paediatric medical subspecialties such as paediatric neurology, endocrine, developmental etc. Child patients in the age up to their 16th birthday, so 0-15 years of age, are treated and admitted at this CCA.

About 6000 children are admitted here a year. The average length of stay is around 5 hours and about 66% is discharged home or admitted to other departments. There is no official maximum of the length of stay. The longest admission is about 12-18 hours depending on the time of presentation, time seen by the medical team and the bed state on the inpatient wards. They tend to transfer to the inpatient wards as soon as they can once the decision has been made and treatment is commenced. They also have reviews returning the next day usually. These are children that they might be happy to discharge home but feel they need to be seen once more to confirm they are improving. One thing that the nurses do is ring the parents/caregivers of the children discharged the previous day. This is done the next morning and gives the parent the chance to ask some more questions and be reassured or to return for review if they aren't happy with the progress.

High, medium, and low care is provided at the CCA. The intention is not to be providing the high-level care but it happens at times. The triage for the CCA is done in the ED, even for the GP referrals, so high-level care cases will usually be taken care of by the ED itself. The nurses at the CCA have a varied background but mainly nursing children with paediatric medical conditions and some with an ED background. Ongoing education has a broad child health focus.

Insights

The set-up of this CCA looks a lot like the adult AMU at the VUmc. Children usually don't stay overnight at this CCA since they are transferred to inpatients ward as soon as possible. Therefore, it functions as an observation unit and a backup for the ED. This is not similar to the plans for the new P-AMU.

2: CONTEXT MAPPING OVERVIEW

In the table below (Table A) an overview is given of all medical professionals that were interviewed or shadowed/ observed to understand the concept of an AMU from various perspectives and to understand the process of an acute admission.

During this reports quotes of these interviews are used. If a quote is used, a summary of the interview with that person will follow in the next appendices.

Function	AMC/VUmc	Context Mapping Tool
Senior Nurse 'Teenagers'	AMC	Interview
General Paediatrician, work group AMU	VUmc	Interview
General Paediatrician, work group AMU	AMC	Interview
Nursing Manager VKC	AMC/ VUmc	Interview
Manager Acute Surgery Unit	AMC	Interview
Acute Internist AMU	AMC	Interview
ED-Doctor in training	AMC	Interview
Nurse AMU	VUmc	Shadowing/ Observation
Senior Nurse AMU	VUmc	Shadowing/ Observation
Acute admission (SEH) at 'Big Children'	AMC	Shadowing/ Observation
Acute admission (transfer) at 'Teenagers'	AMC	Shadowing/ Observation

Table A: Overview medical professionals and context mapping tools for context & field research

3: INTERVIEW SENIOR NURSE

Senior Nurse - Department 'Grote Kinderen' at AMC

Thea is a senior nurse and works at the children's department where children between 1-9 years of age are admitted. During a shift there is always 1 nurse that supervises the division and keeps control of the planning of the day. Very often she experiences acute admissions, for example surgery patients with appendicitis or children with internal bleeding caused by falling of a dresser. When an acute admission arrives, they are more flexible with the rules of admittance, and for example also take in babies older than 3 months. For babies younger than 3 months they need to discuss with the various children's departments and consider what's best for the patient. The overall process of an acute admission is expressed in the Figure A.

Within the 'work group AMU' she represents the nursing perspective. The work group was given the assignment to make a plan for the AMU specifically for children. The implementation plan is progressing slowly because there are some considerations such as:

- The volume of our AMU will be lower because we are dealing with children instead of adults, but at the same time we are also an academic hospital taking care of the top-referral cases, will an AMU still be more efficient? Low and medium complex cases will be referred to regional hospitals in the partner networks.
- When a child is known and familiar at the department, and is acutely admitted, he is not admitted at the department that he is familiar with. Alternatively, the AMU can be a comfortable place to start your admission since they are specialized in acute admission.
- Currently the nurses often work within a specific age range whereas at the AMU all specialisms will be admitted at any age range. Working at a paediatric AMU requires nurses to have knowledge and skills covering the whole paediatric medicine spectrum in the acute phase.
- For the AMU we need to select nurses that like to work in a hectic environment (like at an ED). The focus at the current divisions are patient-centred care which means the nurses want to build a relationship with their patients. If it appears that nurses like to have a balance between building a relationship and a hectic environment, rotating between the AMU and their current division could be a solution.

Every morning there is a meeting where the team updates the team of the next shift to carrier over the patients. In EPIC, the medical professionals can see an overview of all the patients that are admitted into their division and the expected discharge date. If there are no beds available for an acute admission you need to be creative. For example a patient that's 17 years old can be transferred to the adult division, or a child that's 4 years old can be transferred to the infant division. Flexibility and creativity of the staff is a must in cases of emergencies.

Patient experience is already captured in multiple surveys, which include surveys about involvement of parents in the care, attendance of parents during rounds, and instructions of after care. Other tools are the 'Verhalen-monitor', 'Gouden Smiley Rapport', as well as the 'Nut&Noodzaak rapport'.

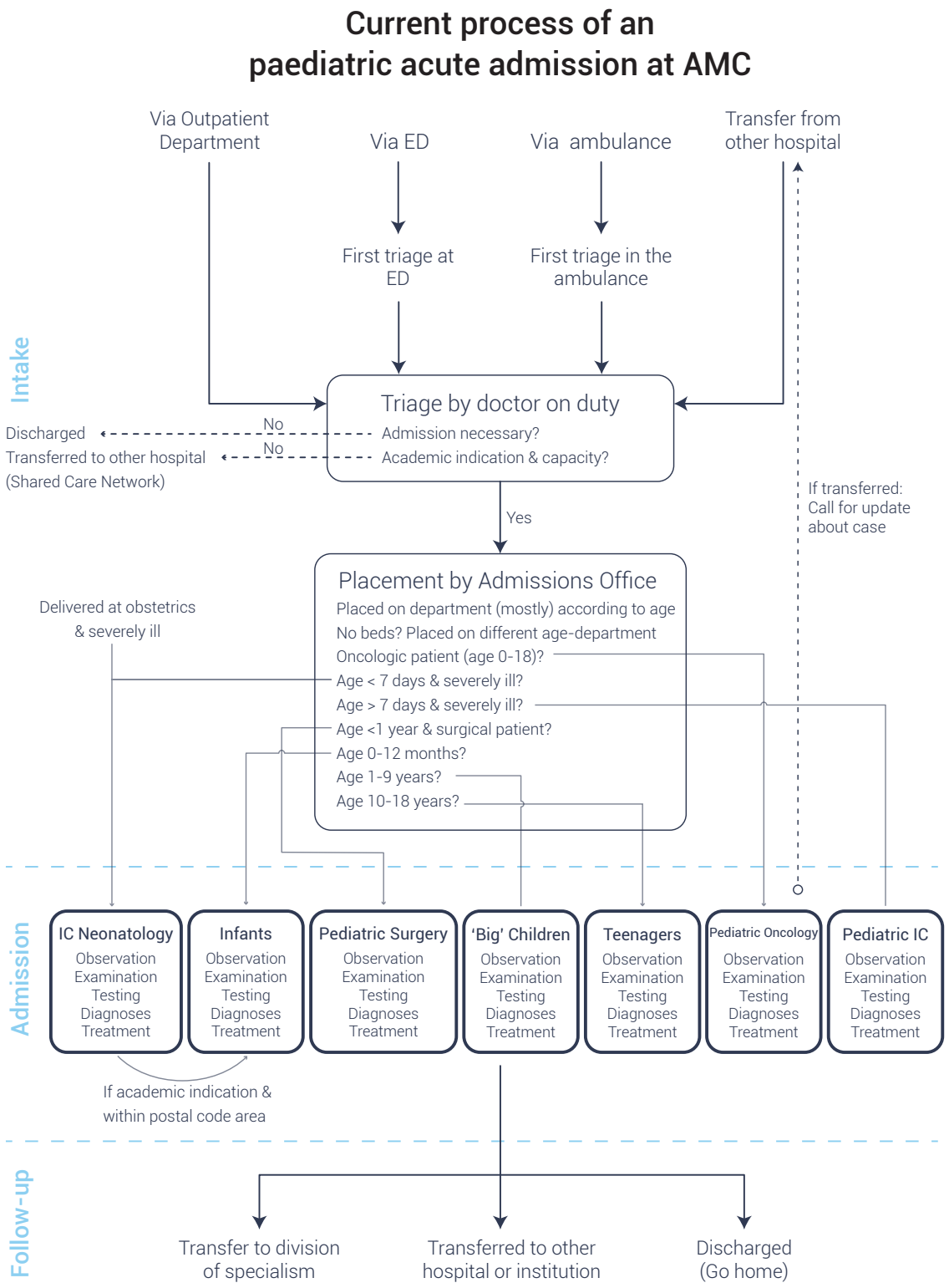


Figure A: Overview of current acute admission process at the paediatric department (Bollé, 2017)

4: INTERVIEW NURSE MANAGER

Nurse Manager - Division Woman-Child at AMC & VUmc

Gerda is a Nursing Manager at the AMC and a member of the board of the division, she has an integral responsibility for everything that happen within her division. At the same time she is Care Manager at the VUmc; the same job with a different title. She coordinates the nursing processes and all the quality and safety matters that come with the job. She also controls the central dossiers that particularly are concerning professional quality.

A while ago Gerda was involved in the discussions about the beginning of the paediatric AMU. In that time AMU's were increasing in numbers, but only for adult divisions. For her graduation project she graduated by recommending an observatory and knew the benefits that it could have. Research has shown that a stay at the ED longer than 4 hours can increase mortality and morbidity, so it should be avoided, which means you have to have a consistent flow from the 'Backland'. Gerda acknowledges that this flow is complex since there are 2 mainstreams of intake patients, the elective and non-elective (acute) admissions. When an acute admission is taken in, you see that all attention goes to that one admission and the quality and safety of the rest of the division falls back. If a division is sure it won't receive acute admissions they can divide staff differently which could lead to better work allocations and divisions of labor. In short, it could treat more patients with less nurses. Besides that, if the AMU is an import dividing-center of the paediatric hospital, you can do multidisciplinary visits multiple times a day to speed up the decision-making-process. If a child is admitted and it's obvious that he or she has to stay longer than 72 hours, the child will be transferred at a time that is convenient to the division in order to optimize the flows. The main goal of the AMU is not to discharge patients at 72 hours, but to increase the amount of patients that are discharged within 72 hours. If they need to be transferred to the regular division then this will happen after the patients is diagnosed and the treatment plan is set up.

One of the meetings of the workgroup AMU that Gerda took part in was about creating the vision of the AMU. They looked at what patients need, but also at what parents that unexpectedly come in with their child and maybe even have children need at home. For a summary of this meeting Wendela Leeuwenburgh can be contact. Currently Gerda, as co-client from the board, inactively follows at the developments of the AMU however the medical managers of the board have taken the lead of the development of the AMU.

Gerda thinks that if attention is payed to improve the patient experience 'patient empowerment' is enhanced. For example with the 'parents joining visits' where the focus is patient empowerment. You don't want to disrupt the position of the child within the family and they way the family and the child cooperate by this admission, this means that parents have to be able to participate in raising and nurturing the child where possible. With an acute admission parents are often have too much going on in their heads and emotionally imbalanced, so therefore it might not be the right moment to ask for active participation. What is important then is first of all to thoroughly understand the patient's situation. Secondly, you should know whether the patient is known within the hospital. And lastly, communicate in the clearest way, and if you can't then tell the patient and parent that you are struggling with communication. You have to consider what the patient is used to at home, such as what time they go to bed, if they drink a cup of tea before bed, etc. this is very important. You should try to connect to

the situation at home in the best possible way and let the parents raise and nurture where possible and give them the space to do so. There aren't any protocols specifically about this. Gerda can imagine that parents can have an important role during the multidisciplinary visits where the medical team can share their remarks and opinions and ask about the parents their impression, comments and opinions as well. This can lead to valuable outcomes with mutual benefits for both the caretakers and the patient/family.

Gerda would definitely advise the involvement of students at the AMU; "if there is any place where you can learn a lot it is the AMU". She specifically mentioned that the BOB-system (Beeldvorming - Oordeel - Besluit) is a valuable skills students can learn here.

5: INTERVIEW MANAGER ACU

Manager ACU (AMU Surgical Specialisms) - AMC

Arjen has a nursing and a business management background and is now managing the Acute Surgery Unit, the Trauma Unit, and hyperbaric medicine at the AMC. His role is mainly to coordinate, and to make strategic and tactical decisions. He came up with the idea of an AMU by an innovation project called "Het zal je moeder maar wezen" that is an idea about viewing and treating a patient as you would with your own mother and he realized that we aren't taking good care of 'our mother'. He also saw that at the ER patients had to wait for days, had slow diagnostics, and patients ended up on wrong divisions of the hospital, and often under the wrong specialisms. Together with a consultancy he made a digital version of the AMC, with 2,5 year of admission data, and simulated the patient flows to see where improvements could be made. Eventually they concluded that with a capacity of 10 beds they could assure a 95% admission guarantee for 48 hours. With this new ACU system they treat around 1800 admissions a year.

The ACU is a 24/7 facilitating unit, made up of a team of specialists consisting of a urologist, orthopedist, internist, radiologist, bacteriologist, etc. In the morning, all senior nurses have a standup to discuss the progress, transfers, and problems. With the old system, acute and nonacute admissions were mixed meaning that plannable care got less plannable. The effect of the ACU on the division is that you can plan your nursing staff better, and you don't have to keep beds available in case of emergencies. In the beginning there was a lot of resistance from doctors within the division since they had to go to a place within the division to do the visits, nurses aren't educated to work on such a division etc. However, now they have experienced the benefits of this ACU, and know that when they need a bed they only have to make a call. Arjen and his team made an internal educational program handling the top 10 of most acute admissions of every specialism to educate the nurses. Teamwork has really improved since creating this ACU. A side-effect is that you take away the 'thinking in islands' and something suddenly becomes a shared problem. Patient come in mainly via the ER and sometimes via the IC or Outpatient Care. However they carefully need to check whether it is actually an acute case and not just a case of a lack of bed capacity.

Very rarely they admit older children (>15) with a surgical trauma case or when there are no bed available at the 'Teenagers' divisions. They don't admit children younger than 15 simply because it changes medication protocols, approaches, cooperating with pedagogical employees, etc. The social safety net for children is bigger and nurses need to be educated and skilled to work with children.

When a patient is admitted they take the following steps: place the patient in bed, check vital signs, check orders from ER, anamnesis (patient history), and the other steps are very dependent on the disorder. In the ideal situation, this is already done at the ER so they don't have to go throughout the hospital to make CT/MRI scans etc.

Arjen doesn't support the idea of a general AMU, he believes that within an academic hospital you can't offer optimal care if nurses have to take care of so many different specialism at one division. It is more complex and harder to structure and coordinate and doesn't benefit the high-complex care. However he supports an AMU with sub-divisions covering one specialism.

Arjen was the co-principal author of a research that was published in the British Journal of Surgery also describing the effects on patient satisfaction. One of the findings of his research was that often people think that patients want peace and silence, however when patient are acutely admitted (first 24 hours) they want some hustle and bustle so they feel like people are taking care of them. Anxiety and stress occur at the ACU, factors that influence anxiety and stress are provision of information, quick diagnosis, quick policies, and a safe surrounding (feeling of being taken care of). Practical support is also very important, meaning also caring about the situation at home; don't forget the human aspects. Currently they are working on a project 'De zorg ontzorgen' where they look into the concept of one 'personal assistant' that does the cleaning, makes the bed, notes down what has been eaten, has a conversation, etc.

6: INTERVIEW INTERNIST

Internist & endocrinologist - Division Internal Medicine & Doctor at ED

Frits is an internist and educator for the acute medicine division, and also supervises and coordinates at the AMU for internal medicine and at the ER. Frist is also a specialist at the outpatient department for diabetic patients. Most patient are referred to the AMU via the ER (around 80%) and sometimes they come in via the outpatient department. If a clear diagnosis can't be made at the outpatient department they first go to the ER since there are more diagnostic facilities to, for example, take a CT-scan. The most common causes for an acute admission is pneumonia, urinary tract infection, and blood loss within gastroenterology. Frits treats adults, so no children. However there is no strict line between treating adults and children because somewhere between 16 and 18 years old they slowly change from child care to adult care, the line between the two is grey. At the ED (Emergency Department), children will be seen by the ED-doctor in case of small or standard disorders, when more complex cases are admitted the paediatrician will come to treat the patient.

According to Frits the AMU is a division where patients can stay for the first 48 hours to; stabilize, receive quick diagnostics, and make sure they are referred to the right division for aftercare. Therefore the AMU's main function is performing triage. With internal medicine it is difficult to determine what the exact problem is and to which specialism it belongs to. Often multiple specialisms are involved, it's important that someone takes the lead. Often if something isn't designated to one of the specialisms, no one will take action. He indicates that the AMU aims for generalization, so the specialisms aren't leading the treatment. An acute internist is a generalist, someone that knows a little bit from various specialisms. He doesn't know the details but functions as a case manager looking after getting the patient what he/she needs and manages the process of it. Main task or questions: What does this patient need, who can take care of it, and make sure that person will take care of it as fast as possible?

Frits would prefer if all admissions go via the AMU and would, from there on, be transferred to the right division. At the moment they admit 5-6 patient to the AMU a day, where the AMU mainly functions as a buffer for doctors to create space to think and reconsider. It is very clear that the AMU is not an observatory since diagnostics are an important part of the AMU. Which steps need to be taken at the AMU is very dependent on the patient and their illness. However some steps are general, for example most patients have a drip (infuse) or receive pain medicine. Frits wasn't educated specifically to treat acute cases but he learned the relevant skills by experience. He is now developing a 2-year program about the most valuable acute medicine skills concerning medication, bleed and blood clotting, infections, etc.

Improvements at the AMU, according to Frits, would be offering a 7-day service for acute cases, not only at the ED which is currently the case, and also more access to diagnostic tools, mainly X-rays. In the mornings at the VUmc they have a multidisciplinary standup discussing all patients on a basic level to keep the process efficient, this is something Frits would like to implement in this AMU to. He thinks it's a good idea to hand out Ipads at the ER and ask patient to give feedback and rate the patient journey. There is a lot of room for improvement when it comes to the patient experience.

7: INTERVIEW ED-DOCTOR IN TRAINING

ED-doctor in training at AMC - Emergency Department (ED)

Maik is a ED-doctor in training (AIOS-SEH) and is currently doing an internship at the Emergency Department of the AMC and the Emergency Clinic (spoed poli) for his specialisation in acute paediatrics. The education program for the ED specialisation was established 15 years ago, and is not recognized as an official medical specialisation. It is a short 3-year educational program where you need to have at least 2 years of experience within the acute care (ED or IC) to qualify to guarantee a certain level of quality to the patients.

As an ED-doctor you see all patients that come into the ED and you are trained to act in acute/ emergency situations. However, children are often not seen by the ED-doctor but will be seen by a paediatrician if admitted into the ED. Only when a child is brought in by an ambulance, or is an unplanned admission, will the ED-doctors treat them. Sometimes a GP will refer a child to the ED. When their GP can't find the cause of illness or thinks the child is severely ill, he will call the paediatrician. The child will be brought into the ED where he will be examined by the paediatrician. Other reasons for referral can be because the parents think they shouldn't wait any longer to take action or because they don't agree with a GP. In most referral cases the children are known at the hospital or they have visited the paediatrician more than once.

The ED serves as a 'gate' to the hospital; here the medical staff decides whether the patient will be admitted. Often the diagnosis isn't clear yet and many test and examinations will follow. Sometimes the patient is no longer acutely ill as treatment was need first. In this case the diagnosis will be completed in retrospect to find the cause of illness. Children who come into the ED often suffer from shortness of breath, have a fever, have garden-variety illnesses, experience epileptic seizures, or arrive via ambulance (accident or acutely ill). Children under 16 years of age need to be accompanied by a parent. If they are older than 16, they may be admitted alone.

The AMC is a trauma centre, this means that patients of any age, who experience anything from a severe car accidents or neurological trauma, will be brought to this ED. Luckily these are rare cases. The ED doctors need to examine every patient that arrives at the ED; however patient flow into this ED is offset by the GPs in the area as they will refer non-academic cases to other hospitals. Unfortunately, if a child needs to be transferred to another hospitals ED in a non-academic case and there is no available bed at the AMC, it will be a long and unpleasant process for the patient. Every child, especially the younger ones, go through a lot. Regarding the patient experience, Maik thinks there are still many improvements to be made in the ED; however the ED staff does not receive many complaints or much feedback from patients.

Triage

Taking a closer look at the ED intake process (Figure B), the patient's first step at the ED is to enter triage. This is executed in accordance to the Nederlands Triage Systeem (NTS -ABCD) and Manchester Triage System (MTS-urgency categories). This first triage is done by the ED-nurse, not the ED-doctor. Within paediatrics, and in an ambulance, the PAT (Patient Assessment Triangle) method is often used. This method, triage is based on what you can see at face without performing tests. After that, the child will be examined by the ABCD method (Airway Breathing Circulation Disability) to check the vitals in the correct order and to determine whether a patient is stable. When non-preferential vitals are

observed, the patient will receive treatment right away, then the ABCD check will start again. The ABCD method specifically developed for children is the APLS department (Advanced Paediatric Life Support).

Diagnostics

Diagnostics consist mainly of lab research and imaging (X-ray, CT, MRI, echo, etc.). The ED has priority access to the diagnostic resources. It normally takes about 1,5 hours before getting any diagnostic results. The ED tries to take in children as soon as possible but it is depended on how busy it is and their 'triage-color'. Normally they tell patients to consider a 3-hour stay at the ED before knowing whether you will be admitted to the hospital or whether you will be discharged. Often a diagnosis can be made after getting the results of the test, however sometimes patient receive a presumable diagnosis (if it's not 100% clear) or a differential diagnosis (multiple possibilities of the cause). After diagnosis the treatment plan is set up and is discussed with the patient. The treatment plan can also include instructions that are designed to take place at home. For every step in the treatment the patient (or representative) needs to give verbal consent, for example when administering pain medication.

Communication

At the ED you see children between the ages of 0 to 18 years old. Maik believes that until they are about 6 years old they don't really understand what is going on, after 6 years old they gain awareness. He tries to communicate in a way that is understood by the child and tries to be empathic. Being able to sense and adapt your way of communication according to the interaction with parents and child is an important skill. Often, during anamnesis, you are interviewing the parents instead of the child, which is referred to as hetro-anamnesis.

During the conversations with the patient you try to include the patient brochures (also available online) and recommend the new website about with formation about visiting the ED (www.sehzorg.nl).

My research

Maik suggested that I present my research at the ED during one of the work transfers that takes place every morning at 8am, or during the education meeting at 12.15pm to help ease collaboration of the teams.

Overall, we can say that the process flow at the ED looks like this:

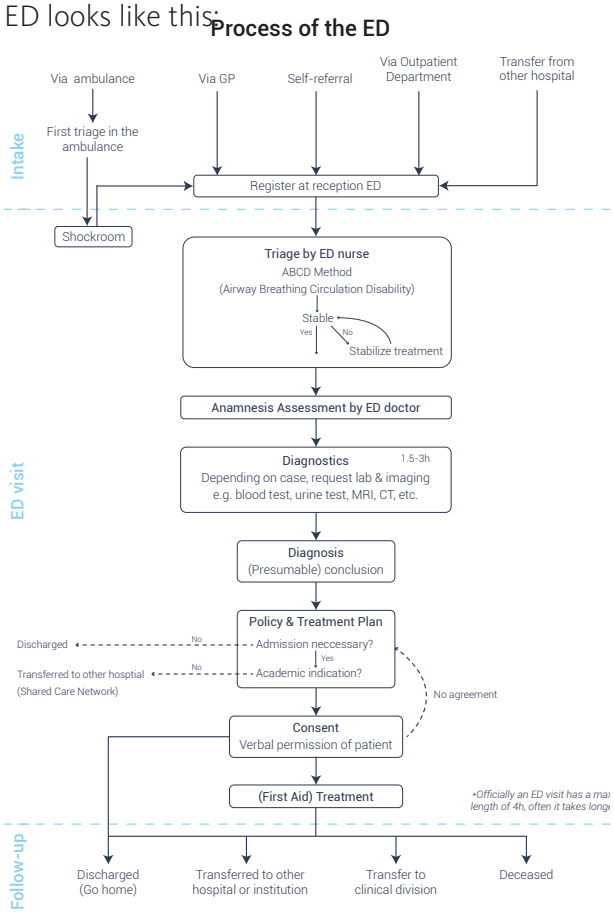


Figure B: Process of an acute admission at the ED (Berendsen, 2017)

8: SHADOWING @ ADULT AMU VUMC

Friday 6/10/2017 7.45-13.00h

I started the day with Cynthia Donk, team leader of this AMU (Acute Medical Unit). This AMU has 24 beds with various specialisms like Gastroenterology, Trauma, and Nephrology, and offers 24/7 care, treating around 300 admissions a month. Most patient are transferred from the ED (Emergency Department) to the AMU, this unit operates more as a buffer for the ED than to treat acute medical cases. They focus more on taking care of the patients rather than perform diagnostics and starting a treatment plan, this will/should be done at the ED (if there is time). The AMU does have priority when MRI and CT-scans need to be made.

The first things Cynthia did was to check the dossiers of the new patients that came in overnight, she also specifically checked for the age of the patients. Patients older than 70 years old need extra care and for example special food checkups. At 8.45am there is a 15 minute standup where all the nurses and doctors are present. They will go over all the patients and discuss how they are doing and whether they can go home or which division they will be transferred to. The doctors will go back to their own division after this meeting and will come back for visits. To optimize this process patients with similar specialisms will be placed close to each other so the doctor only has to come once. After this standup there was another standup with specialists from all divisions to talk about bed availability and capacity to see how the AMU can create beds before the weekend. There was one girl, 19 years old with down syndrome, with her parents at the AMU. I tried to talk to them about their experiences, however they preferred not to talk about it at that moment.

After this I continue my shadowing with Jacob Visser, a nurse at the AMU (Figure C). He has worked at the 'Teenagers' department at AMC before working at this AMU. When I ask him about the fact that children are excluded at most AMUs he says: "Besides the fact that paediatrics is a totally different business then taking care of adults, children also need to be addressed differently. Switching between adults and children is difficult for the nurses." At the AMU patients have to rate their pain which will be put into EPIC (Electronic Patient Records System). If the pain is rated higher than 4, they give medications and need to check up again 30 minutes later.

During the coffee break I talk to another nurse, he just finished his internship in the paediatric

Figure C: Shadowing Jacob Visser at the AMU VUmc

division. I asked him what happens when children or parents indicate that they are unsure about their situation, or have stress or/and anxiety. He tells me that they have to ask the patients if they are afraid or have questions, however if a child is afraid they basically just reassure them by talking. Something else that is noticeable is that all nurses carry an A4 paper with them and take notes like the resuscitation policy, heart rates and temperature measurement on it etc.

After the break, I shadowed another nurse because she was getting a new acute admission. Before picking up the patient from the ED she checked her dossier. The nurse recognized the patient since she was discharged 2 weeks ago by her. While we were bringing the patient down Cynthia was making sure the room was ready since another patient was just discharged home. The head practitioner, assigned at the ED, already made a treatment plan and the nurse follows these steps and marks them as finished in the system. Normally they will ask about the situation at home, but since this was a known patient, they didn't ask about it.

All in all, I feel like this AMU doesn't live up to it's potential since it is just solving a capacity problem instead of speeding up the intake and treatment process so patients can go home sooner. It currently functions as a 'hatch or gate' which is often causing an extra transfer for patients. Other then that, it is a hectic division and there is not much time to really sit down with a patient and discuss their emotional needs.

9: SHADOWING AN ACUTE ADMISSION

A Paediatric Acute Admission
Monday 23/10/2017 1.30pm
Shadowing a nurse at 'Grote Kinderen'

I received a call from the admission office that there is a 9-year-old boy at the ED that will be admitted at the division 'Grote Kinderen' around 1.45pm. I rush to reception to meet the nurse who will treat this patient. Together we go over his (long and elaborated) medical history and check the setup of the treatment plan made at the ED. The nurse tells me that sometimes they can't start treatment because the doctor doesn't know how to put orders into EPIC. Another patient was moved to a double-person room so this patient could be isolated since he has a high risk of infection. In general, the ED-nurse or the patient transport employee brings the patient upstairs, if it is very quiet the nurses can get the patient themselves too, but that usually only happens in the evening or at night. The nurse and I introduce ourselves to the mother and the child. The nurse got interrupted and we wait to enter the room. The nurse was getting special jackets and isolation material however she didn't let us know. The ED-nurse asks me if it is normal that a nurse just walks away and starts transferring the child to the hospital bed themselves. The mom picks up her son and she starts putting everything into place; clothes, medical paper, personal stuff, etc. When the nurse comes back we change and she starts applying the stickers for the monitor. She tries to involve the child but he doesn't show interest other than the game he is playing on his phone. The nurse also asks if the ED-nurse of ED-doctor told them what the procedure is going to be, they said they didn't know and expressed their expectations.

When the nurse is getting something for the mother, the mother asks me something and I explain that I don't know. She asks me if it's my first day, so I explain to her what my project is about. Her first response is 'oh well, there's lots to improve' while she smiles at me. Foremost, she says, it's communication. Communication of the doctors with me, as a parent, and with the nurses. She has a lot of respect for the nurses, even in hard times, she says, we were able to laugh and have fun. However, the doctors interact in a totally different way with her. She also mentions that, since her son is an exceptional case and this is an academic hospital, lots of co-doctors, assistant, assistant of assistant come by, which isn't always pleasant although she understands. Her son has been in the hospital many times and has become afraid for people in white jackets, she has to explain this over and over again to please take it into account. She also told me about some of her bad experiences and she get tears in her eyes while talking. The doctor has violated her trust because she found out via another doctor that her doctor published a medical article about her son, including pictures, blood values, etc. This was very confronting for her and she immediately went to her doctor to confront him with this. The part that frustrated her the most was that at the end of the article was written 'With gratitude to the parents'. While we talk I notice her keeping an eye on the monitors every time her son coughs. Another example was that, one time, her son received antibiotics, the nurse wanted to start and when the doctor would come in an hour and if he didn't agree they would switch antibiotics. So the mother answers by saying 'if it's only an hour then I prefer to wait till the doctor comes because I don't think it's good to switch'. Later on the doctor acknowledges she was right to say that but ends with saying 'however you should let the nurses do their jobs'. One time a nurse had given her son too much morphine. The nurse communicated this with her in an open, human,

transparent way. Because of this, the mother could understand and deal with the situation and therefore is not referring to it as a traumatic experience. When a doctor makes a mistake, they talk around the problem and try to push it away. This has made her not feel comfortable talking openly with doctors and share her thoughts, and the trust has slowly slipped away. Lastly, the doctor had mentioned the child should get a check on his lungs, after he mentioned this he never referred them to the lung specialist. The mother keeps bringing it up but the doctor didn't take action, so after a year when his lungs functionality decreases she was thinking 'what if we had gone sooner...'.

Because of everything she has been through she suffers from panic attacks, fear and anxiety which also reflects on her son. The son is seeing a psychiatrist for this, while she isn't. When he clearly has pulmonary constrictions, he will still deny this because of the fear of going to the hospital. The nurses ask the mom if the child indicates and tells when he is in pain and when he is afraid. The mom answers that he does and also asks the son for confirmation. The nurse also asks what they should do when he confirms to be afraid, which could be handled best by telling him what will happen.

Take-aways from this experience:

- Parents are a very important part of the care-team, the have their child interest at best and they know the patient best.
- Parents opinions are not always heard or respected, this influences the trust-relationship.
- Trust is a crucial element in the care, everyone is dependent on each other so an open and transparent atmosphere has to be created where everyone feels confident enough to speak what's on their mind.
- Communication between doctors nurses and patients and loved ones needs to be improved, everyone should feel open to share.
- Nurses and doctors only slightly address fear, anxiety, expectations, and emotions by incorporating it in their anamnesis protocol. However, I feel there is still lots of room for improvement.

A Paediatric Acute Admission
Tuesday 24/10/2017 11.00am
Shadowing a nurse at 'Tieners'

I got another call from the admission office and they let me know that a 12-year old boy will be transferred from the Flevo Hospital, where he was admitted for 3 weeks, to the AMC since he needs a surgery that they can't execute there. He was admitted because of an appendicitis and needs surgery to remove an abscess. The ambulance employees bring him and his mother to the 'Teenagers'. The medical papers are take immediately so they can start making a digital patient file in EPIC. The nurse asks the boy about his home and family situation and if he knows what is going to happen here. He said that he was coming here for the surgery and needs a drain but other then that he didn't exactly know. The nurse tells him that he will contact the surgeon and that the doctor in training will come see him and will update the child as soon as he knows more. The boy tells him he likes that they will not keep secrets because at the other hospital they often didn't tell him what was happening because then he and his mom would worry a lot. He responds; ' but when you don't know what will happen you worry a lot too!'. The boy is not feeling very sick and the nurse shows him around in the room. He loves all the features and the view from the room. He tells the nurse that this is much better and more modern than the previous hospital. He is very curious

and tries out all the buttons and asks lots of questions. He also asks, since he is placed on a 4 persons room, if there will be other children placed on this room. He indicated that he made some friends in the previous hospital and he was very sad that he had to leave them. He is happy that here he won't be woken up at 6am and during the night for checkups.
Then they do a tour around the division, showing him the cinema/theater and the teenagers lounge etc. He is very impressed and excited about all the facilities and feels like he got an 'upgrade'. The mother feels very at ease seeing her son happy and excited, she also likes that there are no visiting hours, you are welcome every time of the day just make sure you take other patients into account. At the end of the tour, the walk passed the check-up room where they take the basic measurements, one of them is rating the pain on a scale from 1-10, he indicates he has only some small painful stings and rates it between a 3 to 4. The nurse indicates that when he child rates the pain a 4 they will consider giving him more medicines. At the end of the tour, the EPIC registration is done, and they start filling in the file. One thing I notice is that the nurse is mainly talking to the child, even when it concerns medical questions and he is very much able to answer them. The mother sometimes add something if he is doubting. After filling in the file the tells the boy what will happen and what he will do in the meantime at the same time his dad and stepdad arrive and he excitingly starts showing them around.

Take-aways from this experience:

- As a 12-year old you are very aware what it happening and why things are happening, you are able to express if a nurse is not dealing with you respectfully or appropriately and your concerns about things.
- The bond and interaction between the nurse and the child is very important, in this case you could see and feel that they were really getting along and that the child was communication very openly and honestly with the nurse which is important for 'trust'.
- Transfers can be classified as acute admissions, however the patients has been admitted in a hospital before coming. Therefore this is a specific target group and different from the patient that come in via the ED.

10: HCAHPS & PPE

HCAHPS

The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) Survey, or CAHPS Hospital Survey, is developed in 2006 with the intention to become the national standard survey instrument for patient satisfaction, used by all general acute care hospital in the US. The purpose of the survey is to collect data about the patient satisfaction in acute care hospitals. It consists of 27 questions and is assessing seven key aspects of performance:

1. communication with doctors
2. communication with nurses
3. responsiveness of hospital staff
4. cleanliness and noise level of the physical environment
5. pain control
6. communication about medicines
7. and discharge information.

It also includes one overall rating of hospital care and whether the patient would recommend the hospital to friends or family (Giordano, 2010) (Goldstein, 2005). Furthermore, a HCAHPS was developed for children mainly focusing on the discharge process and readmissions (Rosen, 2017).

Picker Patient Experience Questionnaire (PPE)

The Picker Institute Europe developed a questionnaire, consisting of fifteen questions, to measure the patient experience of in-patient care and to assess the quality of care. Questionnaires asking to rate the provided care in order to determine patient satisfaction generate very positive outcomes, the PPE questionnaire therefore asks patients to describe their experience about specific processes and events during their care in detail. (Jenkinson, 2002) The dimensions of the PPE questionnaire are:

1. Information & education
2. coordination of care
3. physical comfort
4. emotional support
5. respect for patient preferences
6. involvement of family and friends
7. continuity and transition
8. overall impression.

This results in quantitative data that can indicate opportunities of improvements for care (Jenkinson, 2002).

11: CQI & NPS

CQi

The Consumer Quality Index (CQi) is an annual survey that measures the patient satisfaction of hospitals in the Netherlands, especially all UMC execute this survey. It is commissioned by NFU (Nederlandse Federatie Universitair Medische Centra; Dutch Federation of University Medical Centers) to create the annual NFU benchmark to compare all the UMC on predefined 'quality measurements'. The CQi is based on the principles of the HCAHPS and the QUOTE method and not only measure patient satisfaction but also approached patient experience (Delnoij, 2010). The QUOTE method was developed based on the theory of SERVQUAL method and applied on health care (Sixma, 1998). For the clinical admissions the thirteen quality measurements are:

1. accessibility of the hospital
2. information about treatment
3. cooperation (before; contradicting information from medical professionals)
4. pain management
5. welcoming on division
6. room & stay
7. content of the anamnesis
8. information when discharged
9. feeling of safety
10. participation
11. communication about medication
12. communication with nurses
13. communication with doctors

For the Emergency Department the twelve quality measurements are:

1. information before treatment
2. waiting times & speed of action
3. information during treatment
4. attitude of medical professionals
5. treatment by medical professionals
6. environment & facilities
7. information when discharged, accessibility, counter assistant & privacy, waiting time before treatment, participation, and aftercare (data MediQuest, 2017).

NPS

Net Promoter Score. The NPS is a management tool to measure the customer loyalty. This is score is determined by answering the question; "How likely would you recommend our organization to a friend or colleague?" The answer ranges between 1-10 and the scores are between -100% and +100%. The percentage of customers who are promoters (P) and subtract the percentage who are detractors (D). This equation is how we calculate a company's NPS: P – D = NPS (Reicheld, 2006). The NPS question is usually included in the patient satisfaction surveys. A positive percentage tells you more people would recommend than discommend your care to others but does not give you any qualitative data on how to improve the patient satisfaction. That's why they add two questions related to the NPS to the CQi survey, namely: 'Can you name one thing that you would like to improve about the care in this hospital?' and 'Which compliment would you like to give?'. Gives you an idea but not the context of the problem.

12: RESEARCH PROPOSAL

"Improving the patient experience of child patients and their informal caregiver(s), in the case of an acute admission"

Research

In this master thesis project, a product or service will be developed to improve the patient experience of children who are acutely admitted, and their informal caregiver(s). In most cases informal caregivers are the child's (biological) parents, however the informal caregiver can also be the child's guardian or a family member. Research is needed to understand the current acute admission process and the patient's experience in every step of this medical journey. The results of this research will lead to a complete patient journey which will be used to identify the main opportunities for improvement. One of these opportunities will be selected and a new design will be created aimed at improving the patient experience. This project is an exploration into the current plans of creating a Paediatric Acute Medical Unit (kinder-AOA) to further spark patient-centered thinking. This research is supervised by paediatrician Dr D. Bosman (AMC) and Dr J. Rotteveel (VUmc).

In this small qualitative study (n=5) patients are first asked to fill in a 'sensitizing booklet'. This booklet is focusing on the expectations and experiences in two phases; the arrival and stay at the Emergency Department (ED), and the acute admission at the paediatric nursing department. Secondly, an interview with the child patient and their informal caregiver(s) will be conducted to gain a deeper understanding into the reasons why people feel a certain way at a specific moment in their medical journey.

1. Purpose

The goal of this research is to gain a thorough understanding of the current acute admissions and experience of both child patients and informal caregiver(s) throughout the two phases of the acute admission process. This will lead to a detailed and complete overview of a patient's journey to identify the main opportunities for improvement.

2. Research questions

The main research question is:
"What are the opportunities for improvement of the patient experience of both child patients and informal caregiver(s) in the current acute admission journey?"

Subquestions are:
- What are the expectations of children and their informal caregiver(s) when acutely admitted?
- Which needs & emotions do children have during the process of an acute admission?
- Which needs & emotions do informal caregiver(s) have during the process of an acute admission?
- What values are important for children during the process of an acute admission?
- What values are important for informal caregiver(s) and how do they influence the process of an acute admission?
- Which individuals play a role in the acute admission process?
- Which actors influence the foremost values, needs, or emotions of both the child patient and the informal caregiver?
- What kind of moments of interaction with the child patient do occur during the admission?
- In what way, and to what extent, do informal caregiver(s) want to be involved in the child's care?
- Do the child patients and informal caregiver(s)

mind a possible extra transfer during the admission?

3. Assumptions

The current CQi (Consumer Quality Index) shows the patient satisfaction of various elements. Improvements for the paediatric nursing departments of AMC are needed on the areas; communication about medication, the content of the intake, participation, and pain management. For the ED of AMC the CQi shows room for improvement on the following subjects; information before treatment, participation, and aftercare. The the ED data is not specifically related to children as it includes the feedback of all patients. I expect to find improvements on similar elements as the CQi.

Another assumption is that the process of acute admissions elicits fear, anxiety, stress and insecurity for both the parents and children. 'Not knowing what to expect' will be a key element in the experience. However, more detailed information about the entire process is needed to create improvements for the patient experience concerning children that need to be acutely admitted at AMC, which will be obtained with this research.

Method

4. Participants

This small qualitative research (n=5) is conducted with child patients between 6-16 years old that need to be acutely admitted and are taken in via the ED, with their respective informal caregiver(s). Patients that need to be admitted to the departments of Intensive Care, Oncology and Psychiatry will be excluded from this research.

Since the number of participants is small, there will be a focus on acute admissions that come in via the ED, which is the main stream for acute admissions. Other major streams of admission include patients that come in via the Outpatient Department or patients which are transferred from other hospitals. Patients of these streams go through a very different journey and therefore have other needs and experiences.

At a Paediatric Acute Medical Unit various medical conditions will be treated. Patients that need to be admitted to the departments of Intensive Care (IC), Oncology, and Psychiatry will be excluded from this research, all others will be included. IC patients will be excluded since their primary focus is on care. They, and their families, shouldn't be distracted by participating in a research. Oncology will be excluded as these patients will be treated at Princess Maxima Centre in the future. Psychiatry will be excluded since the care requires in depth knowledge and expertise about a patient's individual situation, and therefore they will be treated at a Psychiatry department of the hospital.

At the Paediatric Acute Medical Unit patients between 1 and 18 years of age will be admitted, however the involvement of the parents, the child patient's needs, and the way they need to be approached will differ within their age rage. Therefore, patients between the age range of 6-16 years old will be included in this study. Since the perspective of both the child and the parents will be researched, children younger than 6 years will be excluded since they are less able to communicate their needs, feelings, and experiences. The informal caregiver(s) is a key element in this process, in most cases this is the parent(s). From the age of 16 patients can make their own decisions and don't need their informal caregiver(s) approval, therefore teenagers of 16-18 years old are also excluded.

5. Recruitment participants

The recruitment of the participants will be done via the staff that work at the ED. When a child patient needs to be admitted into the ED, ideally, the nurse or doctor will invite the researcher to talk to the child patient and informal caregiver(s) to see if they are willing to participate in this research. The personal invite by the researcher is desirable since the participants will have the opportunity to directly ask questions and they know who they will have an interview with after filling in the sensitizing booklet. In this way, the staff at the ED only have to tell the researcher which children will be admitted to one of the regular paediatric nursing departments, it won't take much of their time, and the researcher will not be in the way of the process at the ED.

6. Research tools

To goal of this research is to gain a thorough understanding of the current acute admissions process and the experience of both the child patients and the informal caregiver(s) throughout this process. Therefore, a sensitizing booklet and a semi-interview are developed.

Sensitizing booklet

The sensitizing booklet focuses on the expectations, emotions, and experiences of patient(s) and their informal caregiver(s) in the two phases of their acute admission experience; the arrival and stay at the ED, and the acute admission at the paediatric nursing department. The patient and their informal caregiver(s) will take this booklet with them on their journey through different departments of the hospital in their journey and return it at the end of their stay. The booklet exists of 3 assignments in which both perspectives are asked. Each assignment will take maximum 10 minutes, so it will take maximum 30 minutes to complete the booklet. Since the stay at the ED can be intense and stressful, it is up to the participants to either complete the booklet at once or complete the assignments over the length of stay in the hospital. If the child patient is, for whatever reason, not able to fill in their perspectives, the informal caregiver(s) can fill it in on their behalf.

Interview

A semi-structured interview will be conducted with the informal caregiver(s) and the child patient, the data that was filled in in the sensitizing booklet will be used to lead the interview. In this way, a deeper understanding of the current process and experiences can be gained and the reasons why people feel a certain way at a specific moment in the process can be explored. This will lead to a detailed and complete overview of a patient's journey.

7. Research procedure

*During stay at ED**

Step 1: Give brief introduction about research

When a patient comes in via the ED, triage will take place. When the doctor decides that the child needs to be admitted the ED staff will inform the researcher that there is a possible participant for the research. The researcher will visit the patient and their informal caregiver(s) to give a short introduction about the research.

Step 2: Ask if the informal caregiver(s) are willing to participate in this research

After they received the introduction, the researcher will hand them an information letter with all the information the patient needs to know about participating in this research. They will have some time to go over the information and decide whether they would like to participate. After approximately an hour the researcher

will come back to ask if they have any more questions and if they agree on participating. The wait time before returning to inquire about patient participation may vary, and will be determined on a case by case basis.

Step 3: Signing Consent Form
When the patient and/or informal caregiver(s) agree on participating a Consent Form will be handed to them. With this Consent Form they give their permission for their participation research and the use of the data collected. They also know that they can stop participating whenever they feel like it. A copy will be given to the participant.

Step 4: Give sensitizing booklet and brief explanation
The researcher will hand them the sensitizing booklet and will shortly explain how it works. Then contact information will be exchanged so an appointment for the interview can be made later in the process.

*Alternatively, the sensitizing booklets can be handed out when the child patient is transferred to the paediatric nursing department. The assignment about the expectations about the ED will then have a retrospective approach and therefore may differ from the results of a prospective approach.

During admission at the paediatric nursing department
Step 5: Make an appointment for the interview
The researcher will ask the admission office at which specific department the child patient is placed and will contact the nurses of that department to check whether it is an appropriate time to visit. When it is okay to visit the child patient, a time for the interview will be set together with the informal caregiver(s).

Step 6: Conduct semi-structured interview
The data in the sensitizing booklet will lead the semi-structured interview. The interview will not take more than 30 minutes. The child patient and informal caregiver(s) can always stop the interview. With this interview an overview of the entire process can be made including experiences, emotions, and to what extent the admission met their expectations.

Step 7: Give compensation
For this research the participants receive a €15 gift card from Bol.com. The researcher will end the interview and let the participant know they can always contact them if they have questions.

Overall, little effort is asked from the ED staff, the one thing that is crucial for this research is for the ED staff to connect the researcher to possible participants. The researcher will become independent from that point moving forward. The researcher will be flexible and can easily adjust to any situation at the ED.

Supervisors:
Dr D. Bosman
d.k.bosman@amc.uva.nl
AMC H7-242

Dr. J. Rotterveel
j.rotteveel@vumc.nl
VUmc ZH9D34

13: INFORMATION LETTER PARENT

Informatie deelname onderzoek

Project *Patiëntbeleving van kinderen en ouder(s) tijdens een Acute Opname*

Academisch Medisch Centrum, Afdeling Vrouw-Kind

Geachte heer/mevrouw,

U ontvangt deze brief omdat uw kind acuut is opgenomen in AMC en ik u wil vragen om mee te doen aan bovengenoemd onderzoek. Meedoen is vrijwillig. Om mee te doen is wel schriftelijke toestemming nodig.

Voordat u beslist of u wilt meedoen aan dit onderzoek, krijgt u uitleg over wat het onderzoek inhoudt. Lees deze informatie rustig door en vraag de onderzoeker om uitleg als u vragen heeft. U heeft 1 uur bedenktijd om te bepalen of u mee wilt doen aan dit onderzoek.

1. Introductie

Binnen de afdeling Vrouw-Kind doe ik een onderzoek met als hoofdvraag: *Hoe kan ik de patiëntbeleving van kinderen en ouder(s) tijdens een acute opname verbeteren?* Het onderzoek, waarin patiënt en ouder(s) centraal staan, richt zich op de vragen: 'Hoe ervaren de patiënt en ouder(s) een acute opname?', 'Waar zitten volgens de patiënt en ouder(s) knelpunten in het proces?' en 'Waar heeft de patiënt en ouder(s) behoefte aan en op welk moment?'.

2. Vragen van het onderzoek

De vragen binnen dit onderzoek zijn:
- Hoe ziet een acute opname eruit vanuit het perspectief van kind en ouder(s)?
- Wat zijn de ervaringen en behoeftes van kind en ouder(s) van een acute opname?
- Wat zijn de belangrijke knelpunten die als focus kunnen dienen voor het verbeteren van de patiëntbeleving?

Het doel van dit onderzoek is het verbeteren van de patiëntbeleving van kinderen die acuut moeten worden opgenomen en hun ouder(s).

3. Wat meedoen inhoudt

Als u meedoet betekent dit dat u eenmalig een boekje invult over uw ervaringen tijdens de acute opname, dit duurt ongeveer 30 minuten. U mag zelf bepalen of u het boekje in 1x invult of op meerdere momenten. Een deel van de opdrachten zal worden ingevuld vanuit het perspectief van het kind en een deel vanuit het perspectief vanuit de ouder(s); dit wordt per opdracht aangegeven. In het boekje wordt gevraagd naar uw diagnose van de acute opname (indien bekend). Dit is bedoeld om inzicht te krijgen in de patiënt en zal niet voor medische doeleinden gebruikt worden. Indien uw kind niet in staat is dit zelf in te vullen, dan kunt u dat namens uw kind doen. In dit boekje komen

ingevulde gegevens worden besproken in een interview van maximaal 30 minuten wat zal worden opgenomen. De audio-opname van het interview wordt alleen voor onderzoeksdoeleinden gebruikt.

4. Mogelijke voor- en nadelen

Uw deelname aan dit onderzoek draagt bij aan het verbeteren van de ervaring van kinderen die in de toekomst acuut moeten worden opgenomen en hun ouder(s). Door dit onderzoek krijgen verpleegkundigen en artsen een beter beeld van de behoeftes en wensen van kinderen en hun ouders. Zij kunnen deze kennis gebruiken voor veranderingen en verbeteringen in de zorg in de toekomst. Een nadeel van het meedoen aan het onderzoek is dat het u extra tijd kost.

5. Als u niet wilt meedoen of wilt stoppen met het onderzoek

U beslist zelf of u meedoet aan het onderzoek. Deelname is vrijwillig. Doet u mee aan het onderzoek? Dan kunt u zich altijd bedenken. U mag tijdens het onderzoek stoppen. U hoeft niet te zeggen waarom u stopt, wel moet u dit direct melden aan de onderzoeker. De gegevens die tot dat moment zijn verzameld, worden gebruikt voor het onderzoek.

6. Gebruik en bewaren van uw gegevens

Al uw gegevens blijven vertrouwelijk. Alleen de onderzoeker heeft toegang tot de verzamelde gegevens m.b.t. de acute opname. Deze gegevens zullen onherleidbaar door de onderzoeker worden gedocumenteerd en zullen niet gedeeld worden met derden. De gegevens kunnen anoniem gedeeld worden met zorgverleners binnen het AMC om daarmee de zorg te verbeteren. Met het ondertekenen van het toestemmingsformulier geeft u toestemming voor het gebruiken van de gegevens en informatie die tijdens dit onderzoek zijn verzameld. De onderzoeker bewaart uw gegevens gedurende 5 jaar, daarna worden de gegevens vernietigd.

7. Vergoeding voor meedoen

Voor het meedoen aan dit onderzoek krijgt u een vergoeding in de vorm van een Bol.com cadeaubon t.w.v. €15. Deze zal worden uitgegeven na afronden van het interview.

8. Heeft u vragen?

Bij vragen kunt u contact opnemen met Rochelle Simons via de onderstaande contactgegevens. Voor medisch gerelateerde vragen kunt u contact opnemen met Dr D. Bosman, kinderarts.

Dank voor uw aandacht,

Vriendelijke groet,

Rochelle Simons
r.j.simons@amc.uva.nl
0631304563

Dr D. Bosman
d.k.bosman@amc.uva.nl

14: INFORMATION LETTER CHILD

Informatie deelname onderzoek

Project *Patiëntbeleving van kinderen en ouder(s) tijdens een Acute Opname*

Academisch Medisch Centrum, Afdeling Vrouw-Kind

Hallo,

Je krijgt deze brief omdat je een paar dagen in het ziekenhuis moet blijven. Ik wil graag van je weten wat jij en je ouders hiervan vonden. Ik doe een onderzoek en in deze brief vertel ik je daar meer over.

1. Wat is dit voor onderzoek?

In dit onderzoek ga ik kijken wat kinderen en hun ouders vinden van een acute opname en wat we kunnen verbeteren aan de acute opname in het ziekenhuis. Een acute opname betekent dat je opeens in het ziekenhuis moet blijven en niet meteen naar huis kunt. Je mag zelf bepalen of je mee wilt doen met dit onderzoek en je mag altijd stoppen. Nadat je deze brief hebt gekregen heb je 1 uur om na te denken over of je mee wilt doen met dit onderzoek.

2. Hoe kan je helpen bij dit onderzoek?

Als je meedoet betekent dit dat je 1x samen met je ouder(s) een boekje invult over wat je vond van de acute opname. Een deel van de opdrachten is voor jou en een deel voor je ouder(s); dit wordt per opdracht met een icoontje aangegeven. Nadat je het boekje hebt ingevuld zullen jij, jouw ouder(s) en de onderzoeker dit samen bespreken in een interview. Met de kennis die we tijdens deze studie opdoen kunnen we andere kinderen en hun ouders helpen als ze ook acuut moeten worden opgenomen. Door mee te doen help je ook de dokters en verpleegkundigen doordat ze beter weten wat kinderen en hun ouders willen. Voor het meedoen aan dit onderzoek krijgen jij en je ouder(s) een Bol.com cadeaubon van €15, deze krijg je na het interview.

3. Wat doen de onderzoekers met jouw gegevens?

De resultaten worden zo opgeschreven, dat anderen niet kunnen achterhalen welke mensen hebben meegedaan aan het onderzoek. De onderzoeker bewaart jouw gegevens gedurende 5 jaar, daarna worden ze vernietigd.

4. Wil je nog meer weten?

Als jij of je ouders nog vragen hebben over het onderzoek dan kun je die stellen aan de onderzoeker. Jouw ouders hebben ook een eigen brief gekregen over dit onderzoek met nog meer informatie.

Groetjes de onderzoeker,

Rochelle Simons
r.j.simons@amc.uva.nl

15: INFORMED CONSENT FORM

Toestemmingsformulier deelname onderzoek

Project *Patiëntbeleving van kinderen en ouder(s) tijdens een Acute Opname*

Academisch Medisch Centrum, Afdeling Vrouw-Kind

1. Ik heb de informatiebrief over het onderzoek 'Patiëntbeleving van kinderen en ouders tijdens een Acute Opname' gelezen en begrepen. Ik heb de gelegenheid gehad om vragen te stellen.
2. Ik doe vrijwillig mee aan dit onderzoek dat bestaat uit een invulboekje en een interview en ik weet dat ik op elk moment kan stoppen.
3. Ik geef toestemming om de gegevens die ik heb ingevuld in het boekje te gebruiken voor de doelen die beschreven staan in de informatiebrief.
4. Ik geef toestemming om de audio-opname van het interview te gebruiken voor de doelen die beschreven staan in de informatiebrief.
5. Ik begrijp dat mijn ervaringen anoniem gedeeld worden met zorgverleners binnen het AMC om daarmee de zorg te verbeteren.
6. Ik begrijp dat alle gegevens onherleidbaar gemaakt worden.

Deelnemers:

Ik doe aan dit project mee *

_____	_____	_____
NAAM PATIËNT	*DATUM*	*HANDTEKENING*
_____	_____	_____
NAAM OUDER	*DATUM*	*HANDTEKENING*
_____	_____	_____
NAAM OUDER	*DATUM*	*HANDTEKENING*

**Kinderen tot en met 11 jaar vallen volledig onder de zeggenschap van de ouder(s). Bij kinderen van 12 tot en met 15 jaar moeten zowel de ouder(s) als het kind toestemming geven.*

Onderzoeker:

Ik heb de patiënt volledig geïnformeerd over het project

_____	_____	_____
NAAM ONDERZOEKER	*DATUM*	*HANDTEKENING*

16: SENSITIZING BOOKLET

Beste deelnemer,

Hartelijk dank voor uw deelname aan dit onderzoek dat ik uitvoer namens het AMC. Het doel van dit onderzoek is om oplossingen aan te dragen die de beleving van kinderen en hun ouders tijdens een acute opname kunnen verbeteren.

Dit boekje bestaat uit een aantal opdrachten waarbij een deel zal gaan over het perspectief vanuit het kind en een deel over het perspectief van de ouder(s), dit is boven in de hoek aangegeven met het volgende icoontje:

Ouder(s)/naasten Kind

U mag zelf bepalen of u het boekje in 1 keer invult of de opdrachten op meerdere momenten maakt, echter gaat het wel over verschillende fases van het acute opname proces. Belangrijk is dat er geen foute antwoorden bestaan; u bent de expert van uw ervaringen en gevoelens. Verder blijven uw gegevens anoniem en worden deze niet verstrekt aan derden.

Door dit onderzoek krijg ik een beter beeld van het proces van een acute opname, de ervaringen en knelpunten tijdens de opname en kan ik de gebieden voor verbetering bepalen. Door uw bijdrage kunnen we de ervaring van kinderen die acuut moeten worden opgenomen en hun ouders in de toekomst verbeteren.

Mocht u nog vragen hebben, dan kunt u altijd contact met mij opnemen via het onderstaande telefoonnummer of mailadres. Voor medisch gerelateerde vragen kunt u contact opnamen met Dr. D. Bosman, kinderarts.

Met vriendelijke groet,

Rochelle Simons
r.j.simons@amc.uva.nl
06 31 30 45 63

Dr. D. Bosman
d.k.bosman@amc.uva.nl

Dit ben ik

Laat zien wie je bent! Teken, schrijf, alles mag

Mijn naam is: ___________________

Ik ben een: jongen / meisje

Ik ben: _________ jaar

Ik heb: ____ broer(s) en ____ zus(sen)

Mijn grootste droom is: ___________________

____

____

Dit ben ik

Is uw kind al eens eerder (acuut) opgenomen geweest?

○ Ja ○ Nee → u mag door naar de volgende pagina

Hoe oud was uw kind toen?

_________ jaar

Heeft deze acute opname te maken met dezelfde diagnose?

○ Ja ○ Nee

Als u vaker acuut bent opgenomen, zijn er speciale regels opgesteld met de arts? Bijvoorbeeld in welke situatie u zich weer moet melden.

De Spoedeisende Hulp

Wat zijn de medische klachten bij binnenkomst op de SEH?

____

____

____

Wat waren uw verwachtingen bij binnenkomst op de SEH?

Wanneer en hoe werd de diagnose bekend gemaakt?

____

____

____

____

De Spoedeisende Hulp

Hoe voelde u zich tijdens uw verblijf op de SEH?

Kruis op een schaal van 1 (=weinig) tot 5 (=erg) bij **elke** emotie aan in welke mate u zich zo voelde.

	1	2	3	4	5		1	2	3	4	5
kalm	○	○	○	○	○	energiek	○	○	○	○	○
gestresst	○	○	○	○	○	hopeloos	○	○	○	○	○
veilig	○	○	○	○	○	opgelucht	○	○	○	○	○
kwetsbaar	○	○	○	○	○	boos	○	○	○	○	○
relaxed	○	○	○	○	○	gefrustreerd	○	○	○	○	○
onzeker	○	○	○	○	○	verveeld	○	○	○	○	○
angstig	○	○	○	○	○	bedachtzaam	○	○	○	○	○
opgewekt	○	○	○	○	○	onveilig	○	○	○	○	○
begrepen	○	○	○	○	○	opgelaten	○	○	○	○	○
vrolijk	○	○	○	○	○	belangrijk	○	○	○	○	○
gespannen	○	○	○	○	○	geirriteerd	○	○	○	○	○
verdrietig	○	○	○	○	○	anders: ____________	○	○	○	○	○

Waardoor werd dit veroorzaakt? (Meerdere redenen mogelijk)

____

____

____

____

____

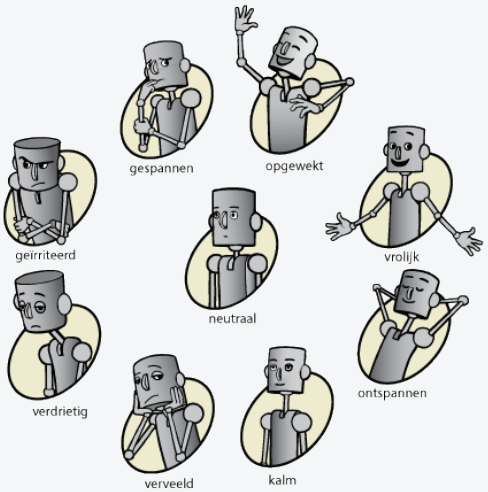
De Spoedeisende Hulp

Hoe voelde je je toen je op de Spoedeisende Hulp was?
Plak de 3 gekleurde stickers bij het juiste plaatje.

bij aankomst op SEH

eerste uren op SEH

einde verblijf op SEH



De Spoedeisende Hulp

Hoe kwam het dat je je zo voelde?

Wat vertelde de dokter tegen jou op de spoedeisende hulp?

Mijn acute opname in een tijdlijn

Hoe zag het proces van de acute opname er in kleine stapjes uit? Hoe bent u naar het ziekenhuis gekomen? Welke professional was er wanneer betrokken ? En wat was uw ervaring op deze momenten?

Aankomst ziekenhuis

Einde opame

Gebruik de stickers om aan te geven hoe u zich voelde bij elke stap.

De Kinderafdeling

De reden voor acute opname was:

Wat waren uw verwachtingen toen u hoorde dat uw kind acuut moest worden opgenomen?

Wat kan er volgens u verbeterd worden?

De Kinderafdeling

Hoe voelde u zich toen uw kind was opgenomen en op de afdeling lag?

Kruis op een schaal van 1 (=weinig) tot 5 (=erg) bij **elke** emotie aan in welke mate u zich zo voelde.

	1	2	3	4	5		1	2	3	4	5
kalm	○	○	○	○	○	energiek	○	○	○	○	○
gestresst	○	○	○	○	○	hopeloos	○	○	○	○	○
veilig	○	○	○	○	○	opgelucht	○	○	○	○	○
kwetsbaar	○	○	○	○	○	boos	○	○	○	○	○
relaxed	○	○	○	○	○	gefrustreerd	○	○	○	○	○
onzeker	○	○	○	○	○	verveeld	○	○	○	○	○
angstig	○	○	○	○	○	bedachtzaam	○	○	○	○	○
opgewekt	○	○	○	○	○	onveilig	○	○	○	○	○
begrepen	○	○	○	○	○	opgelaten	○	○	○	○	○
vrolijk	○	○	○	○	○	belangrijk	○	○	○	○	○
gespannen	○	○	○	○	○	geirriteerd	○	○	○	○	○
verdrietig	○	○	○	○	○	anders:	○	○	○	○	○

Waardoor werd dit veroorzaakt? (Meerdere redenen mogelijk)

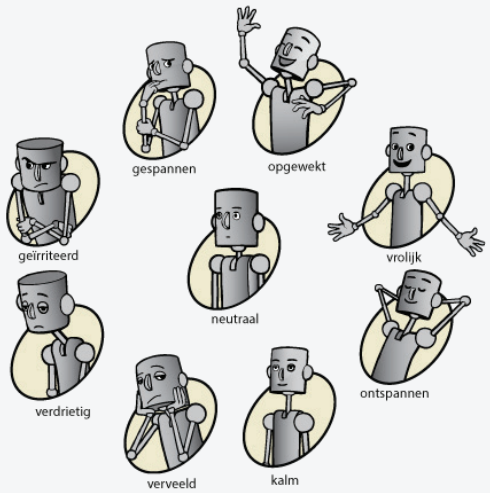
De Kinderafdeling

Hoe voelde je je toen je op de kinderafdeling was?
Plak de 3 gekleurde stickers bij het juiste plaatje.

bij aankomst op de kinderafdeling

eerste uren op de kinderafdeling

einde opname op de kinderafdeling



De Kinderafdeling

Hoe kwam het dat je je zo voelde?

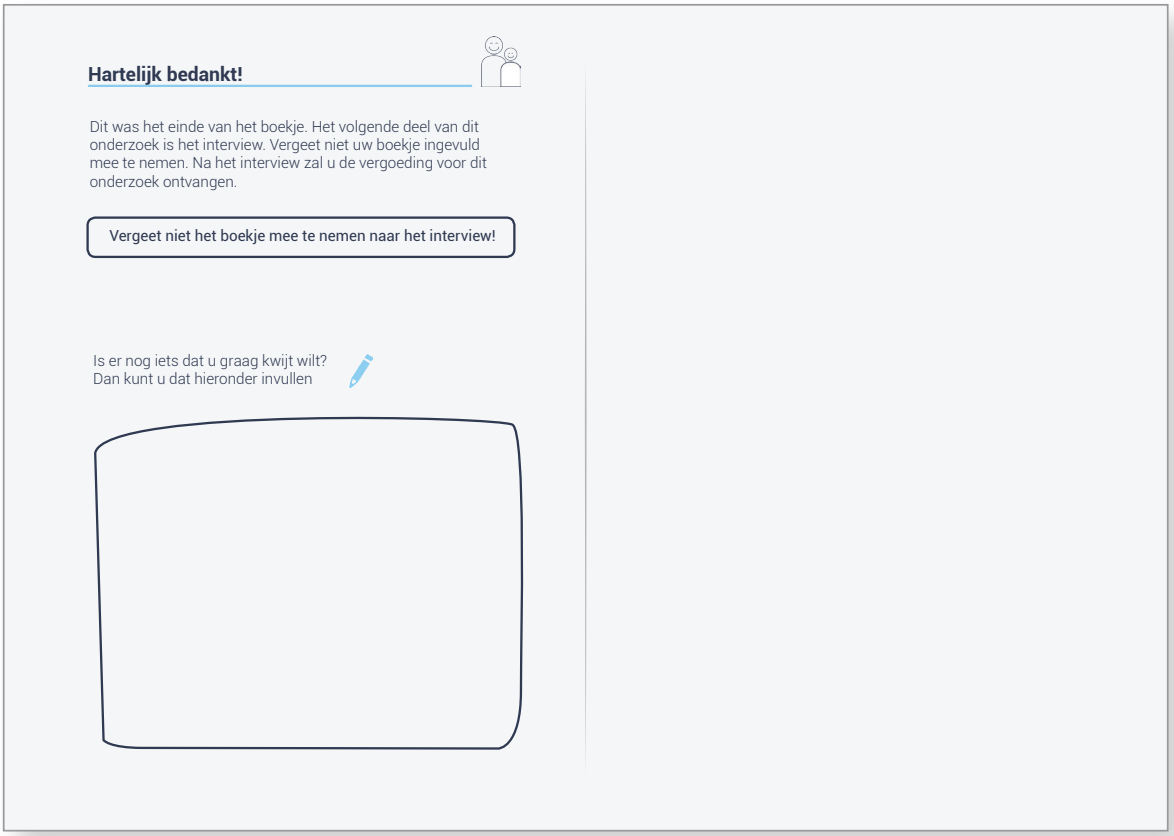
Wat vertelde de dokter tegen jou op de kinderafdeling?

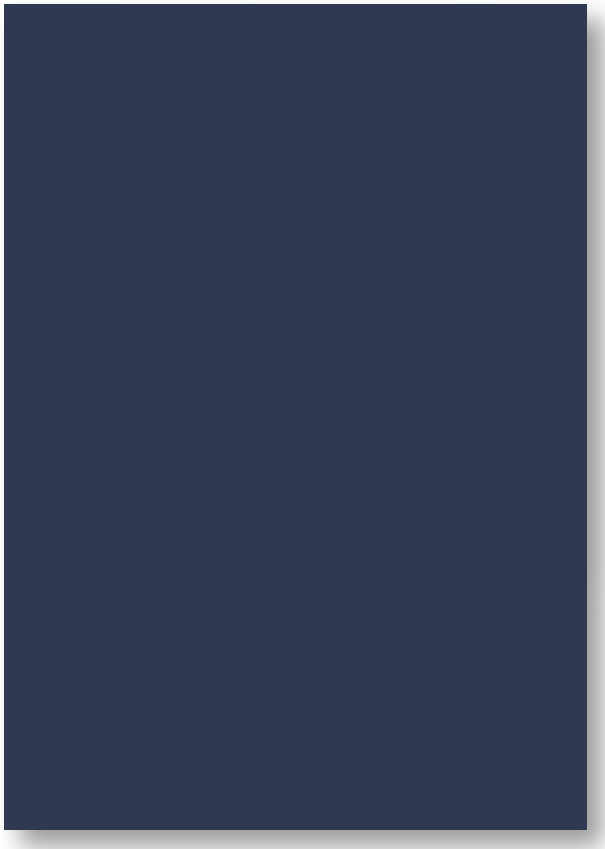
Hartelijk bedankt!

Dit was het einde van het boekje. Het volgende deel van dit onderzoek is het interview. Vergeet niet uw boekje ingevuld mee te nemen. Na het interview zal u de vergoeding voor dit onderzoek ontvangen.

Vergeet niet het boekje mee te nemen naar het interview!

Is er nog iets dat u graag kwijt wilt?
Dan kunt u dat hieronder invullen





17: THE PILOT

For 5 days I was accompanying the paediatrician who was working the emergency shift. If a patient would be seen at the ED and an admission was necessary I could introduce my research. However, this specific week of the pilot, the hospital was not able to admit new patients since all the divisions were full. Therefore I decided to also include patients that were admitted at times I wasn't there, for example during the night, and include them in retrospect, and patients that were admitted via the Emergency Outpatient Department (Spoedpoli). I handed out the booklet to one girl at the Emergency Outpatient Department who was possibly going to be admitted. However the next day, when I checked, she was sent home and therefore was excluded from the pilot.

The pilot test was performed with 1 patient (15 years old). This patient came in around 6.30pm at the SEH and was admitted later that night. The next they he was included in the research.

Introduction to the research

During the introduction the research is shortly explained. The patient and parent then received the Information Letter (parent and child version). After 10 minutes the researcher returned to see whether there were any questions and if they would like to participate. If so, the Informed Consent Form was signed and a form with contact information was filled in. The booklet was shortly introduced and a time for the next they was set to do the interview.

Outcomes of the pilot test

The forms

- The checkboxes after every statement on the Informed Consent Form were said to be confusing. The Patient Information & Privacy Officer of the VUmc also confirmed this was not necessary since they also sign at the bottom of this page. Therefore the separate boxes after the statements were removed from the Informed Consent Form
- 'Naam deelnemer' is changed to 'Naam patiënt' since both parents and child patient are participants, which was a little confusing.
- After reading the Information Letters there were no questions, therefore I assume that the letters provide comprehensive information and no changes are needed.

The sensitizing booklet

Before starting the interview I gave the participants a copy of the signed Informed Consent Form. Everything in the booklet was clear and there were no confusing, missing or unclear things according to the participant. Looking at the answers in the booklet, some improvements can be made:

- Regarding the first page about the history of the patient, the questions are changed to make it less general and gain more information about this admission. The pilot patient had surgery a couple days before his acute admission, the question weren't suitable for his case although it is important information to collect for my research.
- The emotions of the parent weren't all answered, therefore in the questioning it should be clearer that all emotions should be rated.
- The 3 colored stickers for the emotions of the child were placed at the page of the timeline and not used for the emotion assignments. Therefore the 3 colored stickers should be placed on the corresponding page to make it clearer. The explanation of the 3 colored stickers was also placed right under the explanation of the assignment to stimulate using the stickers.
- The icon stickers were placed on the side of the page, covering the emoticons, a different size for the sticker form should be made so they don't

cover the emoticons

- The icon stickers were used well, providing more stickers could probe the participant to put more information down.
- The first question about communication for the child is a yes/no question. The follow-up question wasn't answered. Therefore the question should be changed into 1 open answered question.
- The end of the timeline is 'now' however this corresponds with the actual moment of doing the assignment. Therefore I changed it to end of admission (einde opname) to make it clearer and receive more information.
- The explanation for the timeline assignment was slightly shortened and the emphasis was put on 'small steps'.

The interview

- The interview script was too long and it wasn't useful since the conversation was more natural and not so structured. Therefore I changed the questions into probing words which is easier to keep the focus. The probing words are;
  - Expectations
  - Needs (especially control, stress, anxiety)
  - Logistics (of the admission))
  - Communication & information
- After listening to the recording of the interview, I noticed I asked closed questions quite often. For future interviews I should be aware to ask more open questions.

18: RESEARCH PROCEDURE

Plan van aanpak uitvoeren onderzoek

Vóór de dag van het onderzoek:

1. Zorg dat de teams op de kinderafdeling en de SEH weten van het onderzoek
2. Breng opnamebureau op de hoogte van de start van het onderzoek
3. Email de betreffende dienstdoende kinderarts of arts-assistent die die dag op de SEH loopt (inclusief briefing's document en eventuele eerdere kennismaking) afspreken welke dag, hoe laat, waar melden.

Dag van het onderzoek op SEH:

4. S'ochtends melden bij de desbetreffende kinderarts of art-assistenten en briefingsdocumenten doornemen, benadruk contactgegevens
5. Ophalen korte witte jas en badge 'onderzoeker' en draag korte mouwen, geen sieraden, haar in een staart.
6. Patiënt korte uitleg geven over onderzoek en informatiebrief ouders en informatiebrief kind (kind 12 t/m 15) afgeven. Geef aan dat je ± 1 uur later terugkomt als ze de tijd hebben gehad om de informatiebrief te lezen.
7. Kom terug om te kijken of patiënt en ouder(s) nog vragen hebben en of ze bereid zijn om mee te doen met het onderzoek. Tekenen toestemmingsformulier. Geef het invulboekje (inclusief stickers en stickervel). Laat de contactgegevens invullen. Geef aan dat je morgen terugkomt als ze overgeplaatst zijn naar de kinderafdeling om een tijd voor het interview af te spreken.

Dag na de SEH op de kinderafdeling:

8. Vraag bij het opnamebureau na waar de patiënt ligt, vraag na of zij weten tot wanneer het kind blijft opgenomen.
9. Meld je bij de balie van de betreffende afdeling en vertel waar je voor komt, vraag eventueel of de ouders er zijn. Vraag na of zij weten tot wanneer het kind blijft opgenomen.
10. Ga langs bij de patiënt en vraag hoe het gaat, geef aan dat je een geschikt moment wilt inplannen (vóór ontslag) voor het interview (max 30 minuten). Geef aan dat het boekje ingevuld moet zijn en jullie het samen gaan bespreken. Spreek goed af hoe laat en waar jullie afspreken en dat ze het invulboekje meenemen. Bellen mocht er iets tussenkomen.
11. Geef bij de verpleging van de afdeling aan wanneer het interview is gepland en waar.

Dag van het interview:

12. Bedank patiënt voor het invullen van het boekje en de tijd voor het interview. Volg het interviewscript en start de geluidsopname (genoeg batterij en geheugen telefoon) geef bol.com bon aan het einde. Bedanken.

19: STATEMENT CARDS RELATED TO THEMES

"At the ED I was nervous because I didn't know what would happen" (VUmc)

"You told the nurse that you were thrilled and nervous because you didn't know what was going to happen since you went straight from the ED to the OR' (VUmc)

"Then when we went to the room, I think probably there was not anybody who explained to us from the beginning what exactly was going to happen so we had different people coming in. Maybe in the beginning they could have just said 'look, this is the timeline, expect it to be that and that, these are the different people you are going to see, this are the different things that are going to happen and we think we need 1,5 hour but if not we will come back in the meantime to discuss." (VUmc)

"The plan wasn't really discussed when we went in, it felt a bit ad hoc" (VUmc)

"The only difficult thing is that sometimes you don't know how long you have to wait for something and then there is information about e.g. that you have to stay overnight and then you have a question but yea... if they don't have the answer... that was difficult for I and also difficult for me because I didn't have an answer to something that was very important for us at that moment, that was an unpleasant idea." (VUmc)

"I was tensethe first couple hours here because I wasn't sure of what was going on and what was going to happen and I wasn't introduced to everyone at one go like a person would come in and introduce themselves and then leave and I see them an hour later, but once they kept coming I felt normal and open to them." (VUmc)

"The yellow stickers would have been green if I knew what would happen" (VUmc)

"At the ED I was anxious because he was going to get admitted and I didn't know what I could do or how I could help" (AMC)

"The people also didn't know whether someone could stay overnight with him, that was quite a difficult moment. That is something, especially when it concerns an admission for a child, to make sure... the people at the ED of course didn't know because people don't stay overnight there, that if a child is admitted that a parent can stay overnight in that case" (VUmc)

"In the waiting room, you don't know what happened to everyone, and maybe they have big emergencies but I've got my daughter in such pain and I have got other people eating dropjes and having cups of coffee I was thinking, you are going in front of us, that was tense" (VUmc)

"If, in the other hospital, they would have said like that I had to stay overnight here then I could have already brought some stuff" (VUmc)

"I was a little bit in doubt, I didn't know what to do because they were all busy and I just sat there so I thought 'shouldn't I help them or something'." (VUmc)

"This is purely reasoned from the patient and from me, that sometimes you feel like all the steps are executed accurately, but you can also sense quite

rapidly if for example a blood test is needed. For us it's then much more pleasant the faster it happens, the sooner you will have the results, and the sooner you can move on, which I think is also better for the hospital." (VUmc)

"I was tense because I didn't know what was wrong with him. In my opinion he left our home healthy this morning and an hour later you receive a call at work. That is part of the process" (AMC)

"At a certain moment the doctors didn't give a time indication anymore, I had a difficult time with that, a factor of uncertainty, you just want to know what to expect" (VUmc)

"It took long between the doctor told me they needed to draw blood until they were actually going to do it" (VUmc)

"Also the waiting... like they don't know what to do with me, that's how it feels" (AMC)

"I was bored at the ED, I was just staring around... nothing to do" (AMC)

"I think the problem was the waiting room, because it took forever and there were people going in front of us that didn't look like they are in that bad of a situation" (VUmc)

"We waited about half an hour in the waiting room which is a lot for an emergency. I think it is more like a 'GP practise', but an emergency is about being admitted (VUmc)

"I was in so much pain and my mom had to like fill in like what... 3 forms before we were allowed in the waiting room. It felt so long an I felt so uncomfortable, it made me frustrated" (VUmc)

"I think if you have emergency care you can't have one person, you can't have 3 people waiting. Or coming from the window to the person saying may I help you? Or maybe a laptop and go... because stand at the window... I don't know that piece could be a bit more efficient and maybe also a bit more personalized"

"At the ED I was a little bored, I didn't had anything to do because I just arrived and I didn't know if I had a appendicitis, so yea... I just read some magazines... I read them all twice..." (VUmc)

"At the ED it was a lot of waiting, in the end we have been at the ED around 3 or 4 hours" (VUmc)

"Because of all the waiting my son got irritated" (AMC)

20: EMOTIONS PARENTS

	Emoties ouders SEH							
	VUmc1	VUmc2	VUmc3	VUmc4	AMC1	AMC2	AMC3	AMC4
kalm	3	4	5	3	5	2	1	2
gestresst	4	2	3	/	/	2	2	4
veilig	4	4	5	4	5	5	4	5
kwetsbaar	1	3	1	/	/	1	3	3
relaxed	5	2	3	/	3	3	2	3
onzeker	4	3	5	/	/	4	1	1
angstig	4	2	4	/	/	1	4	4
opgewekt	3	1	1	/	/	5	2	/
begrepen	4	4	5	4	5	2	2	5
vrolijk	5	2	1	1	/	5	2	1
gespannen	4	3	4	4	1	2	2	2
verdrietig	1	2	2	/	/	4	5	5
energiek	2	3	1	2	2	3	2	3
hopeloos	1	1	5	1	/	3	4	1
opgelucht	3	4	4	3	5	3	5	1
boos	1	1	5	/	/	1	3	1
gefrustreer	1	1	3	/	/	1	2	4
verveeld	1	5	1	/	/	1	2	1
bedachtzaa	2	3	1	4	/	1	3	2
onveilig	1	3	1	/	/	1	1	1
opgelaten	1	2	1	/	/	1	2	2
belangrijk	5	3	3	/	/	1	3	1
geirriteerd	1	2	2	/	/	1	3	1

	Emoties ouder Kinderafdeling							
	VUmc1	VUmc2	VUmc3	VUmc4	AMC1	AMC2	AMC3	AMC4
kalm	5	4	/	4	5	5	/	4
gestresst	3	2	/	/	/	2	5	1
veilig	5	5	/	4	5	5	5	5
kwetsbaar	1	1	/	/	/	1	/	1
relaxed	5	4	/	3	3	4	/	2
onzeker	2	2	/	3	/	1	/	5
angstig	2	2	/	/	/	1	5	1
opgewekt	/	3	/	2	/	1	/	4
begrepen	5	4	/	3	5	4	/	5
vrolijk	5	4	/	1	/	2	/	3
gespanner	5	2	/	/	/	2	/	1
verdrietig	1	2	/	3	/	4	5	4
energiek	/	2	/	2	/	1	/	3
hopeloos	/	1	/	/	/	3	/	1
opgelucht	/	4	/	3	/	4	/	3
boos	1	1	/	1	/	1	/	1
gefrustree	/	1	/	1	/	1	/	2
verveeld	2	3	/	1	/	1	/	1
bedachtza	2	3	/	3	/	1	/	/
onveilig	1	1	/	1	/	1	/	1
opgelaten	/	4	/	1	/	1	/	1
belangrijk	5	2	/	/	3	3	/	3
geirriteerd	1	1	/	1	/	1	/	1

Modus		Mediaan		Gemiddelde		
SEH	Kinderafdeling	SEH	Kinderafdeling	SEH	Kinderafdeling	
3.00	5.00	3.00	4.50	3.13	4.50	kalm
2.00	2.00	2.50	2.00	2.83	2.60	gestresst
4.00	5.00	4.50	5.00	4.50	4.86	veilig
1.00	1.00	2.00	1.00	2.00	1.00	kwetsbaar
3.00	4.00	3.00	3.50	3.00	3.50	relaxed
4.00	2.00	3.50	2.00	3.00	2.60	onzeker
4.00	2.00	4.00	2.00	3.17	2.20	angstig
1.00	#N/B	2.00	2.50	2.40	2.50	opgewekt
4.00	5.00	4.00	4.50	3.88	4.33	begrepen
1.00	#N/B	2.00	3.00	2.43	3.00	vrolijk
4.00	2.00	2.50	2.00	2.75	2.50	gespannen
2.00	4.00	3.00	3.50	3.17	3.17	verdrietig
2.00	2.00	2.00	2.00	2.25	2.00	energiek
1.00	1.00	1.00	1.00	2.29	1.00	hopeloos
3.00	4.00	3.50	3.50	3.50	3.50	opgelucht
1.00	1.00	1.00	1.00	2.00	1.00	boos
1.00	1.00	1.50	1.00	2.00	1.25	gefrustreerd
1.00	1.00	1.00	1.00	1.83	1.60	verveeld
2.00	3.00	2.00	2.50	2.29	2.25	bedachtzaam
1.00	1.00	1.00	1.00	1.33	1.00	onveilig
1.00	1.00	1.50	1.00	1.50	1.75	opgelaten
3.00	3.00	3.00	3.00	2.67	3.20	belangrijk
1.00	1.00	1.50	1.00	1.67	1.00	geirriteerd

21: INNOVATION WORK PLAN

All innovation opportunities that were found during this research are categorised in short-term vs long-term so both hospitals can work on all improvements besides the one elaborated on in this thesis. When an opportunity is defined as short-term this means very little changes or effort is needed to implement it, or a solution already exists so it could be implemented tomorrow so to speak. Mid-term opportunities need some changes and require some effort to implement the opportunity, it could be implemented within the next 6 months so to speak. Finally, long-term opportunities require time and effort and often include changes in the business model or process, or new solutions need to be developed. Therefore, long-term opportunities will need at least a year to implement.

SHORT-TERM

Uncomfortable chairs and benches - VUmc
The metal benches are cold and you slide of the wooden chairs. In the waiting room there is no seating adjust per patient need. Like in an airport waiting areas are created fitted to your need, whether that is to rest, to work, or to read. So, the furniture in the waiting area should be replaced to better fit the various patients needs.

Primarily communicate with child
From an age of about 8 years and older (this also depends per child) it is possible to mainly communicate with the child. They don't like it when they talk about them and prefer to be talked with. After the main communication with the child, the parents or informal caregiver(s) can be involved to discuss more complicated matters. This only requires a change in mindset and/or approach of the involved medical professionals.

Floor plan with facilities
Provide a floor plan with facilities for parents staying overnight. Usually the first parent that is staying overnight will get the introduction. To not bother the nurses with a simple question a map indicating the main facilities should be provided.

Communicate via visual tools
This opportunity can be fixed and implement in multiple levels. An easy way is for the medical professional to collect a picture from e.g. a book or internet. For example if you are a surgeon and your child patient needs surgery on his kidneys take a picture of the kidneys with you to the visit. This helps the child visualise and better understand the procedure.

MID-TERM

Everyone should know the total patient journey
I think in most cases medical professionals already know the full procedure. Nevertheless, it is not acceptable if even one professional doesn't. This might require an information session where people that are involved in the whole journey of a patient come to getting and share information or other types of information sharing like a movie or a booklet.

Waiting long for next steps
Sometime certain procedure steps can be taken earlier on in the process even without admitting them. For example in a case of an appendicitis you know that blood test are needed, by taking this step earlier on like at the triage room when the patient is still waiting for an available room. In this way test results can already be acquired while the patient is waiting anyway.

Food for parent staying overnight - AMC
This is a financial or insurance problem. However, to provide that little bit of extra service parents and their children would very much appreciate it if they can have dinner together after, often an intense day at the hospital. The disruption of normal daily life often has a big impact on both and not worrying about dinner and just having some quality time together is a pleasant way to end the day.

No kid section at the ED - VUmc
According to patients there is nothing to do for the kids at the ED, especially the youngsters (> 8 years). There is a rack with magazines however not specifically for youngsters. Different solutions are possible here from simple to more advanced. For example place magazines or cards or place a projector to watch movies on the wall.

Slow responding parking barrier - VUmc
This seems to be a technical defect or programming error, or the system needs to be replaced. A technician is required to look at the system.

LONG-TERM

Blocked emergency entrance -VUmc
Separating the entrance for emergencies and for regular visitors and patients to make the arrival experience for patients in need less stressful. This requires changes in the infrastructure which is a big project.

Accessible information and open communication
The MijnDossier from MyChart is already a start to make information more accessible. However, I didn't see anyone using it or knowing it exists. Besides that, it doesn't provide all information patients and parents want. More research is needed to adjust this to the patients needs or a new platform need to be created.

Not waiting at the window/ registering while waiting & A receptionist coming to you
These two opportunities are very much linked to each other. To provide that extra bit of service it would be nice that in a painful and uncomfortable situation a receptionist would come to you to register. This faces some challenges like, how do you know who is coming in and transportable tools like a laptop or tablet is needed in order to bring the registration process to the patient. Also, a digital environment should be created where a patient can fill in the information themselves.

A case manager for your journey
This option is fixable in different levels. It basically means that you will have one person that will be the main communication point of the patient. This person will join you in your entire journey. This could be done by a nurse that joins you, or someone that has more of a social child care background. It requires a change in service.

A receptionist with more medical understanding (earlier triage)
For patients it is weird that patients that seem in less pain are treated earlier, in order words receive their triage earlier. This is because the current system triages patient in order or arrival/ registering time. Only severe or life-threatening cases will immediately be referred to the ED. If a receptionist has more medical understanding she might be able to make a first shift in triage order not based on arrival time but on the level of pain. This however is more complex as it seems so further research is needed.

Educate or prepare during waiting
Patients have indicated that they are bored and unsure about the process. Sometimes they educate themselves by searching for information and videos on the Internet. To tackle this problem a completely new product or service is needed.

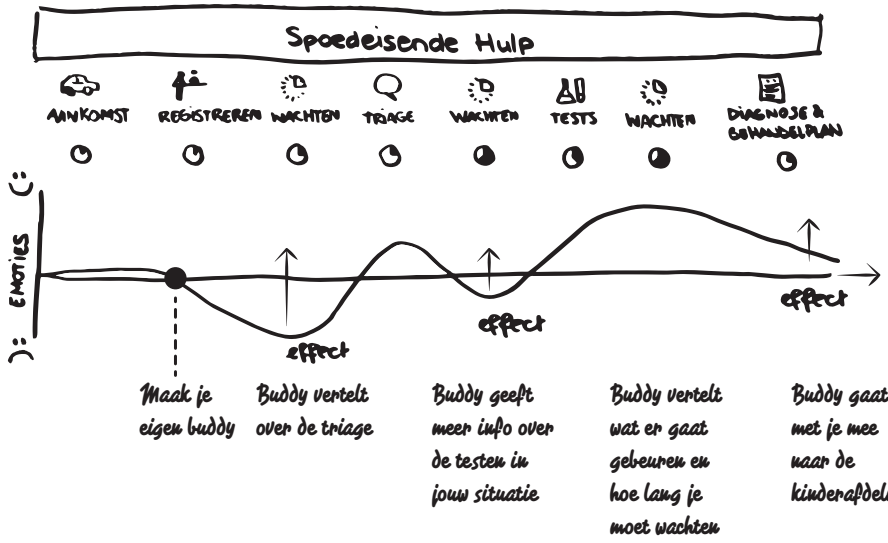
Communication plan
Patient would like to receive an overview of all the things, people, procedures, rooms, etc. they will encounter on their journey. The Patient Journey in itself could be a part of the solution, or a simple sheet where the nurse will make an overview of what will happen. MijnDossier could also be a part of this solution. Nevertheless, research is needed to consider the right medium for this.

Communicate via visual tools
Like explained in the short-term category a simple solution can be implemented right away. However, to tailor it to the understanding of children of different ages, graphically designed pictures could make it understandable for that specific procedure and age category.

22: POSTERS CONCEPT SKETCHES

Leeftijd: 6-10
(on)bekend: onb.
pijnlevel: alle

Uit onderzoek blijkt dat kinderen en ouders bij een acute opname vaak niet weten wat ze kunnen verwachten op de SEH wat zorgt voor onzekerheid en spanning, en voor verveling bij de kinderen..



Wat kan Buddy voor jou doen:

- ✓ Inzicht geven in jouw acute opname
- ✓ Meer kindergerichte informatie geven
- ✓ Je op de hoogte houden tijdens het wachten

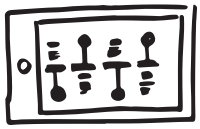
→ Zo weet je waar je aan toe bent!

"Geeft je houvast en begeleidt je door jouw opname"

Hoe werkt het?

1. In de WACHTKAMER MAAK jij je eigen Buddy in de speciale app.

2. Scan de speciale stickers en jouw BUDDY KOMT TOT LEVEN!



3. Buddy WEET WAAR JE BENT EN WAT ER GAAT GEBEUREN DUS BEREID JE VOOR EN HOUD JE OP DE HOOGTE! (LINK EPIC)

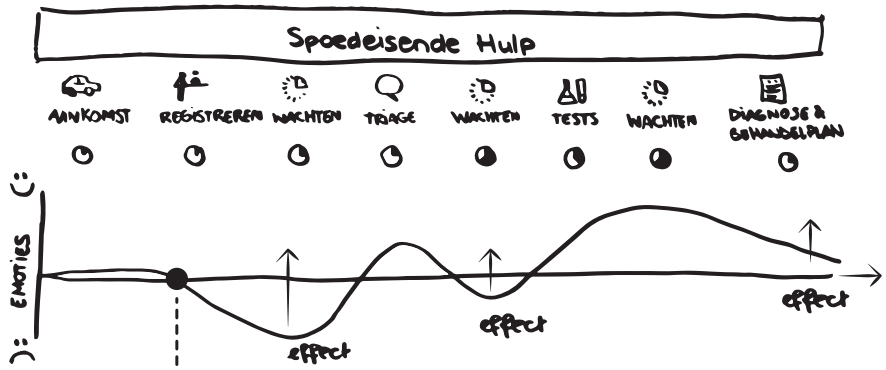
4. In de app kan je zien wat ER ALLEMAAL GEBEURT EN WELKE STAPPEN ER ZIJN.

"VOOR & DOOR KINDEREN"

Patient-to-Patient Platform

leeftijd: 9-19 jr.
(on)bekend: beiden
pijnlevel: alle

Uit onderzoek blijkt dat kinderen en ouders bij een acute opname vaak niet weten wat ze kunnen verwachten op de SEH wat zorgt voor onzekerheid en spanning, en voor verveling bij de kinderen.



Meld je aan op het platform

Kijk filmpjes over de ervaringen van andere kinderen

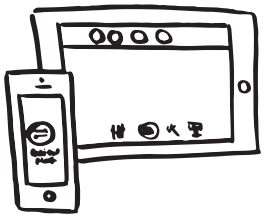
Maak een filmpje over jouw ervaring

Bekijk wie er in jouw behandel team zitten

Lees over alle stappen in jouw acute opname process

Bekijk en maak ook filmpjes op de kinderafdeling!

Wat kan je op het platform doen?



Maak en bekijk filmpjes en lees verhalen over de ervaringen van andere kinderen

Bekijk uit welke stappen jouw opname bestaat en lees hier meer over

Bekijk je team van artsen en verpleeg-kundigen en weet wie jou behandelt

HOE DOE JE DAT?

1. Download de app

2. maak filmpjes — maak foto's — of schrijf je ervaringen op

filters zoals bij snapchat en musical.ly

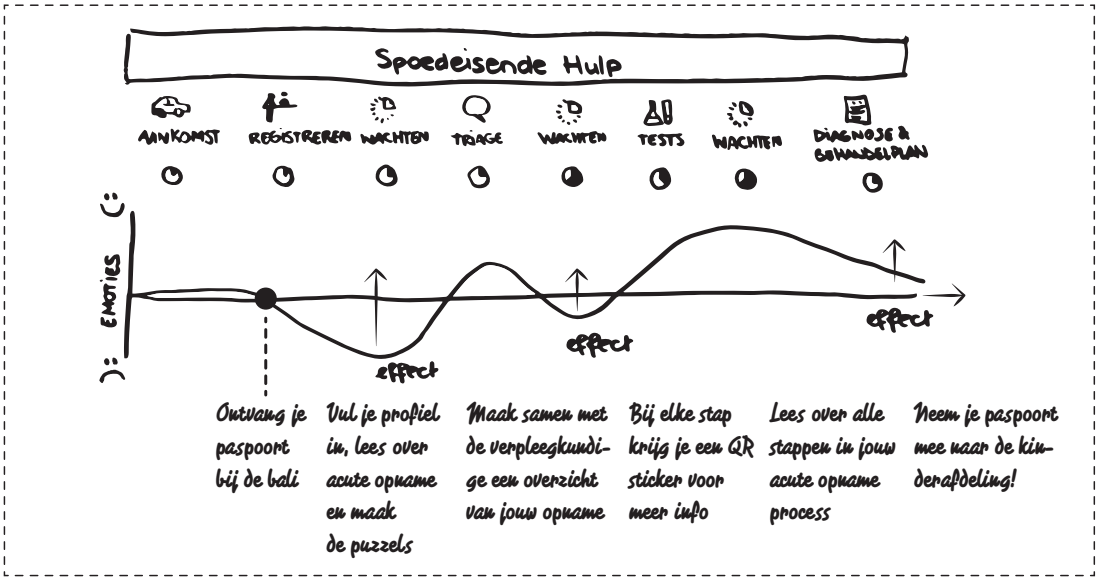
3. upload op het platform

"Als patiënt ben jij de expert, help andere kinderen met jouw ervaringen"

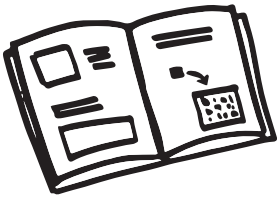
Mijn Paspoort

Leeftijd: 6 - 10
(on)bekend: onb.
Pijnlevel: laag - gem.

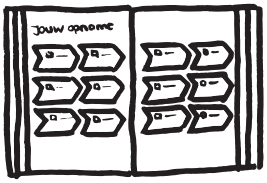
Uit onderzoek blijkt dat kinderen en ouders bij een acute opname vaak niet weten wat ze kunnen verwachten op de SEH wat zorgt voor onzekerheid en spanning, en voor verveling bij de kinderen..



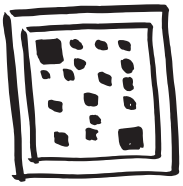
Wat kan je met het paspoort doen?



1. Tijdens het wachten vul je je profiel in en lees je over een acute opname en kan je puzzels maken



2. Samen met de verpleegkundige maak je een overzicht van de stappen in jouw acute opname. Zo weet je wat, waar, wanneer en hoe iets gaat gebeuren en wie je kan verwachten



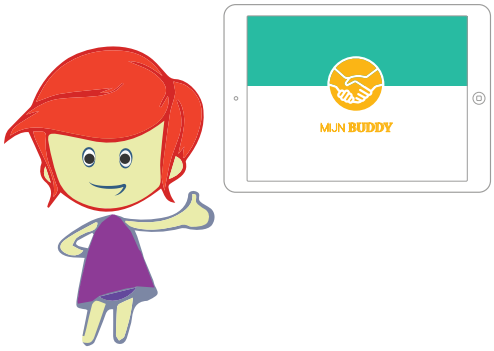
3. Bij elke stap die gaat komen krijg je een QR sticker. Als je die scant krijg je meer info en filmpjes over deze stap (bijv. een CT-scan)

JOUW OPNAME SAMENGEVAT IN JOUW PASPOORT

INFORMATIE PER STAP, BEGRIJPBAAR VOOR KINDEREN

WEET WAT ER ALLEMAAL GAAT GEBEUREN

De 'Mijn Buddy' App



Ik ben een:

◯ jongen ◯ meisje

Ik ben ☐ jaar oud

Ben je acuut opgenomen?

◯ ja ◯ nee

Ben je acuut opgenomen vanwege een blindedarmontsteking?

◯ ja ◯ nee

Hoeveel weet jij van een opname als je een blindedarmontsteking hebt?

◯ heel weinig ◯ klein beetje ◯ veel ◯ heel veel

We gaan nu de 'Mijn Buddy' app gebruiken!

Wat vind jij van deze app?

Hoeveel weet je **nu** van een opname als je een blindedarmontsteking hebt?

◯ heel weinig  ◯ klein beetje  ◯ veel  ◯ heel veel 

Wat vind je van de 'Mijn Buddy' app?

◯ helemaal niet leuk  ◯ klein beetje leuk  ◯ leuk  ◯ heel leuk 

Was het makkelijk om de 'Mijn Buddy' app te gebruiken?

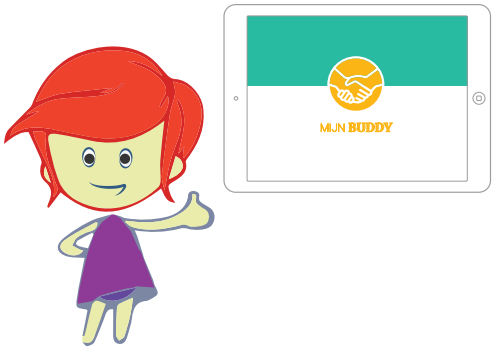
◯ helemaal niet makkelijk  ◯ klein beetje makkelijk  ◯ makkelijk  ◯ heel makkelijk 

Stel je moet nog een keertje in het ziekenhuis worden opgenomen.
Zou je dan de 'Mijn Buddy' app willen gebruiken?

◯ nee  ◯ misschien  ◯ ja 

Bedankt!

De 'Mijn Buddy' App



Ik ben een:

◯ jongen ◯ meisje

Ik ben ☐ jaar oud

Ben je zelf wel eens acuut opgenomen vanwege een blindedarmontsteking?

◯ ja ◯ nee

Hoeveel weet jij van een opname als je een blindedarmontsteking hebt?

◯ heel weinig ◯ klein beetje ◯ veel ◯ heel veel

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Bedankt!

25: PROCEDURE EVALUATION STUDY

The research procedure of the evaluation test will be described below, during the evaluation test this research procedure was completed in Dutch.

Explanation goal

I made an app to prepare children for what will happen in the hospital. Not all buttons in the app work yet. In a bit we will start using the app together. If you see something weird or if something is not clear to you, you can just tell me. You cannot make mistakes.

Storytelling

Imagine... you arrive at the hospital together with you mom or dad and you have a lot of pain in your belly. You have to wait in the waiting room of the Emergency Department until it's your turn. When you were registering, the desk clerk gave you this iPad with the 'Mijn Buddy' app.

Introduction

- What would you like to know in this case?

Journey (triage)

You have just registered and so you are waiting at the Emergency Department.

- What will happen first?
- How do you know that it will come first?
- Do you know what will happen during the triage?
- How does de triage room look like?
- Who will perform the triage?
- How long do you have to wait before it's your turn?

'Ziekenhuisboek' (Hospital-book)

Meanwhile, the nurse has brought you to a room at the ED. She tells you that they think you have an appendicitis. Often the doctor wants to do a blood test because your blood tells a lot about how you are doing.

- If you would like to get more information about a blood test, where could you find that?

The doctor just comes by and tells you that they will have to make an ultrasound of your belly. Buddy asks you if she can help you.

Journey (update ultrasound)

- What will happen when they make an ultrasound of your belly?
- Where will the ultrasound be taken?
- Who will make the ultrasound?
- How long does it take before you will know the results of the ultrasound?

Now, you are waiting for the ultrasound to be taken. You forgot the name of the doctor you saw in the beginning. Maybe Buddy know the name.

Treatment team

- What is the name of the paediatricians that is treating you?

The blood has been tested and also the ultrasound is analyzed. The doctor comes in to tell you that you indeed have an appendicitis and that you need surgery.

Treatment (surgery)

- What time will you get your surgery?
- What will they do during the surgery?
- What kind of objects are placed in the surgery room?
- How many people are cooperation on your surgery?

The surgery is finished. Today, the doctor will come by for a conversation.

Conversation doctor

- What time will the doctor come by?

- Do you know what the doctor will come and tell you?
- When can you go home?

In short, this was the admission for an appendicitis. Is there information you missed that you would like to add?

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