Improving the patient waiting experience in the ophthalmology clinic

Appendix

Design for Interaction

By Hannah Kisjes

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Design for interaction
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Appendices

Appendix A. Ethical research responsibility considerations

It is likely that patients of the ophthalmology clinic are in a vulnerable state during their visit. Furthermore, there is a limited amount of time available for each patient at the clinic. It is therefore key to interfere as little as possible with the patient visit. With regards to informed consent it is important to remember that Erasmus MC is a hospital where research and education are part of the daily workflow. Patients are informed of this prior to their visit and are asked verbal consent each time someone sits in on a consultation or examination. Taking these factors into account and taking into consideration the “minimize harm, maximize benefits” aim of the TU Delft ethical research standards the following guidelines are followed during reseach:

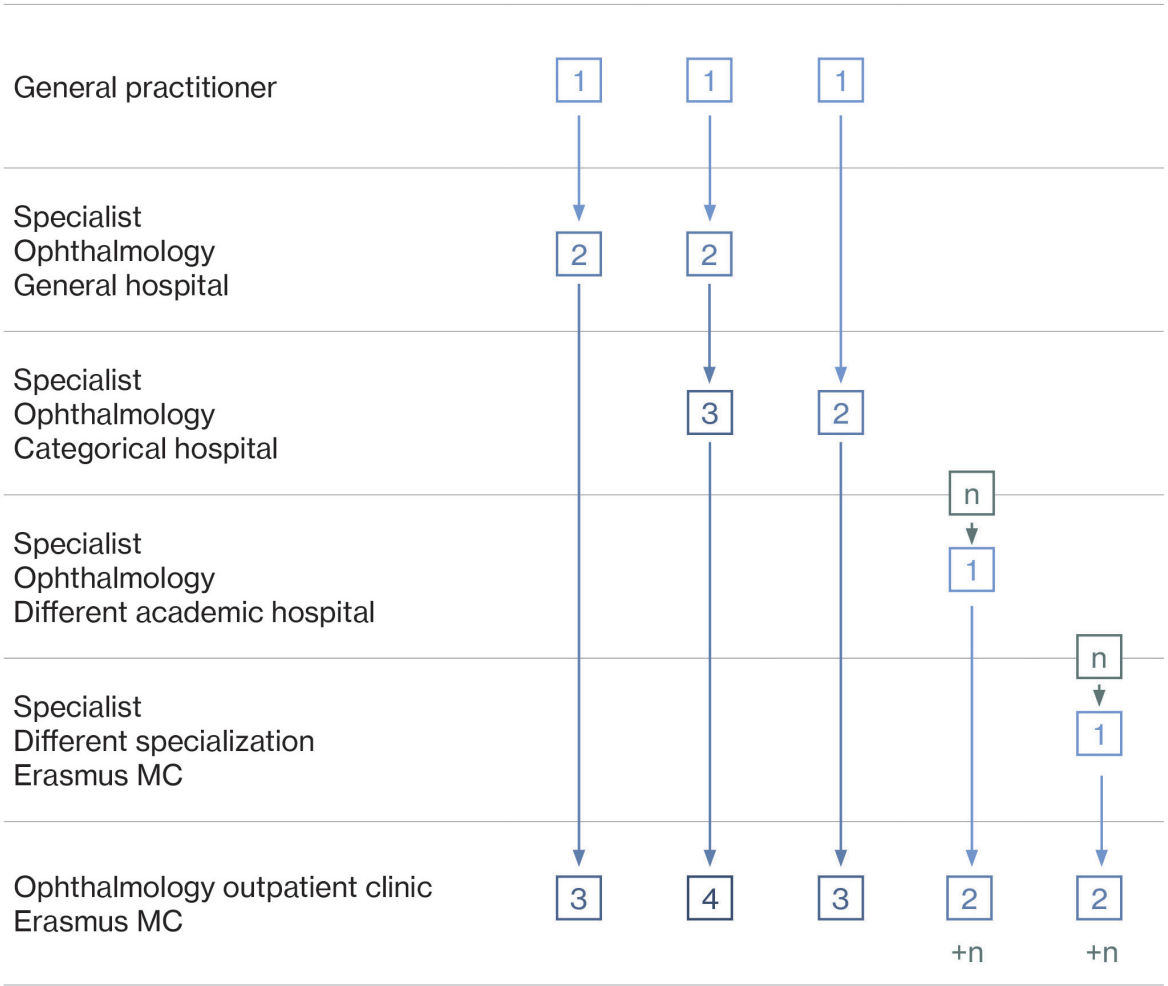
- All actions that require active participation (including answering questions, distribution of questionnaires, asking for participation in interviews or user tests) will not take place during a patients visit. Any such actions will take place when the participant is presumably at a different location than the hospital.
- Where possible, participants will be recruited from eye disease support organizations instead of recruiting hospital patients by e-mail or telephone.
- For observations during consultation the hospital policy of asking for verbal consent for observation is followed. This consent is considered sufficient.
- As asking for written or verbal consent solely for observation in the public area is expected to interfere with the patients visit, consent will not be asked for general observation in the waiting room areas.
- Any observation at the hospital, both observations without verbal consent in the waiting room as well as with verbal consent during consultation are recorded with the highest degree of anonymity possible. No identifying characteristics will be recorded in observation logs. Different observational information (quotes, emotional state, behaviour) are not linked to any one person, but recorded in separate lists.

Appendix B. Referral through the Dutch healthcare system

Before patients arrive at the ophthalmology outpatient clinic of Erasmus MC, they have often been examined by many other people. This is due to how the Dutch healthcare system is structured. Healthcare in the Netherlands is divided into multiple levels. The higher the level, the more specialist and complex the care is. Unless a condition is acute and severe enough to warrant a visit to the Emergency Room, a patient must first be seen by a general practitioner (GP). The GP does initial testing, treatment and diagnosis and can refer the patient to a specialist at a hospital if necessary.

There are multiple types of hospital in the Netherlands. In nearly all referrals by the general practitioner the patient is referred to either one of 54 general hospitals or one of 28 so-called “top-clinical” hospitals. In general hospitals only routine conditions are treated, while “top-clinical” hospitals also provide slightly more complex and specialized care. Sometimes patients are referred to categorical hospitals, which are specialized hospitals that offer a range of care in one specific medical specialty.

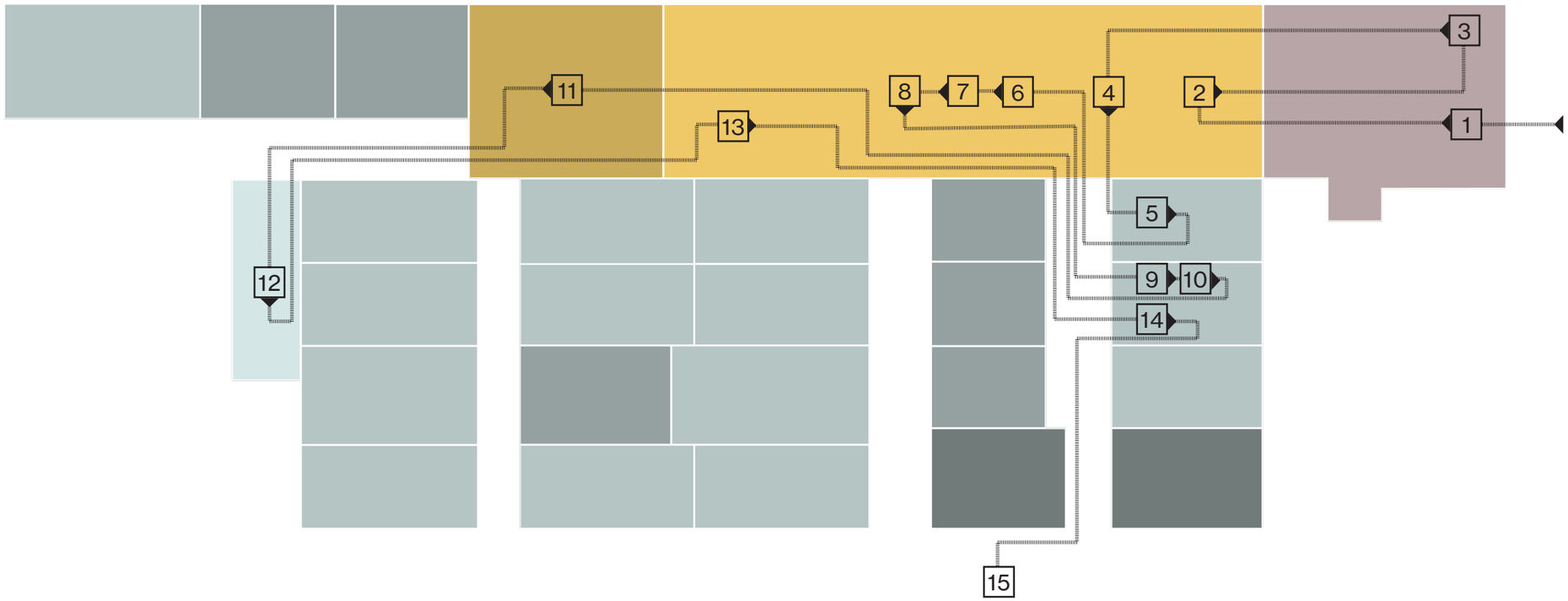
Referral paths to the ophthalmology clinic of Erasmus MC



Examples of categorical hospitals are oncology center or asthma centers. In Rotterdam there is a specialized hospital in the field of ophthalmology called Oogziekenhuis Rotterdam.

Only after a patient has been seen by one or more specialists in these types of hospitals they can get an referral for “top referral care”, which takes place in one of only 8 academic hospitals in the Netherlands. The Erasmus MC is one of these eight.

Appendix C. Example: overview of patient visit



1 Arrival & check-in
2 Wait in 1D
3 Perimetry exam
4 Wait in 1D
5 Oculometry exam
6 Wait in 1D
7 Administration eye drops
8 Wait for eye drops to take effect
9 Start consultation
10 Examination by specialist
11 Wait in 1E
12 Get OCT scan
13 Wait in 1D
14 Discuss results with specialist
15 Exit outpatient clinic

Name	John Doe
Age	67
No. visit	3rd
Time since last visit	2 months
Conditions	Glaucoma & myopia

1 Mr. Doe, a 67-year old man with glaucoma and myopia arrives at the opthalmology outpatient clinic of Erasmus MC for the glaucoma consultation office hours. He is welcomed by the volunteer host and directed to the check-in kiosk. He scans his patient registration card at the kiosk. The kiosk displays the message: “Please be seated in waiting area 1D”.

2 Mr. Doe walks to one of the benches and sits down.

3 His buttocks have only just hit the bench when someone in a white coat who he has not met before walks towards him. She introduces herself, takes him to machine in the corner and explains that they first have to do a perimetry exam.

4 Once the exam is done, mr. Doe is asked to take a seat in area 1D again, so that is what he does.

5 A man in a white coat approaches him. Mr. Doe follows him to another room where he undergoes an oculometry exam.

6 After the exam, mr. Doe takes a seat in area 1D again.

7 The same person that performed the second exam comes towards mr. Doe while seated in area 1D with a bottle of eye drops. He administers the eye drops. He is told that the eye drops will take a little time to take effect.

8 As the eye drops take effect, his eyes begin to sting a little and his already suboptimal vision becomes blurry.

9 After a while, mr. Doe hears his name being called by his main physician, whom he has met twice before. He follows her to her room, takes of his jacket and sits down.

10 The specialist asks about medication, the exams and how it is going with his condition. She dims the lights and performs two examinations. She looks on her computer screen and tells mr. Doe that she is not happy with the state of his optical nerve and wants to have a better look.

11 Mr. Doe is asked to take a seat in area 1E where he will be collected for an OCT-scan. He does so.

12 A third white-coated person takes him to a room where the OCT-scan is performed.

13 He is asked to go back to area 1D and wait there, so he does that.

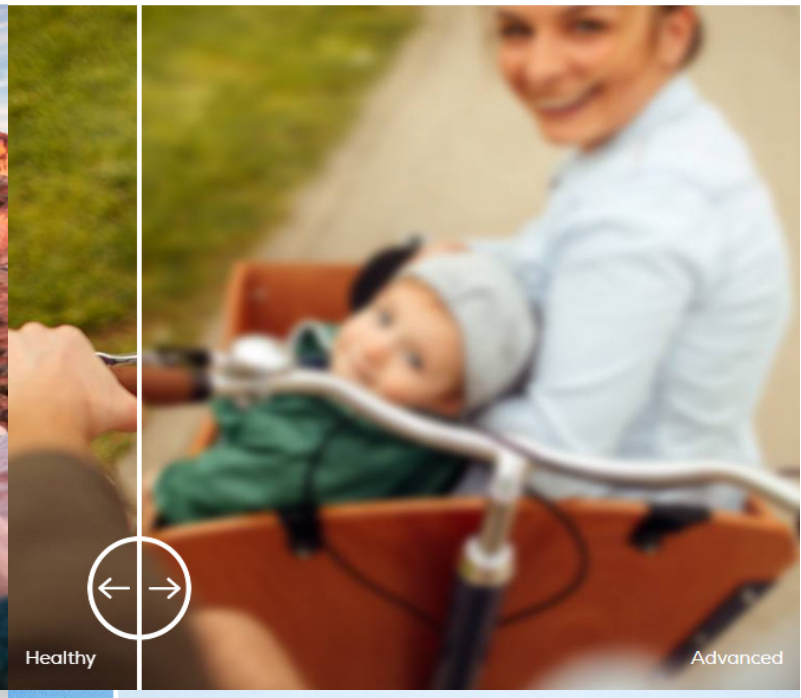
14 The specialist discusses the results of the OCT-scan. The optical nerve is in better condition than expected, the treatment regimen is not changed for now, but she wants to see mr. Doe again in two months.

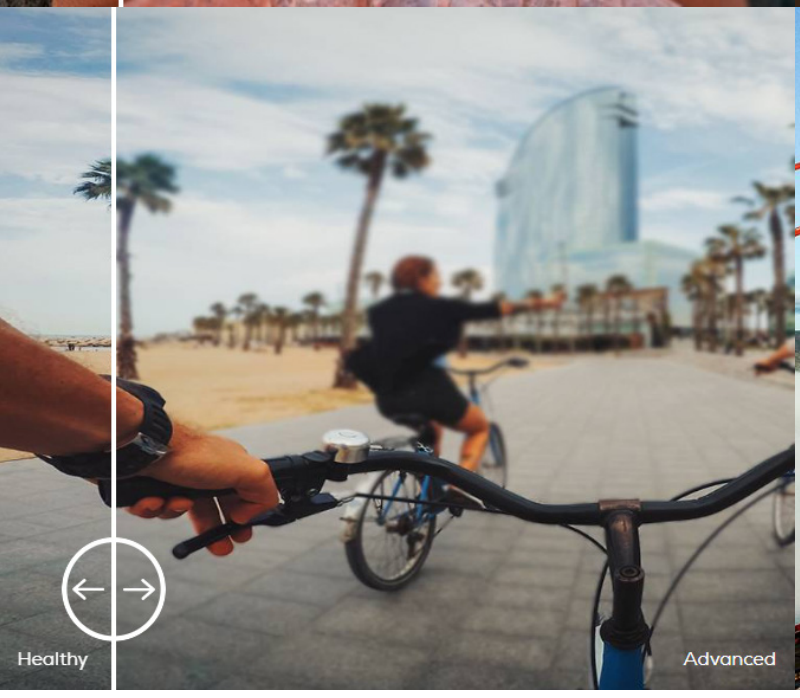
15 Mr. Doe leaves through the atrium

Appendix D. Types of visual impairment

Blurry vision

Blurry vision is one of the most common symptoms of patients with an eye condition. Many different conditions can cause blurry vision, as all parts of the eye need to function correctly for sharp vision. A defect in any part of the eye, from cornea to macula, from something as complex as the clarity of the vitreous humor to something as simple as the length of the eye, can cause light rays not hitting the right spot unobstructed, resulting in blurry vision. Blurry vision is quite common, as it has been experienced to a certain degree by anyone who wears prescription glasses.

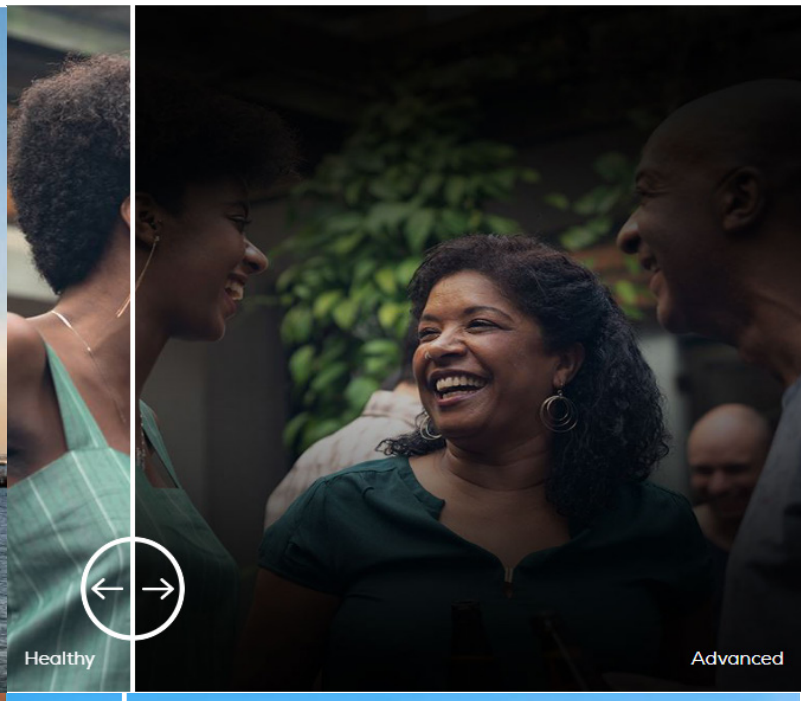




Simulaties: https://www.eyesiteonwellness.com/eye-diseases/

Blind spots

Blind spots are areas that normally are a part of a persons' visual field that are not registered and of which the person receives no image at all. The occurrence of blind spots has to do with the reception and transfer of the light rays hitting the retina (more specifically the macula) and is therefore often caused by damage to the retina or the optical nerve. The shape and location of blind spots depends on the disease it is caused by. Tunnel vision, or the loss of peripheral vision is also a form of blind spot. Areas of the visual field not affected by the blind spots do not necessarily have blurry or otherwise impaired vision.



Cooperation between eyes: alternating or double vision

As mentioned before, our vision relies on our brain processing the images from both eyes together to form a single vision. Some eye conditions affect this process due to the two eyes sending different images that can not be combined into a single vision by the brain. When this happens from birth or a young age it often leads to the patient adopting alternating vision. The perceived image from either eye is not mixed with the other and only one can be registered by the brain at a time. The input from the other eye is ignored by the brain. This can lead to underdevelopment of the ignored eye and a risk of decreased visual acuity from that eye, commonly known as a “lazy eye”. For the patient this means that their vision is based solely on their dominant eye. If they want to see out of the other eye, they have to choose to actively do so, sometimes even needing to close or physically block the dominant eye in order to overrule the brain.

In other cases, the brain tries so hard to still form a coherent picture from the two incompatible images that the patient sees both images at the same time (diplopy), something that is colloquially known as “seeing double”. This also frequently happens in patients that develop eye conditions at a later age when a condition affects only a single eye, or both eyes but in different ways. The brain has to figure out why both eyes aren’t perceiving the same thing the same way anymore and struggles to do so. What this double vision looks like for the patient depends on the input send by the eyes, it can be two clear overlaying images, but it is more often a blurry, distorted image as the brain tries to figure out how to make a single comprehensible image.

Appendix E. Expectation background and model

Expectation of receiving waiting time information

"Can you see anything on the screens?"

"They don't tell me anything"

Expectation of known workflow

"Can you please tell me what I am waiting for?"

Expectation of internal communication

"You would think they would know that"

"Okay, I will do the entire story, again"

"This will be send to my other doctor right?"

Expectation of specific length waiting time

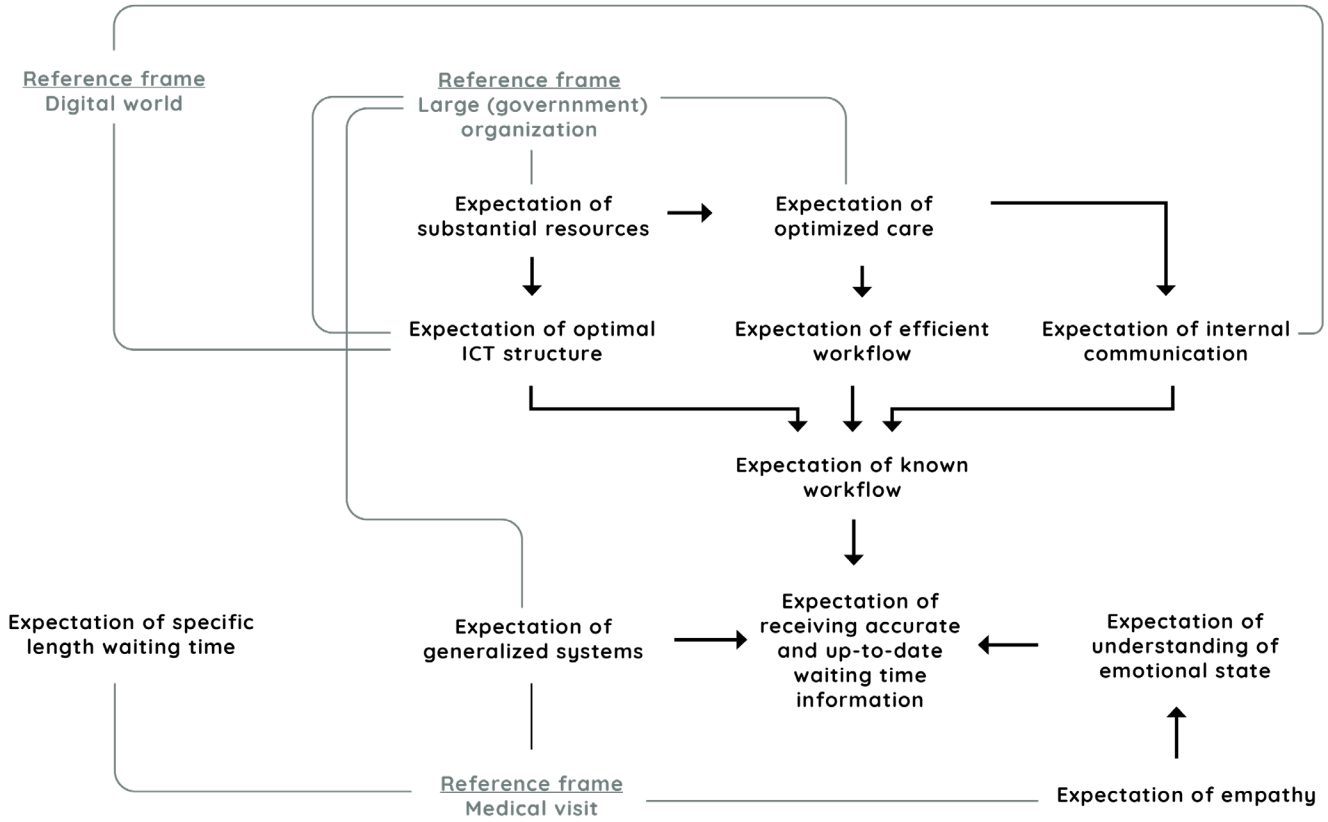
"I will be home before 14.00 am"

"I thought I would make it but now I am not so sure"

Expectation of efficient workflow

"It is not like they don't do it every day"

"I don't get why it has to take so long"



	Inbetween appointments			Examination or medical procedure			Waiting		Additional effects	
	Better than expected	As expected	Worse than expected	Questions / conversation	Examination / scan	Preparation / Procedure	In consultation, during typing	In waiting room	Have been administered medication	First-time
Sensation	Improved visual performance or stabilization decreased visual performance Little to no side effects	Improved visual performance or stabilization decreased visual performance Some to no side effects	Worse than expected visual performance Increased pain, itch Many or severe side effects Allergic reaction / inflammation	Normal sitting position	Uncomfortable position in machine Pain, itch, discomfort Uncomfortable position due to adjustment by doctor Visual performance doesn't pass exam	Pain, itch, discomfort Bleeding Discoloration eyes	Normal sitting position	Normal sitting position	Decreased visual performance Pain, itch, discomfort	-
Influence / perception	Patient brochures Digital information Internet platforms, support groups, social media News stories Friends and family	Patient brochures Digital information Internet platforms, support groups, social media News stories Friends and family	Patient brochures Digital information Internet platforms, support groups, social media News stories Friends and family	Additional people present in room or coming into room	Additional people present in room or coming into room Complicated equipment Changes to environment light Silence	Different person than the one they know	Full attention of doctor on screen of computer Sounds of busy typing	Other people getting called in Electronic information screens with the same 5 images on loop No magazines or other sources of entertainment	Other people getting called in	Unknown equipment Unfamiliar faces Unfamiliar environment
Thought	How permanent is this? If this amount has this effect, maybe a little more is even better I hope it will stay like this	How permanent is this? If this amount has this effect, maybe a little more is even better	Is this going to be my life? How permanent is this? Why doesn't it work? Maybe I am not using enough of this stuff It is not supposed to do this How much worse is it going to get?	Why are there so many people? Why do I need to answer these questions over and over again	Okay, let's make sure that I don't move while they do this. Here we go again. Do they really need all of this, again, everytime? Why are there so many people?	Okay, let's make sure that I don't move while they do this. I hope this won't hurt too much Do they really need all of this?	Why aren't they telling me anything It will be okay, I will be fine Will I make my next appointment?	Will I make my next appointment? Why aren't they telling me anything It will be okay, I will be fine Why are they not coming to get me? Have they forgotten about me?	Is this supposed to feel like this? They said it would be 20 minutes and it has been 40 minutes Have they forgotten about me? +	I don't know where to go What is next? Why are they doing this? Why do the screens say nothing about how long I still have to wait? I thought I would be done by now
Saying	I do feel like they know what they are doing I had fully anticipated going blind and now it seems like that is not going to happen (as soon as I thought)	We will just have to wait and see I will just do as I was told and then it should be alright I'm just glad that they know what to do with it	They really don't know what they are doing I have to wait for another five weeks before my next appointment, they can't honestly expect me to just sit through this. I don't know if anything is going to help.	This important life event happened to me and I think it had an effect on my condition You have made me very happy I have all the time in the world. My time is not as important. ..like I just told your colleague Can't you see this in the computer?	I don't mind being your guinea pig. Can you see anything? How does it look? ..like I just told your colleague Will you send this to my other doctor?	I thought you were the doctor Will this hurt?	Will you send this to my other doctor?	They don't tell us anything You would think with all the technology they have they could at least give us some idea of how long this is going to take.	That does sting pretty bad	Do you think they know I'm here? What was the name of the doctor again? Do you see anything on the screen? I thought we were here for your {specfic eye condition}, I don't know why they did all those tests
Doing	Follow instructions carefully Exceeds prescribed dosage medication Look up more information Talk to others about experience	Follow instructions carefully Exceeds prescribed dosage medication Look up more information Talk to others about experience	Follow instructions carefully Exceeds, decreases or stops prescribed dosage medication Adds alternative treatments Look up more information++ Talk to others about experience ++	Ask questions Make jokes Answer questions	Ask questions Follow instructions	Follow instructions	Sit still Ask questions	Inform about waiting time Entertain self Drink or eat Go to bathroom	Try to not touch eyes Shift in seat	Inform about waiting time + Entertain self - Look around Arrive early
Feeling	Relieved (Cautiously) Optimistic Anxious Insecure	Secure Confident (Cautiously) Optimistic	Scared Anxious Insecure Terrified	Secure Important Grateful Relieved	Relieved Insecure Important Vulnerable	Anxious Confused Vulnerable Dependent	Anxious Insecure Annoyed Confused Dependent	Anxious Insecure Annoyed Unimportant Small Dependent	Anxious Insecure Vulnerable Uncomfortable	Confused Anxious + Insecure + Annoyed + Frustrated +

Appendix F. Other prototypes evaluation test

F1. Appointment letter

Beste meneer H. E. Schilder,

U heeft binnenkort een afspraak in het Academisch Ziekenhuis op de polikliniek Oogheelkunde bij spreekuur dr. A.A. Jansen op 28-09-2022 om 17:00. Houdt er rekening mee dat uw afspraak twee tot drie uur kan duren. Meer weten over wat u kunt verwachten tijdens uw afspraak? Installeer de Digitaal Verbonden applicatie of log in op Mijn EMC.

Met vriendelijke groet,

Afdeling Planning Oogheelkunde

Academisch Ziekenhuis

Beste meneer H. E. Schilder,

U heeft binnenkort een afspraak in het Academisch Ziekenhuis op de polikliniek Oogheelkunde bij spreekuur dr. A.A. Jansen op 28-09-2022 om 17:00.

Met vriendelijke groet,

Afdeling Planning Oogheelkunde

Academisch Ziekenhuis

F2. Personalized day tickets

Dagticket

Wij verzoeken u 15 minuten voor uw afspraak in de onderstaande wachtruimte plaats te nemen

Uw afspraken voor vandaag

17:00 uur
Dokter A.A. Jansen
Polikliniek Oogheelkunde
Wachtgebied 1A

Dagticket

Wij verzoeken u 15 minuten voor uw afspraak in de onderstaande wachtruimte plaats te nemen

Uw afspraken voor vandaag

17:30 uur
Dokter A.A. Jansen
Polikliniek Oogheelkunde
Wachtgebied 1A

Dagticket

Wij verzoeken u 15 minuten voor uw afspraak in de onderstaande wachtruimte plaats te nemen

Uw afspraken voor vandaag

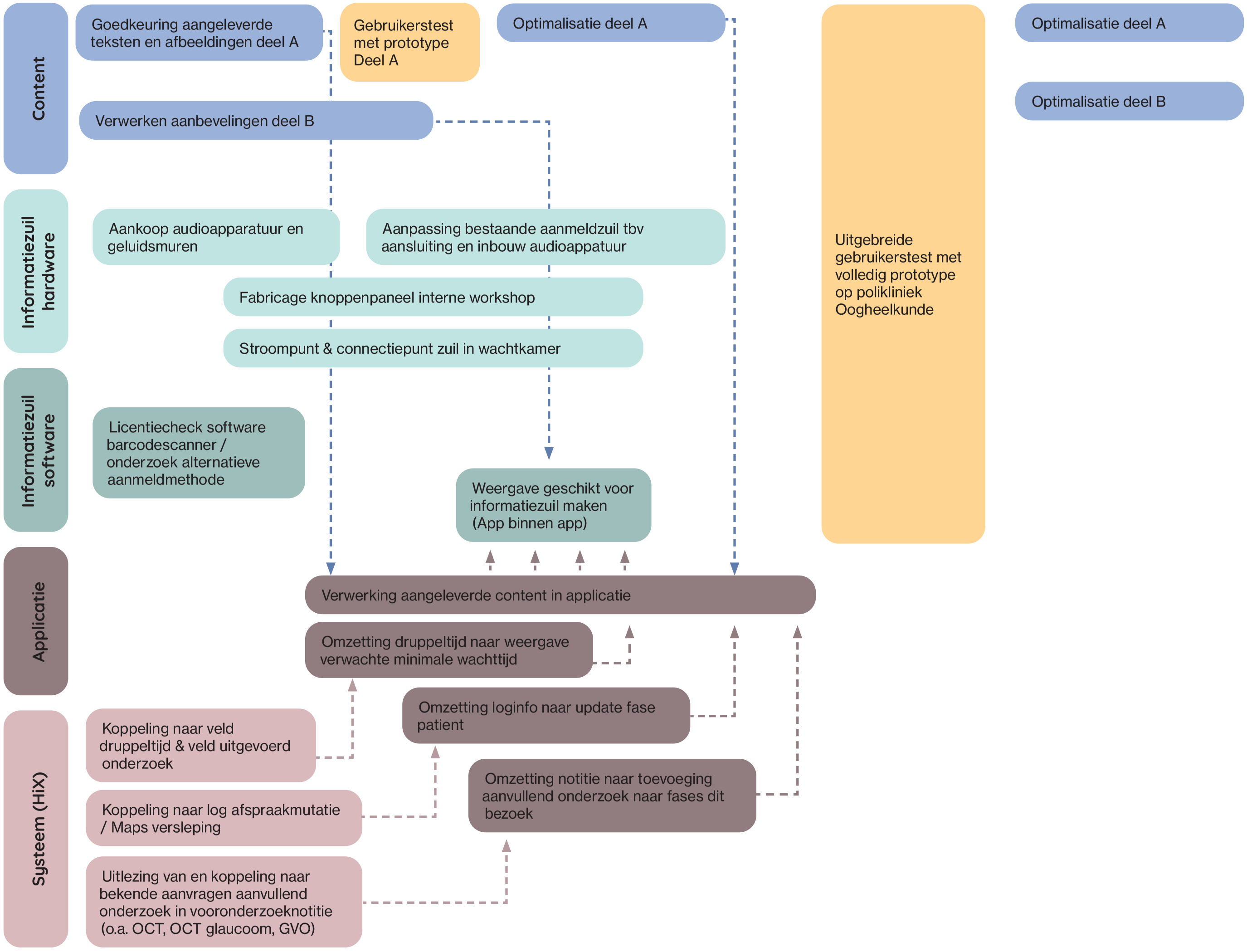
19:00 uur
Dokter A.A. Jansen
Polikliniek Oogheelkunde
Wachtgebied 1A

Dagticket

Wij verzoeken u 15 minuten voor uw afspraak in de onderstaande wachtruimte plaats te nemen

Uw afspraken voor vandaag

19:15 uur
Dokter A.A. Jansen
Polikliniek Oogheelkunde
Wachtgebied 1A


Content
Informatiezuil hardware
Informatiezuil software
Applicatie
Systeem (HiX)
Goedkeuring aangeleverde teksten en afbeeldingen deel A
Gebruikerstest met prototype Deel A
Optimalisatie deel A
Verwerken aanbevelingen deel B
Aankoop audioapparatuur en geluidsmuren
Aanpassing bestaande aanmeldzuil tbv aansluiting en inbouw audioappatuur
Fabricage knoppenpaneel interne workshop
Stroompunt & connectiepunt zuil in wachtkamer
Licentiecheck software barcodescanner / onderzoek alternatieve aanmeldmethode
Weergave geschikt voor informatiezuil maken (App binnen app)
Verwerking aangeleverde content in applicatie
Omzetting druppeltijd naar weergave verwachte minimale wachttijd
Omzetting loginfo naar update fase patient
Omzetting notitie naar toevoeging aanvullend onderzoek naar fases dit bezoek
Koppeling naar veld druppeltijd & veld uitgevoerd onderzoek
Koppeling naar log afspraakmutatie / Maps versleping
Uitlezing van en koppeling naar bekende aanvragen aanvullend onderzoek in vooronderzoeknotitie (o.a. OCT, OCT glaucoom, GVO)
Uitgebreide gebruikerstest met volledig prototype op polikliniek Oogheelkunde
Optimalisatie deel A
Optimalisatie deel B