

# A building on rehabilitation centre layout & customer satisfaction

Exploring outpatient flow & perception of a building layout in the rehabilitation sector.

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# **A BUILDING ON REHABILITATION CENTRE LAYOUT & CUSTOMER SATISFACTION**

**EXPLORING OUTPATIENT FLOW & PERCEPTION OF A BUILDING LAYOUT  
IN THE REHABILITATION SECTOR.**

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## Voorwoord

This thesis is the final step to graduating the business administration master with specialisation operations & supply chains. Here I would like to take the opportunity to thank the people that made this study possible.

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## SAMENVATTING

**Purpose** The purpose of this study is to explore the flow of outpatients in a rehabilitation centre. And to explore outpatients' perception of a rehabilitation centre's building layout and its effect on their satisfaction. In order to allow improvements of the outpatient flow and satisfaction by changing the building's layout in the near future.

**Design/methodology/approach** The outpatient flow was analysed by the graph-based approach called universal circulation network. The outpatient flow analysed the objective distance and the number of routes that 102 outpatients covered. The perception of the building layout and satisfaction of outpatients was measured by conducting a questionnaire. The questionnaire results were used to analyse the opinion of 123 outpatients on the service scape, internal response and perceived outpatient flow.

**Findings** The outpatient flow caused that outpatients cover great distances and use many different routes, especially considering the cognitive and physical problems of rehabilitation patients. Furthermore this study showed weak but significant positive correlations between some of the variables of perception of the building layout and satisfaction. In some cases small percentages of the variance in the items of satisfaction could be explained by the variation in the perception of the building layout.

**Practical implications** The managers of the rehabilitation centre can use the results of the outpatient flow analyses to improve the process of patient flow and in their redesign of the building layout. Furthermore the results of the perception of the building layout show how improving the service scape and the perceived patient flow can contribute to the satisfaction of outpatients.

**Originality/ value** This study contributed to the health-care's goal of working with evidence based practice, by exploring the connection between theoretical facts and actual processes. Furthermore it involved the opinion of patients to improve the processes and outcomes of the rehabilitation healthcare.



## 1 INTRODUCTION

This study analyses the influence of the layout of a building on the satisfaction of its users. A field study that involved the opinion of outpatients was conducted at the Centre for Rehabilitation (CvR) of the University Medical Centre Groningen (UMCG). In this study the importance of involving the opinion of patients is emphasized by discussing theories on the relationship between patient satisfaction and the layout of a building and by analysing both the objective and perceived effects of the layout of the building.

The UMCG is a large hospital in the Netherlands with over ten thousand employees. The CvR is part of the UMCG and has 650 employees, divided over two locations; location Groningen and location Haren called Beatrixoord. Location Groningen takes care of the diagnostics and outpatient treatment for rehabilitation at its early stages. Beatrixoord has a capacity of 127 beds for inpatients and treated 3.013 outpatients in 2010 ([www.umcg.nl](http://www.umcg.nl)). This study focuses on location Beatrixoord in Haren.

Patients with a wide range of medical backgrounds visit Beatrixoord for their specific revalidation programs. Beatrixoord groups her patients in two clusters; Chronic Illness and Rehabilitation Medicine. The cluster Chronic Illness holds three teams; Lung, Heart & Oncology and Diabetes. The cluster Medicine Rehabilitation holds six teams; Pain, Amputation, Spinal Cord Injury, Children, Neurology and Rheumatism ([www.umcg.nl](http://www.umcg.nl)). This way of grouping the population was also used in this study.

Beatrixoord has the opportunity to redesign the layout of its building by reconstructing a part of her building. The future layout should contribute in achieving the strategic and medical goals of Beatrixoord. By making them able to cope with the trend of a rising number of outpatients and delivering effective and efficient care. The new layout should also fit the vision of Beatrixoord by placing her patients in a central role. This should not only be visible in the content of care programs but also in the organisation of providing care (Beatrixoord, 2009-2011; Beatrixoord, 2009-2012).



## 2 RESEARCH METHOD

In order to conduct research in a profound scientific way the process of conducting this study was based on the work of Welker & Broekhuis (2010) that describes the research process. The guidelines of Emans & Jansen (2006) were used to write a scientific report on the research.

This chapter consists of a research design and a methodology part to describe the research method that was used in this study. The research design of chapter 2.1 describes the background and motivation of this study, followed by the research question, the conceptual model and the operationalisation of its variables.

Chapter 2.2 describes the methodology of this study. The research strategies that were used in this study are discussed and the methods to gather data. The chapter ends by discussing how the data was analysed.

### 2.1 RESEARCH DESIGN

#### 2.1.1 MOTIVATION OF RESEARCH AND BACKGROUND

The management and healthcare providers of Beatrixoord assume that the current layout of the building has a negative effect on the satisfaction of her patients caused by two factors. Firstly, they believe that patients walk to a lot of different locations in the building because of the current layout. Secondly, they believe that patients walk long distances because of the current layout. The management assumes that these two factors have a negative effect on the satisfaction of patients.

A future reconstruction of a part of the building gives the opportunity to redesign the layout of the building. This future layout should firstly contribute in reaching Beatrixoord's strategic and medical goals of delivering effective and efficient care while placing her patients in a central role. Secondly, the future layout should be able to cope with the rising number of outpatients in the healthcare industry.

Beatrixoord has no representative data about the distance or actual places in the building where patients walk. This limits their insight into the problem and requires clarification before a future layout could be drawn. The actual distance patients cover may deviate from how patients perceive this

distance (Weisman, 1981). Besides the distance that patients cover, many other factors of the building could influence the satisfaction of patients. The need for insight in these topics was reason for the management of Beatrixoord to initiate a research on the layout of the building and the satisfaction of her patients.

In the past research has been conducted on the topic of healthcare organisations and the way they function. Within this broad scope, the association between the environment and the performance of healthcare organisations has been studied by scientists with all kinds of backgrounds like architectural, medical, behavioural and operational backgrounds (Hornsby & Schmidt, 1913; Bitner, 1992; Bowers et al., 1994; Fottler, 2000; McCarthy, 2006). These researches on the performance of healthcare organisations often involve the opinion of employees but leave out the opinion of patients. Even though research shows that healthcare performance can be improved by involving the patients' opinion (Mitchel, 1995; Wright, Rudicel & Feinstein, 1994). This study gives a humble contribution in filling this gap by involving the opinion of outpatients in answering the question whether the layout of a healthcare building influences patient satisfaction.

#### 2.1.2 RESEARCH QUESTION

The previous section described what effect the layout of the building has on the satisfaction of outpatients, according to the assumptions of Beatrixoord's management and healthcare providers. The absence of data on this topic and the need for more insight in this topic formed the following objective of this study:

**Explore the outpatient flow and perception of Beatrixoord's outpatients, given the current building layout, and its possible effect on their satisfaction.**

This research objective will be met by answering the following research question:

**What is the influence of the building's layout on the outpatient's objective flow and perception and how does this perception influence the outpatient's satisfaction?**

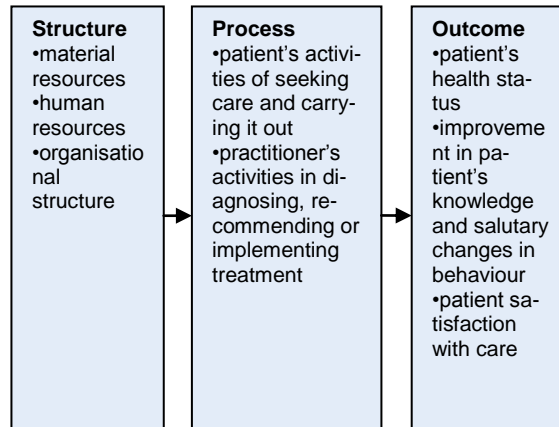
**Figure 1** Research question.

### 2.1.3 CONCEPTUAL MODEL AND SUB-QUESTIONS

**Framework of reasoning** The framework for this study's reasoning is based on the clear 'three-part approach to quality in healthcare' of Donabedian (1988). The so called three-part approach makes a distinction between three categories; structure, process and outcome (see figure 2). Structure denotes the characteristics of the setting in which care occurs, consisting of material resources (such as facilities, equipment and money), human resources (such as the number and qualification of personnel) and the organisational structure (such as methods of staff organisation, peer review and reimbursement). The second category is process and holds the actual giving and receiving of care and includes activities to accomplish this, such as seeking care. The third category is outcome, which denotes the effects of the healthcare on the patient's health status, change in salutary behaviour and satisfaction with care.

Figure 2 displays the three-part approach and shows that a linear connection is assumed between the three categories. A good structure enhances the possibility of a good process which enhances the possibility of a good outcome.

The Institute of Medicine acknowledges the three-part approach relationship between structure, process and outcome (Kohn, Corrigan, & Donaldson, 2000). And notices a growing recognition for the idea that the quality of care delivered by healthcare providers (outcome) depends for a large part on the performance of the organisational system in which they work (structure). The relationships between structure and process and between structure and outcome are the domain of the organisational sciences and will be investigated in this study.



**Figure 2** Three-part approach of Donabedian (1988, p. 1745).

For each category of the three-part approach specific topics concerning the objective of this study were chosen to investigate. These topics will be mentioned shortly in the following and elaborated on in the clarification of the conceptual model of figure 3.

For the structure category the topic of 'material resources' is chosen, to be more specific the 'layout of the building'. For the process category the topic of 'patients activities of seeking care' was chosen. This broad topic was specified by two concepts: 'objective patient flow' and 'perception'. From the outcome category the topic of patient satisfaction was chosen.

Each topic will now be elaborated on and their assumed relationships will be displayed in the conceptual model.

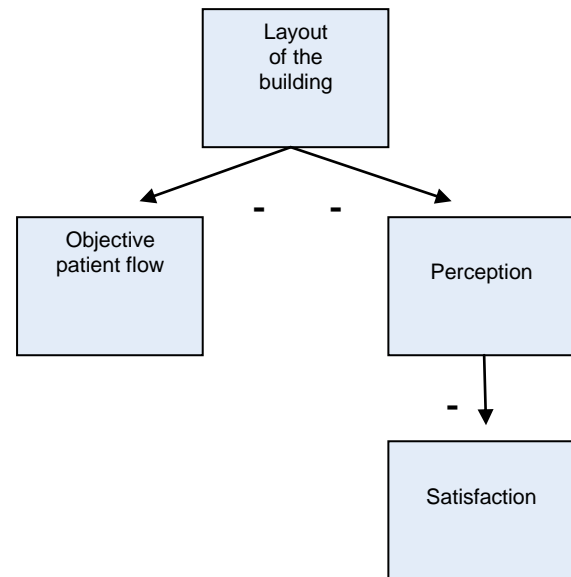
**Conceptual model** There is a relationship between the structure of a healthcare organisation and its processes according to the three-part approach of Donabedian. The management and healthcare providers of Beatrixoord assume this is a negative relationship because they believe that the current layout of the building (structure) has a negative effect on the distance that and places where patients walk while visiting their healthcare providers in the building (process). This first assumed relationship is displayed in the conceptual model (figure 3).

The layout of the building is defined by the architectural construct of Beatrixoord and the location of healthcare providers inside the building. The distance and places that patients walk are variables of the concept 'patient flow'. Patient flow is defined as the physical movement of patients throughout a healthcare chain (Visser & Beech, 2005). Research shows that poor management of patient flow can cause all kind of problems in hospitals like; short supplies, long queues, delays, bottlenecks, waste of resources, long length of stays, low productivity levels, non-appropriate use of clinical settings and workload variability (Noon et al., 2003). In this study patient flow is restricted to the physical movement of outpatients inside the building of Beatrixoord. The variable objective patient flow will be operationalised in section 2.1.4 and elaborated on in chapter 3.1.

Objective data results on patient flow could deviate from how patients perceive the distance and places that they visit. The perception could for example be influenced by the complexity of the route and number of turns (Weisman, 1981). There is a growing recognition of the influence of the subjective (perceived) environment. Kakkar & Lutz (1981) argue that the subjective evaluation of the environment rather than the objective situation determines the behaviour of the consumer. This subjective evaluation of the environment describes how the environment is perceived by the customer and is likely to be very useful for understanding and predicting the behaviour of the customer (Foxall & Hackett, 1994). Consumers and employees are influenced by the physical design and atmosphere of a facility (Milliman, 1982; Bitner, 1992; Hagerman, Rasmanis, & Blomkvist, 2005; Fottler, 2000; Stichler, 2001; Cooper, 2010). Particularly in the service sector this becomes clear because the service is generally produced and consumed simultaneously at the organisations facility. Even before the service is actually delivered customers make assumptions about the organisations capabilities and quality based on the physical design (Foxall & Hackett, 1994). That is why the relationship between the categories of structure (layout of the building) and process will be investigated by a second variable; the 'perception'. This study follows Gibson's approach of perception, which emphasizes how observers pick up information from the environment

(Goldstein, 1981). The variable perception will be operationalised in section 2.1.4 and elaborated on in chapter 3.2.

The conceptual model (figure 3) shows that a negative relationship is assumed between the layout of the building and the perception of outpatients. This means that a bad layout of the building causes that outpatients have a negative perception of the building.



**Figure 3** Conceptual model.

The three-part approach assumes there is a linear relationship between processes and outcome in healthcare. Organisational behaviour studies confirm this relationship by showing that the perception of the layout of the building (process) may influence the satisfaction of consumers (outcome) (Bitner, 1992). Satisfied consumers are a common goal in the service sector. Especially among healthcare organisations that follow the vision of working with a patient centred view this is an important outcome of processes. This gave rise to the third relationship that will be investigated in this study, between the perception (process) and satisfaction (outcome) of outpatients. Satisfaction is de-

defined as the evaluation of an emotion that reflects the degree to which a consumer believes that a service provides positive feelings (Rust and Oliver, 1994).

The conceptual model displayed in figure 3 assumes that a bad layout of the building has a negative effect on the variables objective patient flow and outpatient perception. Furthermore a negative perception is assumed to have a negative effect on outpatients' satisfaction. How the relationships between these concepts can be explained will be discussed in the theoretical framework of chapter 3. Throughout this study the conceptual model will also serve as a structure for the storyline.

**Sub-questions** In order to answer the research question, firstly the concepts of the research question will be elaborated on. This will be done by answering the following sub-questions for each concept:

**Objective patient flow**

- What distance do outpatients cover inside Beatrixoord?
- Which routes are taken most often in Beatrixoord?
- What change in distance has a noticeable effect on the perceived distance?

**Perception of outpatients**

- How do outpatients perceive the service scape of Beatrixoord?
  - How do outpatients perceive the ambient conditions of Beatrixoord?
  - To what extend do outpatients find the rooms of Beatrixoord functional for rehabilitation?
  - To what extent do outpatients perceive that the signs & symbols of Beatrixoord contribute positively to their wayfinding experience?
- How do outpatients internally respond to Beatrixoord's building?
  - What atmosphere do outpatients subscribe to Beatrixoord?
  - To what extend do outpatients feel safe at Beatrixoord?
- How do outpatients perceive the outpatient flow in Beatrixoord?

- How do outpatients perceive the distance they cover at Beatrixoord?
- To what extend do outpatients think it is hard to find locations in Beatrixoord?

**Outpatient satisfaction**

- Are outpatients overall content with the building of Beatrixoord?
- Would outpatients return to Beatrixoord if they could choose?
- Would outpatients recommend Beatrixoord to others?

2.1.4 OPERATIONALISATION OF VARIABLES

The concepts of the conceptual model were operationalised to make them measurable. Table 1 shows the concepts and how they were operationalised.

Concept	Operationalisation
Objective patient flow	1. Objective distance
	2. Number of routes
Perception	1. Perceived service scape
	1.1. ambient conditions
	1.2. function
	1.3. signs and symbols
	2. Internal response
	2.1. Feeling safe
2.2. Atmosphere	
Satisfaction	3. Perceived outpatient flow
	3.1. Perceived distance
	3.2. Wayfinding
Satisfaction	1. Overall content with building
	2. Return to Beatrixoord
	3. Recommend to others

**Table 1** Operationalisation of variables.

The concept objective patient flow is operationalised by two variables, objective distance and number of routes. The objective distance is the distance that a patient must cover to be able to go to the locations of their appointment while using the routes that are prescribed by Beatrixoord. These routes take into account that certain sections of the building are restricted areas. It is assumed that patients show the desired behaviour of walking these prescribed routes. Additional meters because of deviant behaviour may be very



realistic but will vary greatly and were therefore excluded. An example of deviant behaviour is walking via restricted areas or taking detours. The many different routes that patients might take in between appointments (for example a walk in the garden, to the restaurant, or to and from the parking lot) were also excluded. The second variable, number of routes consists of the number of different routes that patients must follow when visiting their healthcare providers at one particular day. How these routes were formed will be explained in chapter 4.2.

The concept perception holds three variables, perceived services scape, internal response and perceived outpatient flow. Its first variable, perceived service scape, is defined by Booms & Bitner as “the environment in which the service is assembled and in which the seller and customer interact, combined with tangible commodities that facilitate performance or communication of the service” (Booms & Bitner, 1981, p. 36). This definition describes the service scape as a complex mix of environmental features. To be more specific, it consists of all the objective physical factors that can be controlled by the firm and influence the actions of employees and customer. These factors are grouped into three dimensions according to Bitners framework; ambient conditions, function and signs & symbols (Bitner, 1992).

Internal response is the second variable of the concept perception. Internal response is defined as a psychological process that influences the behaviour of individual customers and employees and also affects the social interactions among them (Bitner, 1992).

The third variable of the concept perception is perceived outpatient flow and will be measured by two dimensions. The first dimension measures how patients perceive the distance they cover inside Beatrixoord. The second dimension measures to what extent patients feel they can find their way in Beatrixoord.

The concept satisfaction consists of many dimensions and is complex to measure, as will be explained in chapter 3. To analyse how satisfied the outpatients of Beatrixoord are with the building, three variables of satisfaction were measured. The first variable measures to what extent outpatients are overall content with the building, the second whether outpatients will return to Beatrixoord and the

third variable measures whether outpatients recommend Beatrixoord to others.

## 2.2 METHODOLOGY

This section of the research design describes which methods were used to conduct research. Firstly, the research strategies and their data gathering methods are discussed. Secondly, the analyses of the desk research and thirdly the analyses of the case study are discussed.

### 2.2.1 RESEARCH STRATEGIES

Be reminded that the objective of this study is to explore the objective patient flow and perception of Beatrixoord’s outpatients on the current building layout and its possible effect on their satisfaction. To reach this objective two research strategies were followed, neither of these strategies used interventions on the population of Beatrixoord. The first research strategy was a theoretical research consisting of a literature study. The second research strategy was a case study consisting of desk research, open interviews and a questionnaire. Table 2 gives an overview of the methods that were used to gather data. It also shows which data gathering method was used to analyse the concepts of the conceptual model. The following elaborates on the two research strategies.

Research strategy	Data gathering method	Concept
Theoretical research	Literature study	Objective patient flow, perception, satisfaction
Case study	Desk research	Objective patient flow
	Open interviews	Objective patient flow, perception, satisfaction
	Questionnaire	Perception, satisfaction

**Table 2** Data gathering method and dimension per research strategy.

**Theoretical research strategy** A theoretical research was conducted to achieve the objective of this study, without intervening in the populations normal routines. The theoretical research consisted of a literature study. In this literature study existing data from previous researches were gathered from different databases. This resulted in articles

from both the medical, sociology and the operations and supply chain point of view. The consulted databases were: Business source premier, MEDLINE and SocINDEX. Search terms that were used in different combinations were; patient flow, patient satisfaction, perceived service scape. The snowball method of consulting reference lists for relevant articles was also used.

**Case study strategy** The second strategy used in this study was a case study. By conducting a case study the actual situation of Beatrixoord was researched without intervening in the normal routine of the population. The following methods were used in the case study to gather data; desk research, open interviews and a questionnaire. The following elaborates on these data gathering methods. The desk research consisted of analysing appointment schedules of Beatrixoord's outpatients. The planning office of Beatrixoord provided data on the appointment schedules. A sample was taken from these appointment schedules because an analyses of all Beatrixoord's outpatients would be too time consuming for this study. The sample was taken from the pain and neurology diagnosis teams since they make a fair representation of Beatrixoord's outpatient population. This is because they form the largest outpatient group together (41% of the total outpatient population) and they visit a broad range of healthcare providers. Be reminded that the outpatients are rehabilitation patients who have a common goal of rehabilitating into the society, which in most cases requires the expertise of a multidisciplinary team of healthcare providers (CvR, 2011). Outpatients with only an introduction or exit appointment were excluded from the sample. Chapter 4.1 elaborates on the composition of the sample. How the appointments schedules were used to analyse the concept objective patient flow will be explained in paragraph 2.2.2.

Open interviews with Beatrixoord's healthcare providers were used to gain insight in the perceived problem and the current situation of the patient flow and layout of Beatrixoord. These open interviews were held in cooperation with an external consultant during four brainstorm session about a future layout of Beatrixoord's building. A questionnaire developed by the author based on the literature study of chapter 3 was used to measure the opinion of outpatients on the layout of the building and their satis-

faction. The questionnaire can be found in appendix F. Data was gathered from Monday till Friday during four regular weeks in June and July 2011 by asking a convenient sample of Beatrixoord's outpatients to voluntarily fill out the questionnaire. Patients were recruited at the waiting areas of the building by secretaries, healthcare providers and the author. Patients had to meet the following inclusion criteria: firstly, be an outpatient of Beatrixoord; secondly, be at least 18 years of age; and thirdly, having the cognitive ability to fill out the questionnaire. Chapter 4.1 elaborates on the composition of the sample and paragraph 2.2.3 elaborates on the analyses of the questionnaire.

#### 2.2.2 ANALYSES OF DESK RESEARCH

In the desk research appointment schedules were analysed to gain insight in the concept objective patient flow. How the appointment schedules were analysed is explained below.

The planning office provided the appointment schedules of Beatrixoord's outpatients. The order of healthcare providers of each outpatient's appointment schedule was used to form routes that outpatients followed inside the building. The Universal Circulation Network (UCN) method (see chapter 3.2.2) was used to analyse the distance and the routes that outpatients cover during their visit by making a graphic representation of the outpatient flow.

The healthcare providers have their offices, examination rooms and practice rooms at different locations in the building (see inscription of figure B1 of appendix B). The locations of these appointments were grouped into 9 points of measurement (see blue dots in figure B1 of appendix B). These measurement points were based on the location of the healthcare provider's office or waiting area. For example two healthcare providers that are located next to each other were grouped into the same measurement point. This gives small deviation in the analyses of the data. Considering the diagnostic objective of the research this deviation was neglected.

Figure B1 in appendix B shows maps of Beatrixoord. The maps display where the points of measurement are located. The green lines between two points of measurement display the routes that patients are expected to follow based on the UCN method. The distances of these routes are displayed in table B1 of appendix B.

In order to make readers able to follow the reasoning of this thesis a short explanation of the grounds of Beatrixoord is in place. Due to a geological phenomenon, a sand ridge called 'de Hondsrug' there is a seven meter difference in height at Beatrixoord grounds. Because of the sand ridge the grounds at the front side of the building (main entrance, see figure B1) are seven meters higher than the back side of the building (Sportscomplex). Because of this height difference the basement level at the front side (U and K wing) is at the same height as the ground level in the back side (V wing and sports complex). Beatrixoord labelled the V wing and Sportscomplex as basement level even though they are located at the natural ground level.

After analysing the outpatient flow in the current situation, this was compared to the outpatient flow in a future possible layout of the building (see figure B2 of appendix B). The possible future layout was formed in cooperation with an external consultant during brainstorm sessions with healthcare providers. The future layout changes the location of healthcare providers and consequently changes the routes and distance that the outpatients cover. The effect of change in objective distance on perceived distance was analysed using the effect size ratio of Middel (2002).

### 2.2.3 ANALYSES OF QUESTIONNAIRE

In the case study a questionnaire was analysed to gain insight in the concepts of perception and satisfaction. This paragraph shows how the questionnaire measured the opinion of the outpatients and explains how these opinions were analysed.

The questionnaire consisted of statements on several variables of the concepts perception and satisfaction. The statements were accompanied by an ordinal Likert-scale ranging from 'totally agree' (1) to 'totally disagree' (7). The scale had no verbal labels for scale points 2 through 6 and contained the extra option 'no idea' (8). Statements on the items of the variables perceived service scape and internal response were also measured on a nominal scale level with multiple response options. Table A1 in appendix A gives an overview of the variables of each concept and the number of questionnaire items per variable. The questionnaire results showed to what extent the outpatients agreed or disagreed with the statements. The results were analysed by several tests using the statistical program spss 16.0. Firstly,

descriptive statistics and frequency tables were made to summarize the outcomes of the questionnaire and to gain insight in the nominal variables. Secondly, a correlation matrix analysed which items correlated to each other. Thirdly, regression analyses were made in order to forecast the satisfaction of outpatients based on their perception of the service scape, outpatient flow and internal response. This was done by showing what percentage of variance in the dependent variables could be explained by variance in the independent variables.

The questionnaire used in this study was developed by the author based on the literature study of chapter 3. The reliability and validity of the questionnaire were tested using factor analyses and Cronbach's alpha. The results of these analyses are shown in chapter 4.2.

Before the results of this study will be presented, the next chapter gives a theoretical framework on the concepts of the conceptual model by showing the results of the literature study.



### 3 THEORETICAL FRAMEWORK

The management and healthcare providers of Beatrixoord assume that the layout of the building has a negative effect on the satisfaction of their patients. This assumption gave rise to the research question: What is the influence of the building's layout on the outpatient's objective flow and perception and how does this perception influence the outpatient's satisfaction?

This chapter elaborates on the concepts of the research question and serves as a theoretical framework based on previous research. Once more, the structure of this chapter exactly follows the structure of the conceptual model. Paragraph 3.1 discusses the concept objective patient flow, paragraph 3.2 discusses the concept perception and paragraph 3.3 discusses the concept patient satisfaction.

#### 3.1 OBJECTIVE PATIENT FLOW

The conceptual model (figure 3) assumes that a bad layout of the building has a negative effect on the objective patient flow. This paragraph elaborates on the concept of objective patient flow and its relationship with the layout of the building. Section 3.1.1 discusses problems that can be caused by bad patient flow on three levels. Starting with general organisation problems, followed by building circulation problems and ending with problems related to the specific population of this study. Section 3.1.2 discusses how patient flow can be measured in order to control and improve it.

##### 3.1.1 EFFECTS OF PATIENT FLOW

Patient flow is defined as the physical movement of patients throughout a healthcare chain (Vissers & Beech, 2005). This section discusses the effects of patient flow on three different levels.

**Patient flow and general organisation** Research shows that poor management of patient flow can cause all kind of problems in hospitals like; short supplies, long queues, delays, bottlenecks, waste of resources, long length of stays, low productivity levels, non-appropriate use of clinical set

tings and workload variability (Huang, 1994; Noon et al., 2003; Haraden & Resar, 2004; Villa et al., 2009).

Healthcare institutions used to respond to delays by adding more resources, like increasing the number of beds and personnel. Nowadays healthcare institutions can no longer afford to keep increasing their resources and look for other ways to improve their processes. Haraden and Resar (2004) show in their research that delays are not necessary caused by a shortage of resources. In some cases the delay is caused by a problem or variation in the flow of processes.

In order to manage variable processes organisations should change the following five elements of their configuration:

1. Location and layout of spaces and facilities.
2. Organisational structure that supports patient flow management.
3. Capacity planning.
4. Configuration of the wards.
5. Technologies and information systems.

(Villa et al., 2009, p.157)

Villa et al. (2009) show in their research how a change in the organisational structure can contribute to an increase of patient inflows and an increase of patient satisfaction. The organisational structure should have a proactive management on patient flow logistics. That aims among other things at smoothing the workload by a better management of capacity planning and jointly managing and sharing spaces and resources. A joined management and sharing of resources would be based on the requirements of the current flow of patients whereas the allocation to specialties is often based on historical rights.

Healthcare organisations should manage patient flow logistics in similar ways that manufacturing companies manage their materials, according to Villa et al. (2009). The Virginia Mason Medical Centre in Seattle, Washington for example successfully applies techniques that are originally used in the production industry (McCarthy, 2006). This Medical Centre applied 'Lean' and 'Just In Time' techniques which had several positive results like making 13 000 square feet of space available that was used for storage before, reducing the distance staff walked by 34 miles per day and in-

creased patient satisfaction. The management philosophy Lean describes how organisations can work efficient by elimination all forms of waste that do not contribute to the outcome of the process. One of the key aspects of Lean is optimizing the flow of processes. This holds striving for a seamless series of value-creating steps in the process of delivering a service or product (Dale et al., 2007). In this study patient flow is restricted to the physical movement of outpatients inside the building of Beatrixoord. A seamless flow of patients would hold an effective movement of patients through the building. What problems a wrong flow of patients through a building may cause will be discussed in the following.

**Patient flow and building layout** The circulation of persons and materials inside a building (building circulation) are of interest to many people even before constructing the building. Architects, designers, occupants and building owners need to foresee the building circulation. Important safety quality conditions are based on crowd control in case of emergencies. Because incidents where people were seriously injured or killed due to crushing or trampling have shown that wrong building design may lead to problems in the building circulation that cause serious safety problems. Building-design guides, building codes and fires codes formally regulate building circulation to prevent problems with the movement of people that may occur due to wrong building design (Lee et al., 2010). Basic considerations in building design are:

- Occupant load (normal building use, including circulation)
  - Population characteristics (crowd movement efficiency)
  - Orientation and path finding
  - Route redundancy
  - Security (movement safety and distance to exits)
- (Pauls, 1984)

**Patient flow and specific population** The patient flow of the specific population of this study holds the physical movement of outpatients from the pain and neurology diagnosis teams of Beatrixoord. Two factors of movement are relevant to this study; the distance of the movement and the routes that are taken in the movement. The distance an outpatient is able to cover depends on the

health condition of each specific outpatient. Literature on this specific topic is limited; therefore practical examples will be used as a benchmark.

The Dutch government uses a very specific distance to determine whether somebody is granted handicapped parking lot privileges. By rule it is set that the person is not able to walk 100 meter (with use of tools like crutches or a walker) (overheidsloket, 2011). Another practical example that gives an indication of the distances that rehabilitation patients are able to cover is the distance of the practice walking routes that are used at Beatrixoord. These routes are used in rehabilitation programs of Beatrixoord's patients and cover respectively 310 meter, 400 meter, 650 meter and 1750 meter.

The above led to the first sub-question of the concept objective patient flow:

What distance do outpatients cover inside Beatrixoord?

The second factor of movement that is relevant to this study is the routes that are taken in the movement. Research on wayfinding and navigation show that a greater number of routes may cause that people will get lost more often (Weisman, 1981). No literature was found on the exact number of different routes that will cause problems to occur in the patient flow. Navigational skills vary greatly among persons and this is even greater among the population of this study. Since neurology patients often cope with cognitive problems that disturb orientation and coordination. A general remark by Pauls (1984) is that simplicity in all access and movement routes lessens the need for directional graphics and improves safety. As mentioned in the previous section do building-design guides prescribe that, amongst other precautions, route redundancy improves safety conditions. That is why the following sub-question was formed:

Which routes are taken most often in Beatrixoord?

### 3.1.2 MEASURING PATIENT FLOW

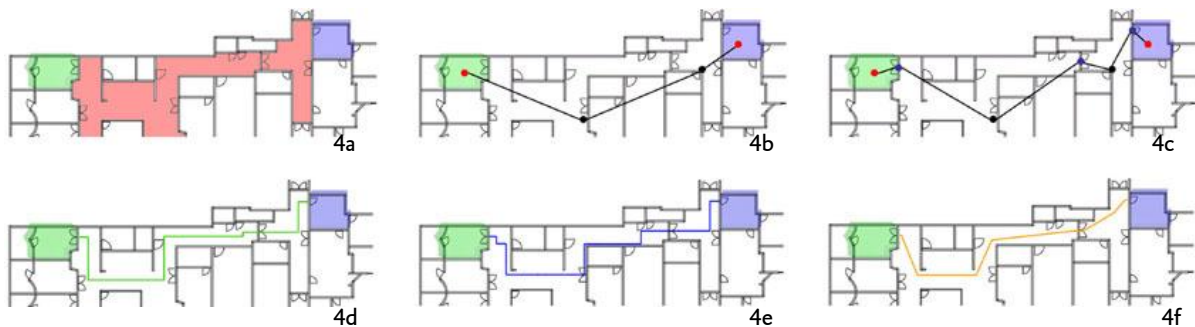
The previous section showed consequences of wrong building circulation and the importance of monitoring the patients flow and safety code compliance. Building Information Modelling (BIM) technologies make it easier to check for code compliance and constructability. Nonetheless, determining the actual building circulation using a

specific and consistent method remains difficult (Lee et al., 2010).

A critical issue in building circulation is the path people take when moving from one space to another. People tend to walk along the shortest, most visible, easiest path. However, not all people follow the same path due to variation in (navigational) knowledge of the environment and personal preferences. This section discusses a method that measures the typical paths taken by people within a given building, rather than the free circulation of individuals. These typical paths represent the objective patient flow that is mostly defined by a given building model.

A graph-based approach called Universal Circulation Network (UCN) can be used to put the objective patient flow taken by people within a given building in a graphic model (Lee et al., 2010). Graph-based approaches for representing and analysing building circulation are commonly accepted

for the efficiency and simplicity of its method (Werner et al., 2000). Figure 4 shows several graph-based approaches of representing building circulation. The UCN method (figure 4f) uses the geometry of a building and its spatial topology instead of external factors that are uncontrollable to determine routes. The UCN method also holds into account that people walk along the shortest, easiest and most visible route (Lee et al., 2010). Using the UCN method it is possible to put the objective patient flow into a graphic model. This is very useful in the design of a new building because UCN makes it possible to draw several building layout scenarios in order to find the ideal objective patient flow. This gave rise to the sub-question: What change in distance has a noticeable effect on the perceived distance? This sub-question contains the concept 'perception'; this is a complex concept and will be elaborated on in the following paragraph.



**Figure 4** Graph-based approaches of representing building circulation.

4a: Spaces without graphs; 4b: Topological graph; 4c: Topological graph with door vertices; 4d: Centre-line-based metric graph; 4e: Metric graph; 4f: Metric graph as the universal circulation network (Lee et al., 2010, p. 630).

### 3.2 PERCEPTION

Gibson's approach of perception emphasizes how observers pick up information from the environment. The first main point of Gibson's approach is that the visual space of observers is defined by information on environmental surfaces (for example texture gradients). The second main point is that crucial information for perception is information that remains invariant as the observer moves through the environment. The third main point is that invariant in-

formation is picked up directly without intervening mental processes (Goldstein, 1981). The building of Beatrixoord may serve as an invariant form of information. And patients mainly judge hospitals on what they encounter and experience instead of hospital's clinical competencies (Lee, 2003). The so called functional quality of the service (see paragraph 3.4) seems to be the distinguishing factor for the image of the service (Ward et al., 2005). Therefore the perception of the building of Beatrixoord is one of the concepts of this study.

The concept perception was operationalised in paragraph 2.1.4 (table 1) by three variables. The following paragraphs will discuss these variables. Firstly, the variable perceived service scape and its relationship with satisfaction will be discussed, secondly, the variable internal response and thirdly the variable perceived patient flow.

### 3.2.1 PERCEIVED SERVICE SCAPE

Kakkar & Lutz (1981) argue that the subjective evaluation of the environment rather than the objective situation determines the behaviour of the consumer. This subjective evaluation of the environment describes how the environment is perceived by the customer and is likely to be very useful for understanding and predicting the behaviour of the customer (Foxall & Hackett, 1994).

A service scape is defined as “the environment in which the service is assembled and in which the seller and customer interact, combined with tangible commodities that facilitate performance or communication of the service” (Booms and Bitner, 1981, p. 36). This definition describes the service scape as a complex mix of environmental features. To be more specific, the service scape consists of all the objective physical factors that influence employee and customer actions and can be controlled by the firm (Bitner, 1992). These factors could for example be the style of furnishing, temperature, layout, colour and lighting of a facility.

Consumers and employees are influenced by the physical design and atmosphere of a facility (Milliman, 1982; Bitner, 1992; Hagerman, Rasmanis, & Blomkvist, 2005; Fottler, 2000; Stichler, 2001; Cooper, 2010). Organisational behaviour studies show that the customer’s perception of the facility has impact on the perception of the service. This is because customers make assumptions about the organisation’s capabilities and quality based on the physical design, even before the service is actually delivered (Foxall & Hackett, 1994). Particularly in the service sector this may have great consequences because the service is often produced and consumed at the organisations facility.

Fottler (2000) describes four ways how the service scape is able to influence the processes and outcomes of organisations in the healthcare setting. The first way is by using the service scape to meet or exceed the customers’ expecta-

tions in the service experience. Secondly, it can be used to evoke a certain state of mind (mood) of customers and employees. Thirdly, the service scape may contribute to a memorable experience, which is a common marketing strategy to increase the likelihood that customers will return to the organisation. Fourthly, the service scape can be used to create a healing environment, which will be elaborated on further in this paragraph.

All together these four ways by which the service scape influences the processes and outcomes of the organisation may positively influence customer satisfaction (Fottler, 2000). And that is why the first sub-question of the concept perception is: How do outpatients perceive the service scape of Beatrixoord?

To be able to answer this sub-question, the variable service scape is operationalised into three dimensions; ‘ambient conditions’, ‘function’ and ‘signs & symbols’. These dimensions are part of the Environment-User framework of Bitner (1992) and will be discussed in the following section.

**Perceived service scape and satisfaction** Bitner’s Environment-User framework (see figure A1 of appendix A) is often used to explain the connections between the service scape, experiences of the customer and the satisfaction of customers (Bitner, 1992). The framework suggests that environmental dimensions influence how both employees and customers perceive the service scape. And it shows that by managing the service scape, organisations may be able to influence the behaviour of customers in a positive way, which may contribute to the achievement of organisational goals.

Bitner’s framework describes that the service scape consists of three environmental dimensions; the ambient conditions, the space/ function and the signs/symbols/artefacts. The effect on customers and employees by a single dimension is hard to predict because people respond holistically to their environment. The three dimensions of the service scape will be discussed further in the following.

**Ambient conditions** The first environmental dimension, ambient conditions, has been the subject of many researches and healing environment studies. Some found that ambient conditions like temperature, noise and



lightning influence the performance and job satisfaction of employees. Others found that ambient conditions may influence customer responses. For example Milliman (1982; 1986) found in his studies that music tempo can affect the pace of shopping, the amount of money spent and the time that customers stay in a restaurant or supermarket.

In healthcare organisations the effects of the environment and more specific the effect of ambient conditions on patients is studied by theories on healing environment. The theory of healing environment suggest that the environment of a health care setting may influence how quickly a patient recovers from or adapts to a specific health condition (Stichler, 2001). Research claims that healing environments have positive effects on several health indicators, like blood pressure, postoperative recovery, anxiety, length of stay and the use of analgesic medication (Ulrich, 1995). The support for the theory of healing environments increases, although the scientific evidence lacks robustness (Health Council of the Netherlands, 2009). Research on healing environment is fragmented and often the methodology employed is not valid enough.

Dijkstra et al. (2006) tried to order the fragmented researches on healing environment in their extensive literature review. They found nine studies on several ambient conditions. The most convincing results were found for the exposure to sunlight, although the effects showed to be highly dependent on the characteristics of the patient population. Research does show more convincing evidence for the positive influence of good, natural ventilation with fresh air and construction precautions that reduce noise nuisance and hospital-acquired infections (Hagerman et al., 2005). Research (Ulrich, 1984) also shows a positive effect on the recovery of patients due to the view on (real or depicted) natural landscapes. Which of the interventions is the most effective is not clear.

Taken the above into account the following sub-question was formed: How do outpatients perceive the ambient conditions of Beatrixoord?

**Function** The second environmental dimension of Bitner's framework is spatial layout and functionality. Spatial layout holds the way in which furnishing and equipment are arranged. Functionality is the ability of the users to perform

well thanks to the equipment, spatial layout and architectural features.

Dijkstra et al. (2006) found six studies in their healing environment literature review on the effects of architectural features. The outcomes showed some positive effects on clinical and psychological outcomes, however statistically the outcomes were non-significant on several measures. Moreover, the methodological part of the studies contained flaws, which makes the outcomes even less valid. Eleven studies were reviewed that studied multiple interior design features. Some of the studies found positive effects for patients' environmental appraisal. But the studies showed conflicting outcomes for social behaviour and no effects on clinical outcomes.

However the spatial layout logically has an effect on the functionality of the environment. The layout and furnishing of an airport check-in could for example cause problems in the queuing of customers. And changes in the layout could speed up the flow of interactions between customers and employees (Bitner, 1992). Another example is the study of Zamora et al. (2008) on the perception of the flooring design and environment among the elderly. They found that the design of floors in combination with the right lighting can elicit a perception of safety among elderly. The texture of the floor was found to be the most important design element, smoothly profiled floors were perceived as safe and shiny floors were perceived as unsafe. Architectural features that contribute to feeling unsafe are not functional in the rehabilitation setting. Taken the above into account the following sub-question was formed:

To what extent do outpatients find the rooms of Beatrixoord functional for rehabilitation?

**Signs & symbols** Sign, symbols and artifacts are the third environmental dimension of Bitner's framework and can be used as explicit or implicit signals that communicate about the facility to its users. Firm image can be set by implicit cues in the signs, symbols and artifacts. And signs on the in/exterior of the facility can be used as explicit communication to communicate rules of behaviour or for directional purpose (Bitner, 1992). Public buildings with low degrees of wayfinding signs may receive angry and hostile responses from its users (Dixon, 1986; Berkeley, 1973). On the other hand good wayfinding signs can positively affect customer and staff behaviour and satisfaction (Cooper, 2010). That is

why the following sub-question was formed:

To what extent do outpatients perceive that the signs & symbols of Beatrixoord contribute positively to their way-finding experience?

### 3.2.2 INTERNAL RESPONSE

According to Bitner's well known framework will the perception of the environment lead to internal responses (Bitner, 1992). These internal responses caused by the service scape mediate how employees and customers behave. Depending on the internal response a so called approach or avoidance behaviour may occur. Approach behaviour represents positive behaviour like spending money, staying longer and returning, whereas avoidance behaviour has opposite, negative effects. This implies that organisations that provide interpersonal services, like hotels, schools and hospitals should hold into account how the design of a service scape may influence the internal response of both employees and customers (Bitner, 1992). Considering the above the second sub-question of the concept perception is: How do outpatients internally respond to Beatrixoord's building?

Internal responses consist of several forms of responses (Bitner, 1992). For example the possibility of contacting an elevator operator in case of emergencies could give an internal response of feeling safe. Another response of employees on the service scape is for example the categorising of colleagues based on office sizes. Or the expectation of food quality based on the atmosphere of the service scape. The expectations could be different for a fast food restaurant or a dining restaurant based on the atmosphere of the service scape. Taken the above into account the following two sub-questions were formed:

What atmosphere do outpatients subscribe to Beatrixoord?

To what extent do outpatients feel safe at Beatrixoord?

### 3.2.3 PERCEIVED PATIENT FLOW

The third variable of the concept perception is perceived patient flow. Chapter 3.2.1 defined patient flow as; the physical movement of patients throughout a healthcare chain (Vissers & Beech, 2005). In this study patient flow is restricted to the narrower definition of; the physical movement of outpatients inside the building of Beatrix-

oord.

The variable perceived patient flow relates to the concept of objective patient flow, this is however not a straightforward linear relationship (Weisman, 1981; Fukusima et al., 1997). That is why the third sub-question of the concept perception is: How do outpatients perceive the outpatient flow in Beatrixoord?

To be able to answer this sub-question, perceived patient flow is operationalised by two dimensions: perceived distance and perceived wayfinding. This paragraph will discuss these dimensions.

**Perceived distance** As mentioned before, the perceived distance is related to the objective distance but this is not a straightforward linear relationship. A major goal in vision research is to characterise the mapping from physical to visual environment. This could lead to predicting the visually perceived environment by sensory inputs (for example signage) and internal determinants (for example observer's assumptions) (Fukusima et al., 1997). Environment perception research distinguishes two forms of perceived distance; egocentric distance (the distance from the object to the observer) and exocentric distance (the distance between any two locations). The focus of this study is on the former, it involves how the outpatient perceives the distance from him or herself to the healthcare provider's location.

Weisman (1981) studied the effect of several building variables on the perceived distance. Weisman (1981) found that routes with many turns are perceived as being longer and called this the route angularity effect. He also found that persons perceive a route as being longer when they have to process a lot of information, like intersections. Research by Moeser (1988) showed that familiar routes are perceived as shorter than unfamiliar routes. Research shows that in general the perception of egocentric distance is misperceived when visual cues to distance are reduced greatly. Research regarding egocentric distance (in environments with full cues) show that the perceived distance is nearly linear with the physical distance for targets within 20 meter (Fukusima et al, 1997). Taken the above into account the following sub-question was formed: How do outpatients perceive the distance they cover at Beatrixoord?

**Perceived wayfinding** The second dimension of the variable perceived patient flow is perceived wayfinding. Wayfinding is defined by the degree to which a building enables users to find their way within it (Weisman, 1981). Wayfinding requires the right encoding, processing and retrieval of information from the environment by its visitors, the ability to do so varies greatly among persons (Fortin et al., 2008). This section discusses the consequences of the extent to which an environment enables wayfinding.

Hospitals and other healthcare facilities often expand over time because of strategy changes, integration or mergers. They can become a complex maze of disorienting spaces and annexes. On top of this, complex medical terminology and the often high stress levels among visitors and patients make hospitals difficult to navigate (Cooper, 2010). The fact that hospitals consist of different departments and often have several annexes may have a larger impact on the wayfinding experience of patients than the impact of their health conditions (Rousek & Hallbeck, 2011). Research on customer satisfaction with a new convention centre in Birmingham showed that the appraisal of the place by its users consisted of four factors; atmosphere, centre environs, the centre's physical features and wayfinding (Foxall & Hackett, 1994).

Weisman (1981) discusses earlier studies (Dixon, 1986; Berkeley, 1973) that showed how public buildings with low degrees of enabling wayfinding resulted in angry and hostile responses from its visitors. On the other hand Cooper (2010) found that proper wayfinding systems can positively affect the behaviour and perception of staff, patients and visitors. Ultimately it can affect patient satisfaction and the morale of staff. Cutting (1996) adds that awareness of the surrounding environment may result in more safety during wayfinding. Gifford et al. (2006) state that applying architectural, graphical and organisational principles may reduce patient stress and anxiety and ultimately may lead to improved patient outcomes, profitability and staff utilisation. Furthermore they state that a high degree of enabling wayfinding is synonymous with optimal patient flow. Wayfinding can be improved by regulatory giving information, direction and orientation by the use of graphics like signs, maps, banners, colour coding and websites. Tactile communication like textured floors and raised lettering can also improve the degree of wayfinding (Arthur & Passini, 1992). The use of 'landmarks' like furniture and artwork has

also been the topic of research on wayfinding (Raubal & Winter, 2002; Roger et al., 2009; Salmi, 2007). It showed that people use landmarks in their spatial reasoning and communication of routes but also to mark and remember a path. Especially people with cognitive or visual impairments and those who cannot read the native language or cannot read at all rely heavily on landmarks to find their way. Taken the above into account the following sub-question was formed: To what extent do outpatients think it is hard to find locations in Beatrixoord?

### 3.3 PATIENT SATISFACTION

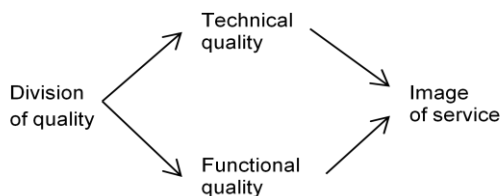
This paragraph starts with a definition of the concept satisfaction. This is followed by ways of measuring satisfaction and more specific patient satisfaction.

**Definition of satisfaction** There are many definitions of satisfaction that all differ slightly from each other. Hallowell (1996) defines satisfaction as the result of a customer's perception of the received value, where value stands for the perceived service quality relative to the price. The definition of Oliver (1981, p.27) describes satisfaction as a "psychological state resulting when the emotion surrounding disconfirmed expectations is coupled with the consumer's prior feelings about the consumption experience". This study uses the broad definition of Rust and Oliver (1994) who define satisfaction as; the evaluation of an emotion that reflects the degree to which a consumer believes that a service provides positive feelings.

**Measuring satisfaction** Measuring patient satisfaction is very complex. The SERVQUAL questionnaire of Parasuman et al. (1988) analyses ten dimensions of service quality and their relationship to satisfaction. The SERVQUAL questionnaire was adapted to the healthcare sector which resulted in the measurement of the following five dimensions; reliability, responsiveness, assurance, empathy and tangibles. In recent years the SERVQUAL has received criticism as research shows that it is not complete for measuring satisfaction in the healthcare sector (Bowers et al., 1994). Therefore this study is not based on the SERVQUAL study but on other theories as will be explained in the following.

In the service management literature it is argued that several factors determine the customer satisfaction. That is why patient satisfaction is measured in this study by three variables that cover different factors of satisfaction. Research by Fornell et al. (1996) suggests that the first determinant of overall customer satisfaction is perceived quality. Parasuraman et al. (1988) define perceived service quality as “the degree and direction of discrepancy between consumers’ perceptions and expectations” (Parasuramen et al., 1988, p. 16). And they state that perceived service quality is related but not equivalent to customer satisfaction. They explain the difference by the following: “perceived service quality is a global judgment, or attitude, relating to the superiority of the service, whereas satisfaction is related to a specific transaction” (Parasuramen et al., 1988, p. 16).

Grönroos (1984) made a distinction between technical and functional quality that together form the content of the image of a service (see figure 5). Technical quality is defined by the degree of following technical norms and procedures, whereas functional healthcare quality is defined by the way in which the healthcare service is delivered (Ward & Paterson, 2005).



**Figure 5** Grönroos’ divisions of quality.

Healthcare providers are assumed to be better equipped to judge technical quality than patients who lack knowledge on technical quality. Patients often find the majority of healthcare providers equal in technical proficiency and consider the technical quality as satisfactory. This makes functional quality the factor that distinguishes the image of healthcare service (Ward et al., 2005). Lee (2003) suggests that patients mainly judge hospitals on what they encounter and experience instead of clinical competencies. That is why this study only focuses on the functional quality of care

and does not intent to measure how satisfied patients are with the technical quality of care. From the concept of functional quality this study focuses on the specific subject of the building. Therefore the first sub-question of the concept satisfaction is:

Are outpatients overall content with the building of Beatrixoord?

**Measuring patient satisfaction** Satisfying customers is a common goal in the service industry. This is because of its potential influence on customer’s behavioural intentions of returning to the company and to recommend it to others (Seltman, 2004; Cronin, Brady and Hult, 2000; Fottler, 2000; Bitner, 1992). Therefore the second sub-question of the concept satisfaction is: Would outpatients return to Beatrixoord if they could choose?

Fornell et al. (1996) suggest that customer satisfaction consists of two dimensions, perceived quality and perceived value. Cronin et al. (2000) conducted an extensive research in different countries and different sector on the relationships between these two determinants and behavioural intentions. They found a significant indirect relationship involving satisfaction, value and behavioural intentions. Meaning that the value customers describe to the service influences their satisfaction and consequently their behavioural intension. Remarkably this effect was not significant for the healthcare sector. The effect of quality on behavioural intentions was also not significant for the healthcare sector. Theories of Grönroos (1984), Oswald et al. (1998) and Goodman et al. (1995) also found no direct relationship between these variables.

These findings show that the behavioural intensions of patients are not significantly influenced by the quality or the value patients describe to the service. Research by Seltman (2004) shows that patients often choose their medical care providers based on recommendation. This was reason for the third sub-question of the concept satisfaction: Would outpatients recommend Beatrixoord to others?

This chapter provided a theoretical framework that elaborated on the concepts of the conceptual model. The next chapter will show the results of this study per concept of the conceptual model.

## 4 RESULTS

Be reminded that the research question of this study was:

What is the influence of the building's layout on the outpatient's objective flow and perception and how does this perception influence the outpatient's satisfaction?

In order to answer this research question in a structured way several sub-questions were formed. These sub-questions are answered in this chapter per concept of the conceptual model. The structure of this chapter will again follow the structure of the conceptual model, after discussing the results of the composition of the samples and the reliability and validity of the questionnaire.

Paragraph 4.1 presents the results of the composition of the sample. Paragraph 4.2 shows the results of the reliability and validity test of the questionnaire. Chapter 4.3 presents the results of the concept objective patient flow. Paragraph 4.4 displays the results of the three variables of the concept perception. Paragraph 4.5 shows the correlation between the variables of the concepts perception and satisfaction. Variables that showed enough correlation were analysed further by regression analyses. The results of the regression analyses are shown in paragraph 4.6.

### 4.1 COMPOSITION OF THE SAMPLES

Several methods (see table 2) were used in this study to gather data on the concepts of the conceptual model. For the concept objective patient flow data was gathered from appointment schedules. Data on the concepts perception and satisfaction were gathered by conducting a questionnaire. For each of these two data gathering methods a different sample was used. The following describes these two samples in detail.

**Objective patient flow sample** The population of Beatrixoord's outpatients (N= 3013) is grouped by medical diagnosis in nine different teams. Chapter 2.2 mentioned that the sample on the concept objective patient flow was taken from the pain (N=565) and neurology (N=681) diagnosis teams. These teams were chosen for two reasons.

Firstly, these diagnosis teams form the largest outpatient group. Together the two diagnosis teams form 41% (N= 1246) of the outpatient population of the CvR (CvR, 2010). Secondly, these diagnosis groups were chosen because they visit a broad range of healthcare providers. As mentioned in chapter 2.2 does the majority of rehabilitation outpatients consult a multidisciplinary team of healthcare providers. After applying the exclusion criteria the sample (n=123) consisted of 43 outpatients from the pain team and 80 outpatients from the neurology team.

**Perception and satisfaction sample** The second sample was taken from outpatients of all nine diagnosis teams (N=3013) and used to analyse the concepts perception and satisfaction. Outpatients that met the criteria mentioned in chapter 2.2.1 were included. The sample (n=102) was a good representation of Beatrixoord's outpatient population, all diagnosis teams and age levels were represented in the sample. And the largest diagnosis groups and age levels in the population were also represented by the largest numbers in the sample. A detailed description of the sample can be found in table A2 of appendix A.

### 4.2 RELIABILITY AND VALIDITY OF THE QUESTIONNAIRE

Even though there has been a considerable increase in the development of instruments that measure patient's perspective in the last 10 to 15 years, no measurement instrument was found that covered the topic of this study close enough. Because the existing instruments often focus on the technical quality of care and do not fully cover patient's perception of the functional quality of care (Middel, 2002). The author developed a questionnaire based on the literature study of chapter 3. The questionnaire focusses on the functional quality of care and specifically on outpatient's perception of the layout of the building. The reliability and validity of the questionnaire were tested using Cronbach's alpha and factor analyses. The reliability of the questionnaire was determined by calculating the internal consistency of the items per variable. The internal consistency is called Cronbach's alpha coefficient and shows how well the

different items complemented each other in measuring different aspects of the same variable (George & Mallery, 2003). Items that lowered the internal consistency of a variable were excluded from the results to obtain the highest reliability possible. Furthermore the questionnaire was tested for its validity by a factor analyse. Again items that were loaded for a different factor or showed too low factor loadings were excluded from the results to obtain the highest validity possible. The result of the factor analyses and the internal consistency coefficients are shown in table A3 of appendix A and will be discussed below.

The concept perception consisted of two variables measured by several questionnaire items. The two variables were perceived service scape and perceived patient flow. Table A3 of appendix 3 showed that the items of the variable perceived service scape show poor ( $\alpha = 0.58$ ) internal consistency, meaning that the scale should be used with caution. The factor loadings of perceived service scape showed that not all items loaded for the same factor. The items that loaded for a different factor were excluded from the results. Excluding these items left three items that loaded for the same dimension ( $r > 0.6$ ) these items were 'clean', 'accessible' and 'suitable for rehabilitation'. The item 'good signage' showed a poor factor loading ( $r = 0.51$ ). Since the internal consistency of the items was poor but the factor loadings were convincingly high enough, the items of the concept perception were treated as single items.

The variable perceived patient flow showed an acceptable internal consistency ( $\alpha > 0.70$ ) for its items, meaning that this variable shows reliable results. The factor loading of the item 'different locations' ( $r = -0.40$ ) showed not enough consistency with the other items and was therefore excluded from further analyses. The first three items of perceived patient flow showed high ( $r > 0.7$ ) factor loadings, however the item 'hard to find locations' lowered the internal consistency. Therefore it was decided to treat all the items of the variable perceived patient flow as single items. The patient satisfaction items showed low internal consistency ( $\alpha < 0.5$ ), meaning that these three items do not complement each other too well in measuring the different aspects of satisfaction. Therefore the items were treated as three single items.

#### 4.3 OBJECTIVE PATIENT FLOW RESULTS

The management and healthcare providers of Beatrixoord assume that the building's layout causes that their outpatients walk great distances and to a lot of different places in the building. To gain insight in the actual situation of these assumptions the concept objective patient flow was analysed. Using the UCN method as mentioned in chapter 2.2 the objective distance and number of routes that outpatients take were analysed.

##### 4.3.1 RESULTS OBJECTIVE DISTANCE

The objective patient flow of the sample was analysed using the UCN method in order to answer the sub-question: What distance do outpatients cover inside Beatrixoord?

The results showed that:

Outpatients covered a mean distance of 276 meter ( $\sigma = 116$  meter) per day (see table 3) and 58 % of the outpatients covered a total distance between 201 and 400 meters (see table 4).

These results are elaborated on in the following.

Table 3 shows that the shortest distance that outpatients covered per day was 86 meter, the longest distance was 782 meter and the mean distance was 276 meter with a standard deviation of 116 meter. The large standard deviation was caused by the difference in number of routes patients covered. This difference can be explained by the number of appointments patients had during a day, ranging from 1 to 4 appointments per day.

(Be reminded that the distance of each route is displayed in table B1 of appendix B and note that the letters in table B1 of appendix B correspond with the letters of the inscription of the maps of Beatrixoord displayed in figure B1 of appendix B.)

(n=123)	Shortest	Longest	Mean	Standard deviation
Total distance (m)	86	782	276	116

**Table 3** Total distance covered on one day.

Table 4 shows that most outpatients covered more than 200 meter per day. And almost all outpatients covered a distance between 101 and 400 meter. To be more specific the largest part of the outpatients covered 201-300 meter followed by 301-400 meter and 101-200 meter (see table 4). A complete overview of the total distances can be found in table B3 of appendix B.

Total distance (m)	Percentage (n=123)
101-200	25 %
201-300	30 %
301-400	28 %

**Table 4** Grouped total distance frequencies.

#### 4.3.2 RESULTS DIFFERENT ROUTES

Analyses of the objective patient flow answered the following sub-question: Which routes are taken most often in Beatrixoord?

The results showed that: outpatients most often (55%, n=376) took the routes that started at the main entrance or the back of the I wing and ended at either the T wing, the far end of the B wing and to the back of the I wing (see table 5). The following elaborates on these results.

Table 5 shows that the most common route was from the main entrance (HI) to the T wing in the basement (K). The second most common route was from the main entrance (HI) to the far end of the B wing on the first floor (Ba). The third most common route was from the main entrance (HI) to the back of the I wing in the basement (I) and the route from the back of the I wing in the basement (I) to the T wing in the basement.

Analyses of the sample's appointment schedules showed that 29 different routes were followed in Beatrixoord's building to meet the healthcare providers (see table B1 appendix B). The 29 routes were used 376 times in total during one week. This means that some outpatients of the sample (n=123) used more than one route per day and on average outpatients used three different routes per day. The frequency column in table B1 of appendix B shows how often each route was taken.

Route	Percentage (n=376)
HI.K	15 %
HI. Ba	14 %
HI.I	13 %
I.K	13 %

**Table 5** Percentage of frequency of routes.

#### 4.3.3 RESULTS FUTURE POSSIBLE CHANGES

By using the UCN method the objective patient flow of a possible future building layout was analysed and answered the following sub-question: What change in distance has a noticeable effect on the perceived covered distance?

The results of the analyses showed that: the current mean distance of 276 meters has to decrease to 185 meters to have a large noticeable effect on the perceived distance or decrease to 219 meter to have a moderate noticeable effect (see table 6).

The following elaborates on these results.

A possible future layout of the building was developed in cooperation with Beatrixoord's healthcare providers and an external consultant. This possible future layout as displayed in figure B2 of appendix B would change the location of several healthcare providers. The main changes for the sample would be that all the healthcare providers for the pain rehabilitation patients will be located at the ground floor in the L wing and R wing. And the neurology healthcare providers will be located at the first floor in the M and F wing.

The future layout plan describes in what wing the healthcare providers will be located but does not describe the exact location. This made it impossible to analyse the exact difference in objective distance between the current and future layout. Instead the difference in distance that is needed to evoke a difference in the perceived distance of outpatients was calculated. This minimal change between the current and future distance was calculated using the effect size ratio of Middel (2002). The theory behind the effect size ratio is that not the statistical significance of the differences between the experimental and control group, but the relevance or importance of the outcomes matters. In this study the relevance of the difference between the current and future layout is whether or not outpatients no-

tice the difference in distance they have to cover. Table 3 showed that the current mean of the total objective distance covered by outpatients on one day was 276 meters. Middel's effect size ratio was used to calculate the future mean distance that is needed to have a noticeable effect on the distance perception of outpatients. The calculation used to find this future mean can be found in table B4 of appendix B. The future total objective distance should go down to a mean of 185 meter to have a large noticeable effect on how outpatients perceive the distance. To have a moderate noticeable effect the future mean objective distance should go down to 219 meter (see table 6). The total objective distance could be decreased in two ways. Firstly, the healthcare providers are strategically positioned at locations near to other healthcare providers and the entrance/ exit. Secondly, the routes are shortened by removing excessive meters caused by for example restricted areas.

Effect size ratio	Current mean	Future mean
Large(0.8)	276 (m)	185 (m)
Moderate(0.5)	276 (m)	219 (m)

**Table 6** Current vs. future mean total objective distance.

#### 4.3.4 Summary results objective patient flow

The results of the objective patient flow analyses showed that outpatients covered a mean distance of 276 meter per day and most of the outpatients covered a total distance between 201 and 400 meter. The routes that were taken most often started at the main entrance or the back of the I wing and ended at either the T wing, the far end of the B wing and to the back of the I wing. And the current mean distance of 276 meters has to decrease to 185 meters to have a large noticeable effect on the perceived distance or decrease to 219 meter to have a moderate noticeable effect.

## 4.4 PERCEPTION RESULTS

The concept of perception was analysed by conducting a questionnaire. This paragraph starts by displaying the descriptive statistics of the questionnaire results. Secondly, the results are displayed in frequency tables per variable of

the concept perception. The paragraph ends with a summary of the results.

### 4.4.1 DESCRIPTIVE STATISTICS PERCEPTION

The descriptive statistics of the questionnaire showed that:

Outpatients feel safe at Beatrixoord and they are content with the ambient conditions and functionality of the building. However the outpatients do mention ambient conditions that they do not find pleasant. And outpatients are clearly less content with the patient flow and signs & symbols in the building (see table 7). The following elaborates on these results.

Table 7 shows the descriptive statistics of the questionnaire's results. The scale of the questionnaire ranged from 1 (totally disagree) to 7 (totally agree). The mean scores ( $\mu$ ) show that the outpatients either strongly agree ( $\mu \geq 6$ ), slightly agree ( $5 > \mu > 4.5$ ) or do not agree nor disagree ( $4.5 > \mu \geq 3.5$ ) with the questionnaire items.

The variable perceived service scape showed high mean scores with small standard deviations on the dimensions of ambient condition and function ( $\mu=6.2$ ,  $\sigma= 1.1$ ;  $\mu=6.3$ ,  $\sigma= 1.3$ , see table 7). This implies that the outpatients were content with the cleanliness and functionality of the building.

The results on the variable perceived outpatient flow and the dimension signs & symbols show lower mean scores with high standard deviations ( $4.9 \geq \mu \geq 4.2$ ,  $2.3 \geq \sigma \geq 2.0$ , see table 7). This implies that the outpatients are less content or neither content nor discontent with the signs & symbols and the outpatient flow. However, the large standard deviations show that the perception differed greatly among the sample. Given these high standard deviations the mean scores are likely a simplified and misleading presentation of the actual results. The next section will clarify this by showing frequencies of the perception item results.



Variable	Dimension	Questionnaire item	$\mu$	$\sigma$	n
Perceived service scape	Ambient condition	Clean	6.2	1.1	92
	Function	Suitable for rehabilitation	6.3	1.3	96
	Signs & symbols	Signage make wayfinding easy	4.3	2.0	96
Internal response	Feel safe		6.5	0.9	92
Perceived outpatient flow	Perceived distance	Locations are distant from each other	4.2	2.3	84
		Covering distance tires me	4.3	2.3	87
		Do not mind the distance	4.9	2.2	87
	Perceived wayfinding	Hard to find locations	4.7	2.1	86

**Table 7** Descriptive statistics of concept perception.

#### 4.4.2 FREQUENCIES OF PERCEPTION

This paragraph presents the frequency results of the questionnaire by answering the sub-questions for each of the three variables of the concept perception. Firstly, the frequency results of perceived service scape are presented, secondly of internal response and thirdly of perceived outpatient flow. Table C1 in appendix C gives a complete overview of the frequencies per item of the questionnaire.

**Perceived service scape** The mean scores of the variable perceived service scape showed that outpatients are very content with the ambient conditions and functionality of the building ( $\mu=6.2$ ,  $\sigma= 1.1$ ;  $\mu=6.3$ ,  $\sigma= 1.3$ , see table 7). However, they are clearly less content with the signs & symbols in the building ( $\mu=4.3$ ,  $\sigma= 2.0$ , see table 7).

The frequency table results of the dimension ambient conditions are summarised by answering the sub-question: How do outpatients perceive the ambient conditions of Beatrixoord?

The outpatients perceive Beatrixoord's building as clean but more than half of the outpatients perceive at least one ambient condition as unpleasant. The temperature was mentioned most often as unpleasant, followed by noises, air quality and dark corridors. The following elaborates on the results of the dimension ambient conditions.

The dimension ambient conditions consisted of two items

of which one was measured on an ordinal scale and the other on a nominal scale. The results on the first item showed that 85.3% (n=87) of the outpatients perceived Beatrixoord's building as clean (see table C1 appendix C).

This second item of ambient conditions was measured on a nominal scale with multiple response options. It showed which ambient conditions the sample perceived as 'not pleasant'. Calculating a mean or standard deviation on a nominal level is simply not possible. However, displaying the frequencies for each response option of the scale was possible.

The results showed that 57.8% (n=59) of the sample perceived at least one ambient condition as 'not pleasant' (see C2 of appendix C). Some of the cases perceived more than one ambient condition as 'not pleasant', resulting in a total of 71 responses. The 'percent of responses' column of table C2 shows that 37 % (n=26) of these responses consisted of the ambient condition temperature. The column 'percent of cases' showed the percentages of cases that perceived at least one ambient condition as not pleasant and excluded the cases that did not perceive any ambient condition as 'not pleasant'. It showed that in case at least one ambient condition was perceived as unpleasant, this was in 45.8% of the cases 'temperature', 25.4% of the cases noises, 22% of the cases 'air quality' and in 13.6% of the cases 'corridors are too dark'.

The second sub-question of the variable perceived service scape was:

To what extent do outpatients find the rooms of Beatrixoord functional for rehabilitation?

The results showed that the majority of the outpatients (88%,  $n=90$ , see table C1 of appendix C) find Beatrixoord's rooms functional for their rehabilitation.

The third sub-question of the variable perceived service scape was:

To what extent do outpatients perceive that the signs & symbols of Beatrixoord contribute positively to their wayfinding experience?

The results showed that outpatients differ in how they perceive the contribution of the signs & symbols in their wayfinding experience. One part of the outpatients finds that the signs & symbols of Beatrixoord contribute to their wayfinding experience 52% ( $n=53$ ) and the other part finds that they do not contribute to their wayfinding experience 43% ( $n=44$ ) (see table C1 appendix C). The frequency table shows that the descriptive statistics of table 7 ( $\mu=4.3$ ,  $\sigma=2.0$ ) gave a misleading impression that the sample does not agree or disagree with the item 'the signs and symbols in the building make it easy to find locations inside the building'.

Overall, the results of the variable perceived service scape showed that outpatients are content with the functionality of the service scape but more than half perceived some of its ambient conditions as unpleasant and only half of the outpatients find that the signs & symbols positively contribute to their wayfinding experience.

**Internal response** The second variable of the concept perception was internal response. Internal response was measured by two dimensions, subscribed atmosphere and the extent of feeling safe. The descriptive statistics of the internal response only displayed the results of the extent to which outpatient's feel safe ( $\mu=6.5$ ,  $\sigma=0.9$ , see table 7), since the atmosphere that outpatients subscribe to Beatrixoord was measured on a nominal scale. The results showed that the majority of the outpatients feel safe at Beatrixoord. Furthermore, the results showed that outpatients describe the atmosphere of Beatrixoord most often as relaxed, warm and old fashioned.

The following describes the results in more detail.

The results show that 89.1% ( $n=91$ ) of the sample feel safe at Beatrixoord (see table C1 of appendix C). The atmosphere outpatients subscribe to Beatrixoord was measured on a nominal scale by a multiple response set with 11 options. Table C2 of appendix C shows that 97% ( $n=99$ ) of the sample choose at least one atmosphere to describe Beatrixoord. Some respondents choose several options, resulting in 166 responses in total. Leaving out the cases that did not respond, the atmosphere was most often perceived as 'relaxed' (38.4%,  $n=64$ ), secondly as 'warm' (24.2%,  $n=40$ ), and thirdly as 'old fashioned' (22.2%,  $n=37$ ).

Overall, the results of the variable internal response showed that outpatients feel safe at Beatrixoord and describe its atmosphere as relaxed, warm and old fashioned.

**Perceived outpatient flow** The third variable of the concept perception was perceived patient flow. The mean scores of table 7 showed that outpatients slightly agree or do not agree nor disagree with the items of perceived patient flow ( $\mu=4.2$ ,  $\sigma=2.3$ ;  $\mu=4.3$ ,  $\sigma=2.3$ ;  $\mu=4.9$ ,  $\sigma=2.2$ ;  $\mu=4.7$ ,  $\sigma=2.1$ ). The large standard deviations showed that the perception differed greatly among the outpatients and the mean scores are likely a simplified and misleading presentation of the actual results.

The results of the frequency table C1 in appendix C clarify this result and answered the sub-question: How do outpatients perceive the outpatient flow in Beatrixoord?

The perception of the outpatient flow was divided by a group of outpatients that perceived the outpatient flow as good and a group that perceived the outpatient flow as not good.

The following describes this result more detailed.

The variable perceived patient flow was measured by two dimensions, wayfinding and perceived distance. The dimension perceived distance, was measured by three questionnaire items. The results showed that the perception of the distance was split into two opposite groups (see table C1 of appendix C). One group of the sample perceived the locations as 'distant from each other' (44.4%,  $n=45$ ) and the other group as 'near to each other' (39.0%,  $n=40$ ). This split was also found for whether or not covering the distance between two appointments was perceived as tiresome or not (agree 38.3%,  $n=39$ , disagree 47.1%,  $n=48$ ). The last

item showed that just over half of the outpatients do not mind to cover the distance between the different locations (56.9%, n=58 do not mind, 13.7%, n=14 does mind).

To summarize these findings the following sub-question was answered: How do outpatients perceive the distance they cover at Beatrixoord?

The results showed that outpatients differ in how they perceive the distance they cover at Beatrixoord. One group perceives the locations as distant from each other and finds it tiresome to cover the distance between the locations. Whereas the other group of outpatients perceives the locations as near to each other and does not find it tiresome to cover the distance between the locations. Furthermore the results showed that more than half of the outpatients do not mind to cover the distance between the locations. The frequency table C1 of appendix C showed the results on the second dimension of perceived outpatient flow and answered the sub-question: To what extend do outpatients think it is hard to find locations in Beatrixoord? The results showed that 35.3% (n=36) of the outpatients agreed and 49% (n=50) of the outpatients disagreed that it is hard to find the locations in the building.

Overall, the results of the variable perceived outpatient flow showed that outpatients perceive the distance between the locations either as distant from each other or near to each other. The same holds for whether outpatients find it tiresome to cover the distance or not. The results also showed that more than half of the outpatients do not mind to cover the distance. And almost half of the outpatients think it is hard to find the locations in the building.

#### 4.4.3 SUMMARY RESULTS PERCEPTION

The concept perception was operationalised by three variables, perceived service scape, internal response and perceived patient flow.

Overall, the results of the variable perceived service scape showed that outpatients are content with the functionality of the service scape but more than half perceived some of its ambient conditions as unpleasant and only half of the outpatients find that the signs & symbols contribute positively to their wayfinding experience.

The results of the variable internal response showed that outpatients feel very safe at Beatrixoord and describe its atmosphere as relaxed, warm and old fashioned. And the results of the variable perceived outpatient flow showed that outpatients perceive the distance between the locations as far and tiresome to cover or not far nor tiresome. But more than half of the outpatients do not mind to cover the distance. And almost half of the outpatients think it is hard to find the locations in the building.

## 4.5 SATISFACTION RESULTS

The concept satisfaction was measured by three questionnaire items. The descriptive statistics of the questionnaire results are displayed firstly followed by the results of the frequency table.

### 4.5.1 DESCRIPTIVE STATISTICS SATISFACTION

The mean scores of the questionnaire showed that outpatients are satisfied. To be more specific, all three questionnaire items on satisfaction scored high means with small standard deviations ( $\mu \geq 6.0$ ,  $\sigma \leq 1.1$ , see table 8). The results showed that the majority of the sample was overall content with the spaces of Beatrixoord ( $\mu=6.0$ ,  $\sigma=1.1$ ), would recommend Beatrixoord to others ( $\mu=6.3$ ,  $\sigma=1.0$ ) and would choose to rehabilitate at Beatrixoord again ( $\mu=6.2$ ,  $\sigma=0.8$ ).

Variable	Questionnaire item	$\mu$	$\sigma$	n
Satisfaction	Content with spaces	6.0	1.1	95
	Recommend to others	6.3	1.0	85
	Return	6.2	0.8	96

**Table 8** Descriptive statistics of concept satisfaction.

### 4.5.2 FREQUENCIES OF SATISFACTION

The frequency table C1 of appendix C showed the results of the concept satisfaction and answered the following three sub-questions:

Are outpatients overall content with the building of Beatrixoord?

The result showed that the largest part of the outpatients (88.3%, n=90) were overall content with the spaces of Bea-

trixoord.

The second sub-question was: Would outpatients return to Beatrixoord if they could choose?

The results showed that the largest part of the outpatients (94.2%, n=96) would choose to rehabilitate again at Beatrixoord.

The third sub-question was: Would outpatients recommend Beatrixoord to others?

The results showed that the largest part of the outpatients (82.4%, n=84) would recommend Beatrixoord to others.

Overall, the results showed that the majority of outpatients are satisfied.

The previous paragraphs displayed the results of each concept of the conceptual model. The following paragraphs will display the results of the analyses of the relationships between the concepts perception and satisfaction.

#### 4.6 RESULTS CORRELATIONS PERCEPTION AND SATISFACTION

The previous paragraphs showed the results of the concepts objective patient flow, perception and satisfaction. The descriptive statistics were shown and the results were displayed in frequency tables for each variable of the concepts. In order to determine possible relationships between the variables a correlation analyses was conducted. The concept objective patient flow was analysed by a different sample as the concepts perception and satisfaction. The objective patient flow variables could therefore not be tested for possible correlations with the variables of perception and satisfaction.

The statistical programme SPSS 16.0 was used to determine correlations between all variables of the concepts perception and satisfaction. The result of this analysis is displayed in a correlation matrix in table D1 of appendix D. The correlation matrix showed that there were some significant correlations between items of the same variable and between items of different variables. Most of the significant correlations were moderate ( $0.3 < r \leq 0.5$ ) to strong ( $r > 0.5$ ), however some of the correlations were weak ( $0.3 \geq r > 0.1$ ) and should be used with caution. Table 9 is a concise version of the correlation matrix of table D1 of appendix D. The following elaborates on the moderate and strong correlations between the items of different variables.

**Perceived service scape** Table 9 shows that five significant moderate correlations were found between perceived service scape variables and variables of internal response, perceived outpatient flow and satisfaction. The first perceived service scape item 'accessible' had a moderate correlation with the internal response item 'feel safe' ( $r = 0.49$ ). The second perceived service scape item 'clean' also showed a moderate correlation with the internal response item 'feel safe' ( $r = 0.35$ ). Furthermore the item 'clean' showed moderate correlations with the perceived outpatient flow item 'do not mind the distance' ( $r = 0.37$ ) and the satisfaction item 'overall content with the building' ( $r = 0.33$ ). The fourth perceived service scape item 'good signage' showed a strong correlation with the perceived outpatient flow item 'hard to find locations' ( $r = 0.70$ ) (see table 9).

**Internal response** The internal response item 'feel safe' showed a significant moderate correlation with the perceived outpatient flow item 'do not mind the distance' ( $r = 0.37$ ) and the satisfaction item 'overall content with the building' ( $r = 0.32$ ) (see table 9).

**Satisfaction** The satisfaction item 'recommend to others' showed a moderate correlation with the perceived outpatient flow item 'do not mind the distance' ( $r = 0.31$ ). Overall, the analyses of the correlation matrix showed two remarkable findings. Firstly, it showed some significant moderate relations between items of the three perception variables. This means that there is a relationship between how outpatients perceive the service scape and how they internally respond and perceive the patient flow. Secondly, some significant moderate relationships were found between perception variables and satisfaction variables. This means that there is a relationship between how outpatients perceive the service scape and how satisfied they are. Significant moderate or strong correlations indicate that there is a relationship between the items; however this does not imply a causal relationship. This means that one item cannot be interpreted as the only or direct cause for change in the other item. To analyse whether the items cause a change in the other item a regression analyses was conducted. The results will be discussed in the following paragraph.

<b>Variable</b>	<b>Item</b>	<b>Internal response</b>	<b>Perceived outpatient flow</b>		<b>Satisfaction</b>
<b>Variable</b>	<b>Item</b>	3.2.1 Feel safe	3.3.1 Hard to find locations	3.3.4 Do not mind the distance	4.1 Overall content with the building
<i>Perceived service scope</i>	3.1.1 Accessible	0.49 **	0.14	0.24*	0.16
	3.1.2 Clean	0.35 **	0.10	0.37**	0.33**
	3.1.4 Good signage	0.16	0.70**	0.15	0.29**
<i>Internal response</i>	3.2.1 Feel safe	1	0.06	0.37**	0.32**
<i>Satisfaction</i>	4.2 Recommend to others	0.24*	-0.10	0.31**	0.05

\*\*= Correlation is significant at the 0.01 level

\* = Correlation is significant at the 0.05 level

**Table 9** Moderate and strong correlations between items of different variables.

#### 4.7 RESULTS REGRESSION ANALYSES

Regression analyses were conducted in order to forecast the satisfaction of outpatients based on their perception of the service scope, the outpatient flow and their internal responses.

Paragraph 4.7.1 shows the results of the regression analyses between items of the perception variables. Regression analyses between individual items were conducted because the items are treated as single factors, as explained in paragraph 4.2 (see table A3 of appendix A). Regression analyses were conducted on perception items that moderately ( $0.3 < r < 0.5$ ) or strongly ( $r > 0.5$ ) correlated to each other. Firstly, the results of the regression analyses of items of different perception variables are displayed. Secondly, the regression analyses results of items of the same perception variables are shown.

Paragraph 4.7.2 shows the results of the regression analyses between items of the perception and satisfaction concepts. Regression analyses were conducted on items with the strongest correlations between these concepts. Be reminded that most of these correlations were weak or moderate (see table D1 of appendix D). The results are shown per variable of the concept perception. Firstly, the results of the regression analyses between the perceived service scope items and the satisfaction items are displayed. Secondly, the results of the regression analyses of the internal response item and the satisfaction items are displayed. Thirdly, the results of the perceived patient flow items and the satisfaction items are shown.

##### 4.7.1 RESULTS REGRESSION ANALYSES BETWEEN ITEMS OF PERCEPTION VARIABLES

The regression analyses between the items of the perception variables showed that a positive change in some of the perception items caused a significant positive change in items of the same perception variable and in items of different perception variables.

Table D2 of appendix D shows the result of the regression analyses, the results are summarised in figure D1 of appendix D. The following elaborates on the most remarkable results.

**Items of the same perception variable** The regression analyses between items of the variable perceived service scope showed that variance in the degree to which patients find the building 'accessible' could be explained by two other items of the variable perceived service scope. The degree to which the building was perceived as 'accessible' could be explained for 26% by the degree to which outpatients perceived the building as 'clean' ( $R^2=0.26$ ,  $p<0.01$ ,  $\beta=0.51$ ) and for 23% by the degree to which outpatients perceived the building to be 'suitable for rehabilitation' ( $R^2=0.23$ ,  $p<0.01$ ,  $\beta=0.47$ ). This means that the perception of the cleanliness and suitability of the building significantly influences to what degree the building is perceived as accessible.

The regression analyses between items of the variable perceived outpatient flow showed that 41% of the variance in the item 'do not mind the distance' could be explained by variance in the item 'distance tires me' ( $R^2=0.41$ ,  $p<0.01$ ,

$\beta=0.64$ ). And 21% of the variance in the item 'distance tires me' could be explained by variance in the item 'locations distant from each other' ( $R^2=0.21$ ,  $p<0.01$ ,  $\beta=0.46$ ). This means that the degree to which the locations are perceived as distant from each other influences to what extent patients perceive covering the distance between locations as tiresome. And the degree to which the outpatients perceive covering the distance as tiresome influences whether or not outpatients mind to cover the distance between the locations.

**Items of different perception variables** The regression analyses between items of different perception variables showed that variance in some of the items of a perception variable had significant influence on the variance of items of another perception variable.

Variance in two items of the perceived service scape variable significantly explained variance in items of the internal response and perceived outpatient flow variables.

Firstly, variance in the degree by which the building was perceived as 'accessible' explained 24% of the variance of the internal response item 'feel safe' ( $R^2=0.24$ ,  $p<0.01$ ,  $\beta=0.49$ ). Secondly, variance in the degree by which the signage was perceived as good explained 49% of the variance in the perceived outpatient flow item 'hard to find locations' ( $R^2=0.49$ ,  $p<0.01$ ,  $\beta=0.70$ ). This means that the degree to which outpatients perceive the building to be accessible influences the degree to which they feel safe. And the degree to which outpatients perceive the signage to be good influences the degree to which they find it hard to find locations.

Overall, the regression analyses between the items of the concept perception showed that the perception of some of the perceived service scape items significantly influenced the perception of other perceived service scape items. This result also held for the perceived outpatient flow items. Furthermore, the perception of some of the perceived service scape items influenced the perception of the internal response item and the perception of the perceived outpatient flow items. Figure D1 of appendix D summarises these results.

The following paragraph shows the results of the regression analyses between items of the concept perception and

items of the concept satisfaction.

#### 4.7.2 RESULTS REGRESSION ANALYSES BETWEEN PERCEPTION AND SATISFACTION VARIABLES

The regression analyses between items of the concept perception and the concept satisfaction showed that variance in some of the perception items significantly predicted small changes in the satisfaction items. The following elaborates on these results by showing the results per variable of perception.

**Perceived service scape and satisfaction** The regression analyses between the items of perceived service scape and the items of satisfaction showed that a positive change in some of the perceived service scape items causes a significant but small positive change in the satisfaction of patients (see table D3 of appendix D). The following elaborates on these results.

- Variance in the satisfaction variable 'overall content with the building' could be explained by variance in two of the perceived service scape items: 10% could be explained by the item 'the building is clean' ( $R^2=0.10$ ,  $p<0.05$ ,  $\beta=0.33$ ). And 8% of the variance in the item 'overall content with the building' could be explained by variance in the perceived service scape item 'good signage' ( $R^2=0.08$ ,  $p<0.05$ ,  $\beta=0.29$ ).
- 5% of the variance in the satisfaction variable 'return to Beatrixoord' could be explained by the perceived service scape item 'good signage' ( $R^2=0.05$ ,  $p<0.05$ ,  $\beta=0.22$ ).

This means that the degree by which outpatients are overall content with the building is influenced by the degree to which they perceive the building to be clean and perceive the signage to be good. Furthermore, the degree to which outpatients believe they will return to Beatrixoord is influenced by the degree to which they perceive the signage as good.

**Internal response and satisfaction** The correlation matrix of table D1 in appendix D showed that the internal response item 'Feel safe' had a significant but weak relationship ( $r<0.5$ ) with variables of the concept satisfaction. The results of the regression analyses between the

internal response item and the variables of satisfaction showed that a positive change of the internal response causes a small positive change in the satisfaction of patients (see table D3 of appendix D). The following elaborates on these results.

- 10% of the variance in the satisfaction variable 'overall contend with the building' could be explained by the internal response item 'feel safe' ( $R^2 = 0.10$ ,  $p < 0.05$ ,  $\beta = 0.32$ ).
- 6% of the variance in the satisfaction variable 'recommend Beatrixoord to others' could be explained by the internal response item 'feel safe' ( $R^2 = 0.06$ ,  $p < 0.05$ ,  $\beta = 0.24$ ).

This means that the degree to which outpatients feel safe at Beatrixoord influences how content they overall are with the building and if they would recommend Beatrixoord to others.

**Perceived outpatient flow and satisfaction** The correlation matrix of table D1 in appendix D showed that one item of the perceived outpatient flow variable had a significant but weak relationship ( $r < 0.5$ ) with a satisfaction variable. The regression analyses between the perceived outpatient flow item and the satisfaction variable showed that a positive change in the perceived outpatient flow causes a small positive change in the satisfaction of outpatients (see table D3 of appendix D). The following elaborates on this result.

- 9% of the variance in the item 'recommend Beatrixoord to others' could be explained by variance in the item 'I do not mind to cover the distance between two locations' ( $R = 0.09$ ,  $p < 0.05$ ,  $\beta = 0.31$ ).

This means that the degree to which outpatients mind to cover the distance between two locations influences if they would recommend Beatrixoord to others.

#### 4.8 SUMMARY OF RESULTS

This paragraph shows the most relevant and noticeable results that were found in this study. The results represent the actual situation at Beatrixoord of the concepts: objective outpatient flow, perception and satisfaction. Furthermore the most noticeable relationships that were found

between the variables of the perception and satisfaction concepts are shown. The structure of this paragraph will again follow the structure of the conceptual model (figure 3) and answers the sub-questions from paragraph 2.1.3.

**Objective outpatient flow** The conceptual model assumed that the layout of the building has a negative effect on the outpatient flow. Two sub-questions were formed to gain insight in this relationship. The first sub-question was: What distance do outpatients cover inside Beatrixoord? The UCN method was used to analyse the appointment schedules of the sample and found that the distance covered by the sample on one day ranged from 86 to 782 meter. The mean distance was 275 meter with a standard deviation of 116 meter. The large standard deviation was explained by the number of appointments outpatients had during a day, which ranged from 1 to 4 appointments per day.

In the future the mean total objective distance should go down from 275 meter to 185 meter to have a large noticeable effect on outpatients.

The second sub-question was: How many routes do outpatients follow inside Beatrixoord?

Analyses of the appointment schedules showed that in total 29 different routes were followed by the outpatients to meet their healthcare providers. The 29 routes were used 376 times in total during one week. This means that some outpatients of the sample ( $n=123$ ) used more than one route per day.

**Perception** The conceptual model assumed that a bad layout of the building has a negative effect on the perception of outpatients. Three sub-questions were formed to gain insight in this relationship. The first sub-question was: How do outpatients perceive the service scape of Beatrixoord?

This sub-question was answered by analysing the three dimensions of the service scape. These three dimensions were; ambient conditions, signs & symbols and function. Overall, the results of the variable perceived service scape showed that outpatients are content with the functionality of the service scape but more than half perceived some of its ambient conditions as unpleasant and only half of the outpatients find that the signs & symbols contribute positively to their wayfinding experience.

The second sub-question of the concept perception was: How do outpatients internally respond to Beatrixoord's building?

The internal response was measured by the extent to which outpatients feel safe at Beatrixoord and the atmosphere they subscribe to Beatrixoord. Overall, the results of the variable internal response showed that outpatients feel safe at Beatrixoord and describe its atmosphere as relaxed, warm and old fashioned.

The third sub-question on the concept of perception was: How do outpatients perceive the outpatient flow in Beatrixoord?

The variable perceived outpatient flow was measured by two dimensions; perceived distance and wayfinding. Overall, the results of the variable perceived outpatient flow showed that an almost equally large group of outpatients perceive the distance between the locations either as distant from each other or near to each other. The same holds for whether outpatients find it tiresome to cover the distance or not. The results also showed that more than half of the outpatients do not mind to cover the distance. And almost half of the outpatients think it is hard to find the locations in the building.

**Satisfaction** The conceptual model assumed that a negative perception has a negative effect on the satisfaction of the outpatients of Beatrixoord. Three sub-questions were formed to gain insight in this relationship:

1. Are outpatients overall content with the building of Beatrixoord? 2. Would outpatients return to Beatrixoord if they could choose? 3. Would outpatients recommend Beatrixoord to others?

The results showed that the majority of the outpatients are overall content with the building, would choose to return to Beatrixoord and would recommend Beatrixoord to others.

**Relationships between variables** The results described above showed the actual situation of the outpatient flow and described how the perception and satisfaction of outpatients was. The results of the concepts perception and satisfaction were analysed further by correlation and regressions analyses. The results of these analyses showed how the variables of the concepts related to each other and to what degree the variables influenced each other. The

following will discuss the most relevant results of the regression analyses between items of the same perception variable. This is followed by the most remarkable results of the regression analyses between items of the perception and satisfaction concept, these results are displayed in a detailed version of the conceptual model (figure 6). The regression analyses between items of the same perception variable showed that:

- The perception of the cleanliness and suitability of the building significantly influences to what degree the building is perceived as accessible.
- The degree to which the locations are perceived as distant from each other influences to what extent patients perceive covering the distance between locations as tiresome.
- The degree to which the outpatients perceive covering the distance as tiresome influences whether or not outpatients mind to cover the distance between the locations.
- Overall, the regression analyses between the items of the concept perception showed that the perception of some of the perceived service scape items significantly influenced the perception of other perceived service scape items. This result also held for the perceived outpatient
- flow items. Furthermore, the perception of some of the perceived service scape items influence the perception of the internal response item and the perception of the perceived outpatient flow items.

The regression analyses between items of the perception concept and items of the satisfaction concept showed that the perception of outpatients had a significant but small influence on the satisfaction of outpatients.

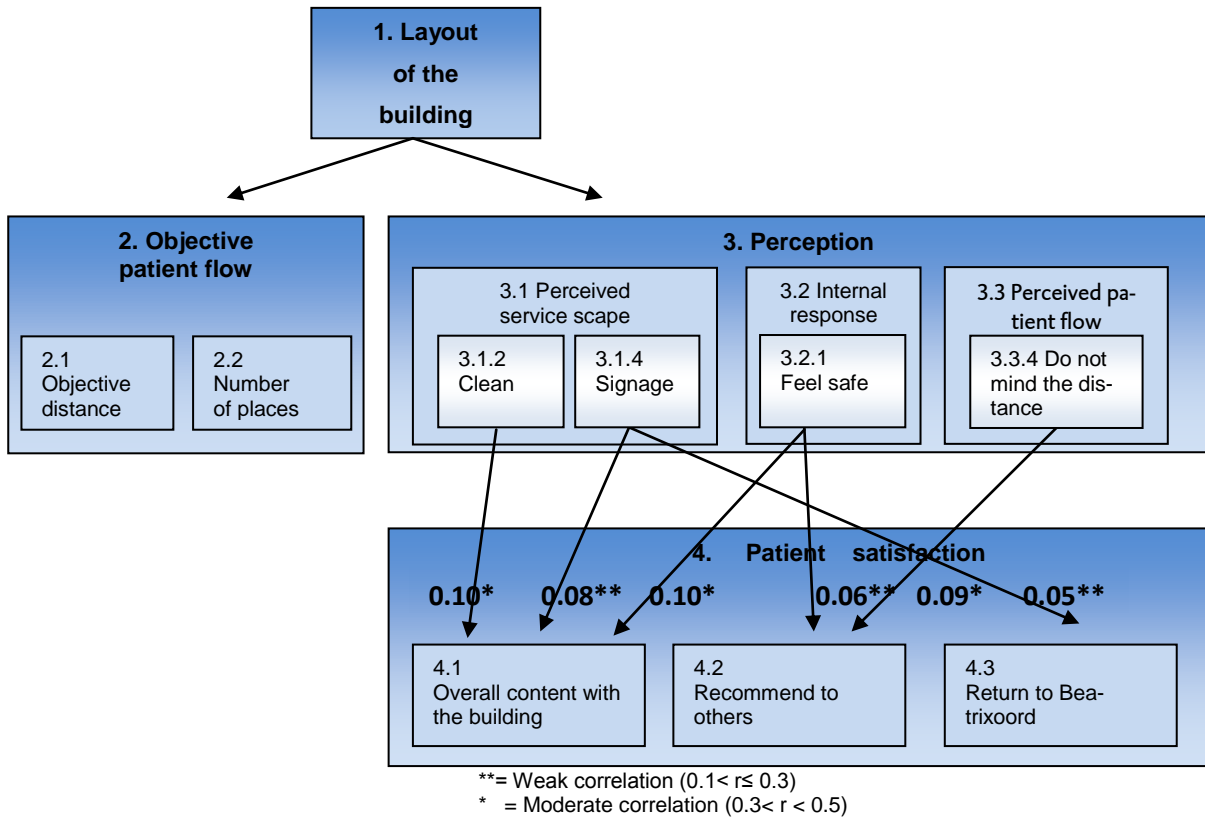
The results are summarised in figure 6, this figure shows the conceptual model with the perception variables that influence satisfaction variables. The arrows indicate which perception variable influences which satisfaction variable. The numbers displayed in the arrows represent the variance in the satisfaction variable that can be explained by variance in the perception variable. This means that an increase in the perception variable predicts by what percentage the satisfaction variable will increase.



Figure 6 shows that:

- The degree by which outpatients are overall content with the building is influenced by the degree to which they perceive the building to be clean, feel safe at Beatrixoord and perceive the signage to be good.
- The degree to which outpatients believe they will return to Beatrixoord is influenced by the degree to which they perceive the signage as good.
- The degree to which outpatients feel safe at Beatrixoord influences how content they overall are with the building and if they would recommend Beatrixoord to others.
- The degree to which outpatients mind to cover the distance between two locations influences if they would recommend Beatrixoord to others.

This chapter showed the results of this study. The following chapter will discuss how these results relate to the theoretical framework of chapter 3.



**Figure 6** Results regression analyses with explained variances of items ( $R^2$ ).

## 5 DISCUSSION

The previous chapter showed the results of this study per concept of the conceptual model. This chapter relates these results to the theoretical framework of chapter 3. The structure of this chapter will again follow the structure of the conceptual model. Firstly, the results of the concept objective outpatient flow will be related to the theoretical framework, secondly to the results of the concept perception and thirdly to the results of the concept satisfaction.

### 5.1 OBJECTIVE PATIENT FLOW

Ville et al. (2009) proposed in their research that organisations should manage variable processes by changing the configuration of the location and layout of spaces and facilities. Besides this physical change, the organisational structure should have a proactive management on patient flow logistics in order to increase patient inflows and increase patient satisfaction (Villa et al., 2009). To be able to manage the patient flow, the management should know what the patient flow looks like. However, this was not known. The results of this study shows the actual patient flow, the organisational structure can now take this into account.

The flow of patients (and goods) is formally regulated in building-design guides and building and fire codes. These regulations have to prevent that problems, due to wrong building design, occur when people move about a building (Lee et al., 2010). Three basic safety considerations in the design are: path finding, population characteristics and route redundancy (Pauls, 1984). Path finding will be discussed in paragraph 5.2. Route redundancy and population characteristics will be compared to the results of the two variables of objective patient flow in the following.

**Number of places** Orientation and path finding research shows that a greater number of routes cause that people are getting lost more often (Weisman, 1981). An explicit number of how many routes will cause people to get lost was not found in literature. This makes it hard to judge the number of routes that were used by outpatients in Beatrixoord. This study showed that the sample took 29 different

routes in total to visit their healthcare providers. The outpatients from the sample ( $n=123$ ) used one of these routes 376 times in total, this means that on average the sample used 3 different routes per visit. The UCN method that was used to determine the routes holds into account that people walk along the shortest, easiest and most visible paths (Lee et al., 2010). The graph-based maps depicting the objective patient flow routes of this study showed that the routes consisted of several floor levels and different wings of the building. This is not in congruence with the basic safety considerations of route redundancy and simplicity in all access and movement routes to improve safety (Pauls, 1984).

It is hard to judge whether the number of different routes is too high or the routes are too complex, because no exact numbers were found in literature on these specific topics. However, the fact that 29 different routes were used to visit the healthcare providers gives the impression that at least a few routes are redundant and the number of different routes could be lowered.

**Objective distance** Good building design and smooth patient flow hold population characteristics into account (Lee, 2010; Pauls, 1984). The distance persons are able to cover and their wayfinding abilities depend on the specific (health) condition of each population. The population of the sample consisted of outpatients from the pain and neurology diagnosis teams; therefore it is likely that the movement efficiency of this population is lower than that of healthy people. Literature on the exact distance that pain and neurology patients are able to cover and their route finding abilities is limited; therefore the rehabilitation practice routes of Beatrixoord were used as a rough benchmark. These routes were respectively 310 meter, 400 meter, 650 meter and 1750 meter. The results of this study showed that a large part (40%,  $n=123$ ) of the sample covered the distance of the shortest practice route or more to visit the healthcare providers of their appointments ( $\mu=275$  meter,  $\sigma= 116$ meter). This distance is large compared to the distance of the shortest practise route. It should be taken into account that this study showed the objective distance. This

objective distance was determined by the UCN method, which uses the geometry of a building and its spatial topology instead of external factors to determine routes. The actual distance that outpatients cover will be even larger because of external factors like taking a detour via the restaurant or wandering in the building. This emphasises the fact that the distances covered by outpatients was relatively large.

## 5.2 PERCEPTION

**Perceived service scape** Bitner's framework (1992) described three environmental dimensions of the service scape (ambient conditions, function and signs & symbols) that influence customers in a positive way. Bitner also states that the effects of the individual dimensions are hard to predict because people react holistically to the environment. This study supports Bitner's theory because its findings showed that the signage ( $R^2=0.08$ ,  $p<0.05$ ,  $\beta=0.29$ ) and cleanliness ( $R^2=0.10$ ,  $p<0.05$ ,  $\beta=0.33$ ) of the service scape had a small significant influence on whether outpatients were overall content with the building of Beatrixoord. Cooper (2010) found that good wayfinding signs can positively affect customer behaviour and satisfaction. This study found similar results that showed that the degree to which outpatients believe they will return to Beatrixoord is influenced by the degree to which they perceived the signage to be good ( $R^2=0.05$ ,  $p<0.05$ ,  $\beta=0.22$ ). The correlation between the signage and the intention to return to Beatrixoord was weak and should therefore be used with caution.

Furthermore the findings of this study corresponded with Bitner's (1992) statement that the signs & symbols of the facility can be used as explicit communication with a directional purpose. Because the results showed that the degree to which outpatients perceive the signage to be good has a large influence on the degree to which they perceive the locations as hard to find ( $R^2=0.49$ ,  $p<0.01$ ,  $\beta=0.70$ ).

Overall, the influence of the service scape items on the satisfaction of outpatients was found to be small. Also, the findings showed that the perception of some items of the service scape had a large influence on the perception of other items of the service scape. These findings are in con-

gruence with Bitner's (1992) finding that people react holistically to the environment which makes it hard to predict peoples behaviour based on individual dimensions of the service scape.

**Internal response** The findings of this study corresponded with the assumption of Bitner's framework (1992) that internal responses affect behaviour of customers. The results showed that the degree to which outpatients feel safe at Beatrixoord influences how content they overall are with the building ( $R^2=0.10$ ,  $p<0.05$ ,  $\beta=0.32$ ) and if they would recommend Beatrixoord to others ( $R^2=0.06$ ,  $p<0.05$ ,  $\beta=0.24$ ). Even though the influence of the internal response on the overall satisfaction with the building was found to be small, it does have a significant influence that is in strength similar to the influence of the perception of the service scape. The influence of the internal response on whether or not outpatients would recommend Beatrixoord to others should be used with caution because the correlation was found to be weak.

**Perceived outpatient flow** Weisman (1981) found that routes are perceived as being longer if they are complex because of many turns and intersections. Moeser (1988) found that familiar routes are perceived as shorter than unfamiliar routes. The results of this study showed two almost equal but opposite groups that perceived the locations in Beatrixoord as distant from (44.4%) or near (39%) each other ( $\mu=64.2$ ,  $\sigma=2.3$ ,  $n=84$ ). The 29 routes that the sample of this study took were not all the same, some were more complex than others. In the analyses of the perception of the outpatient flow a different sample was used as in the study of the objective patient flow. Therefore this study could not hold into account if the outpatient took a complex route nor if the outpatient was familiar with the route in. But it is most likely that some of the outpatients were familiar with the routes and some were not, this assumption could explain the result of two opposite groups in the perceived outpatient flow results. Cooper (2010) found that proper wayfinding systems can positively affect the behaviour and perception of staff, patients and visitors. Ultimately it can affect patient satisfaction and the morale of staff. The results of this study were consistent with the findings of Cooper. For the results showed a positive relationship between the extent to

which the signage was perceived to make the locations easy to find and the extent to which the sample was overall content with the building ( $R = 0.08$ ,  $p < 0.05$ ,  $\beta = 0.29$ ). Only a small percentage of the variance of the item overall content could be explained by the item signage. This corresponds with earlier findings of Foxall & Hackett (1994) who found that the satisfaction with a building was not determined by one factor but by three factors; wayfinding, atmosphere and physical features.

Overall the findings of this study are in line with Dijkstra et al's (2006) extensive literature study that found some positive but mostly non-significant measures on the effects of architectural features on clinical and psychological outcomes.

### 5.3 SATISFACTION

Patients mainly judge hospitals on what they encounter and experience in a healthcare setting instead of the technical quality of healthcare (Lee, 2003, Ward, 2005). Research shows several variables that partly determine the satisfaction of patients (Fornell et al., 1996; Parasuman et al., 1988) however the exact variables that determine the satisfaction of patients are not clear in literature. The findings of this study also found relationships between the perception of outpatients and their satisfaction. Some of the perception variables even positively influenced the satisfaction of outpatients. However the regression analyses showed that the perception variables only predicted a small percentage of outpatients' satisfaction.

Overall, the perception variables (service scape, internal response and outpatient flow) have a significant but small positive influence on the satisfaction of outpatients.



## 6 CONCLUSION

The management and healthcare providers of Beatrixoord assume that the layout of the building causes patients to walk great distances and to a lot of different places in the building. Furthermore they assume that the building layout has a negative effect on the satisfaction of their patients. A redesign of the building in the near future gave the possibility to create a building layout that contributes to effective and efficient care processes. The absence of data concerning the actual outpatient flow and outpatient satisfaction with the building gave rise to this study. This chapter presents the final results of this study, gives recommendations for the future layout of the building and gives directions for further research.

### 6.1 CONCLUSIONS

The objective of this study was to explore the outpatient flow and perception of Beatrixoord's outpatients, given the current building layout, and its possible effect on their satisfaction. This objective was met by using the UCN method to analyse the objective patient flow and a questionnaire to analyse the opinion of outpatients.

The results of the outpatient flow analyses showed that the building layout causes that outpatients walk relatively long distances ( $\mu=275$  meter,  $\sigma=116$  meter) and at many different places (29 different routes in total). Furthermore the graphical display of the routes showed that some of these routes were rather complex because they passed several floor levels and wings.

The results of the questionnaire showed that the majority of the outpatients were overall content with Beatrixoord's building. The satisfaction of outpatients was significantly influenced by the perception of the layout of the building. However, the influence of each of the three perception variables (perception of the service scape, internal response and perception of the outpatient flow) was small. Furthermore the results showed that the perception of the service scape has a small to large positive influence on the internal response of outpatients and on the perception of the outpatient flow.

Overall this shows that the perception of the building is

one of several factors that influence the satisfaction of outpatients.

This study contributed in reaching the management's goal of designing a future building layout that makes effective and efficient care processes possible. This was done using an evidenced based practise approach that showed the actual objective outpatient flow and the perception and satisfaction of Beatrixoord's outpatients.

### 6.2 RECOMMENDATIONS

This study started by explaining the three-part approach of Donabedian (1988) that formed the basis of the conceptual model. This three-part approach showed the linear relationship between structure, process and outcome. A good structure enhances the possibility of a good process which enhances the possibility of a good outcome. This paragraph gives recommendations on improving Beatrixoord's structure and processes in order to enhance the possibility of a good outcome. The results of this study showed that the outcome of Beatrixoord's healthcare service was good, because the majority of the outpatients were overall content with Beatrixoord's building. However the results of the processes showed there is room for improvement in the concepts objective patient flow and perception of the service scape. This paragraph gives recommendations for the improvement of the processes and structure of Beatrixoord healthcare service.

#### 6.2.1 OBJECTIVE PATIENT FLOW

The results of this study showed that the objective distance covered by outpatients on one day to visit the healthcare providers of Beatrixoord ranged from 86 to 782 meter. The mean objective distance was almost as long as the shortest practice route that is used in the rehabilitation programs of Beatrixoord's patients. This mean distance is large considering the cognitive and physical problems of the outpatients. The mean objective distance should go down from 275 meter to 185 meter to have a large noticeable effect on outpatients. This could be reached by placing the healthcare providers of the outpatients close to each other and

close to the entrance of the building. The distance could also be shortened by removing the current restricted areas that make it impossible for outpatients to take the shortest routes to their healthcare providers.

Deliberately placing the healthcare providers in such a way that outpatients need to cover great distances to reach them could be part of the rehabilitation programs of outpatients who benefit from the exercise. This form of exercise could be used when the current signs & symbols are improved. Because the results of this study showed that only half of the outpatients find the signs & symbols positively contribute to their wayfinding experience.

The results of this study showed that the sample took 29 different routes and some of these routes were complex. The number of routes could be reduced by placing healthcare providers around a central square. Or by removing the routes that were not taken often and leading these routes via the routes that were taken more often. The routes could be made less complex by placing all the healthcare providers of a patient group in a single wing and the same floor level.

#### 6.2.2 PERCEPTION

This study showed that it is hard to predict the satisfaction of outpatients by the perception of the service scape. However, previous research shows that patients mainly base their opinion on what they encounter during their visit at the healthcare centre instead of on objective results of the healthcare service. This section gives recommendations on the improvement of the variables of perception.

**Service scape** In the service industry customers form an opinion on the quality of the service based on the perception of the service scape (Foxall & Hackett, 1994). The results of this study showed that more than half of the sample perceived at least one ambient condition as unpleasant. The temperature was chosen most often as unpleasant, this could be improved by a climate control system. The results of this study showed that only half of the sample believes that the signs and symbols in the building make it easy to find locations. Navigational skills vary greatly among persons and this is even greater among the population of this study, because neurology patients often cope with cognitive problems that disturb orientation and coordination.

Especially people with cognitive or visual impairments and those who cannot read rely heavily on landmarks for their wayfinding (Raubal & Winter, 2002; Roger et al., 2009; Salmi, 2007). These landmarks like furniture and artwork could be used to improve the ease of finding locations. Wayfinding could also be improved by regulatory giving information, direction and orientation by the use of graphics like signs, maps, banners and colour coding. Furthermore an important general remark that could be used to improve wayfinding is that route redundancy and simplicity in access and movement routes lessens the need for directional graphics.

**Internal response** Bitner's framework (1992) suggests that atmosphere can create a certain mood among customers which can positively influence the behaviour of customers. The atmospheres the sample most often ascribed to Beatrixoord were 'relaxed', 'warm' and 'old fashioned'. By actively creating a desired atmosphere, the behaviour of patients could be improved. A desired atmosphere could for example be 'energetic' to create a mood among patients that positively stimulates them during their rehabilitation.

**Perceived patient flow** The results of this study showed that almost equal percentages agreed and disagreed that it is hard to find the locations in the building. The regression analyses showed that 49% of the perception that it is hard to find the locations in the building could be explained by the extent to which the signs and signage are perceived to contribute to the wayfinding experience. Therefore the perception of wayfinding could be improved by improving the signs and signage.

The results of the perceived distance analyses also showed two almost equal but opposite groups that perceived the locations in Beatrixoord as distant from or near to each other. The number of patients that perceive the locations as distant from each other could be reduced by changing three factors. Firstly, the routes should be made less complex, because routes are perceived as longer when they require a lot of information processing, like intersections and turns (Weisman, 1981). Secondly, visual cues of the distance to locations should be given. Because research shows that in general the perception of distance is misper-



ceived when visual cues to distance are reduced greatly. Thirdly, the number of different routes should be reduced so patients become familiar with the route to their health-care providers. Research shows that familiar routes are perceived to be shorter than unfamiliar routes (Moeser, 1988).

### **6.3 FURTHER RESEARCH**

This study analysed the connection between the layout of the building and patient satisfaction. Its objective was to analyse the current patient flow and the perception of Beatrixoord's outpatients on the current layout of the building and the effect on their satisfaction. Even though this objective was met, the results of this study can only be used in considerations of its limitations.

Firstly, two different samples were used to analyse the objective patient flow and the perceived patient flow. This made it impossible to analyse possible relations between these concepts. Further research should use the same sample to measure the concepts to be able to compare the objective distance with the perceived distance and the satisfaction. Secondly, the samples consisted of two patient diagnosis groups with specific characteristics. This might limit the extent to which the results can be generalised to other populations. Thirdly, the reliability and validity of the questionnaire showed low factor analyses and Cronbach's alpha for some items. The items that were not valid or reliable enough were omitted from further analyses. Further research should analyse the concepts of perception and satisfaction in more detail in order to find all the factors that these concepts consist of. The cut off level of 0.7 was used for Cronbach's alpha. However, the 0.7 rule of thumb is high and lower levels like 0.6 or 0.4 are used by some researches with exploratory purposes. Items that scored lower than 0.7 Cronbach's alpha were treated as single items in order to maintain an acceptable reliability and validity. The reliability and validity test showed a low to medium Cronbach's alpha. Considering the explorative nature of this study this is not assumed to reduce the value of the description of the actual situation.



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**APPENDIX A**

<b>Concept</b>	<b>Variable</b>	<b>Dimension</b>	<b>Questionnaire items</b>
Perception	Perceived service scape	Ambient conditions	2
		Functionality	2
		Signs & Symbols	1
	Internal response	Atmosphere	1
		Feel safe	1
	Perceived patient flow	Wayfinding	2
		Perceived distance	3
Satisfaction		Intention to return	1
		Recommend to others	1
		Overall satisfaction	1

**Table A1** Number of questionnaire items per dimension of each variable.

(n=102)	<b>Gender</b>		<b>Diagnosis</b>		<b>Age</b>		<b>Rehabilitation time</b>	
		<b>(%)</b>		<b>(%)</b>		<b>(%)</b>		<b>(%)</b>
	Men	48	Amputation	2	18-24	4	<3 months	52
	Women	52	Heart & Onco-logy	18	25-44	25	3-6 months	28
			Lung	20	45-64	56	6-12 months	12
			Pain	19	>65	15	> 1 year	7
			Rheumatism	3				
			Neurology	23				
			Diabetes	14				
			Spinal cord injury	1				

**Table A2** Composition of the second sample.

Items	Factor 1 (r)	Factor 2 (r)	Factor 3 (r)	Factor 4 (r)
<i>Perceived service scape:</i>				
Clean	0.65			
Accessible	0.79			
Suitable for rehabilitation	0.64			
Good signage	0.51			
<i>Perceived patient flow:</i>				
Locations distant		0.74		
Covering distance tires		0.81		
Mind the distance		0.71		
Hard to find locations		0.33		
<i>Patient satisfaction:</i>				
Overall content with the building			0.62	(-0.61)
Return			0.88	(0.11)
Recommend			(0.18)	0.88
<i>Cronbach's <math>\alpha</math></i>	0.58	0.73	0.32	

**Table A3** Reliability and validity tests for the multiple-item scales.



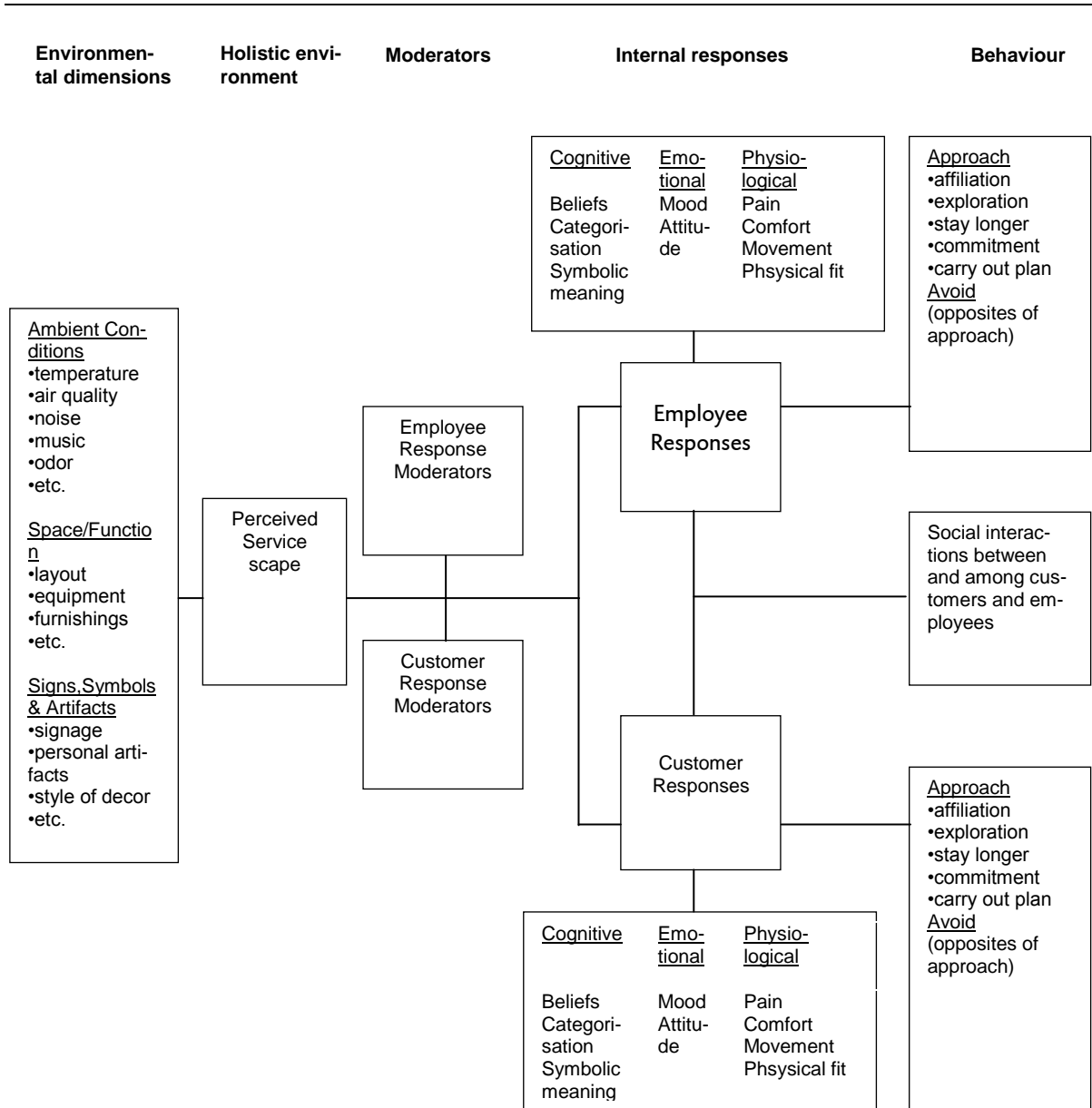
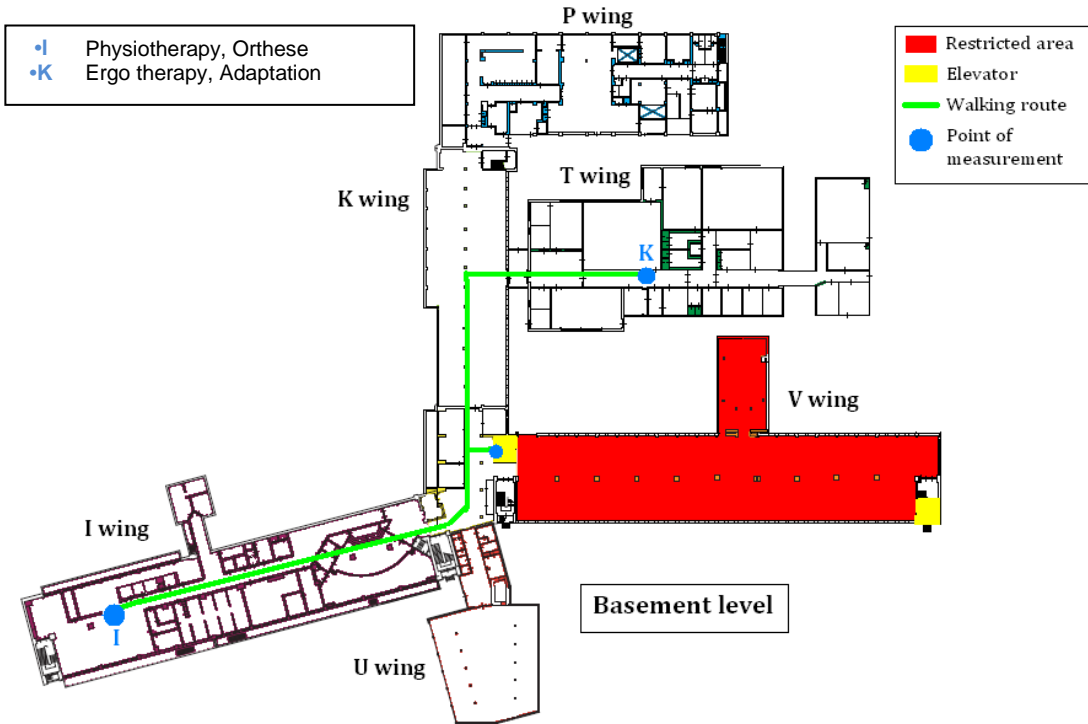


Figure A1 Environment-User framework by Bitner.

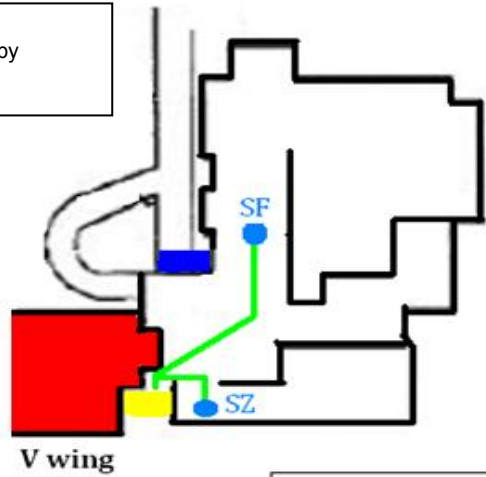
APPENDIX B

50



- SF Fitness, (group) 'movement' therapy
- SZ Swimming

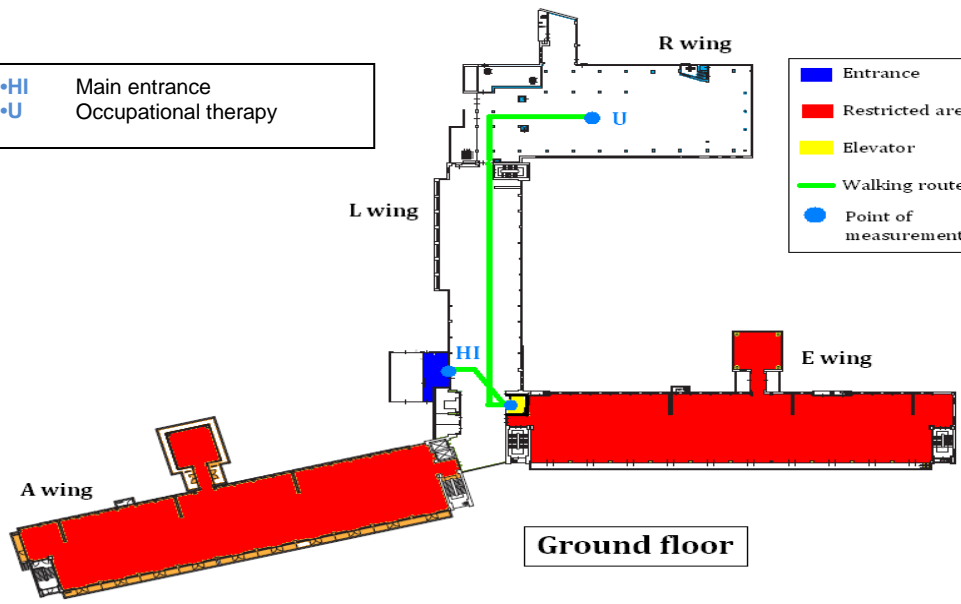
- Restricted area
- Elevator
- Walking route
- Point of measurement



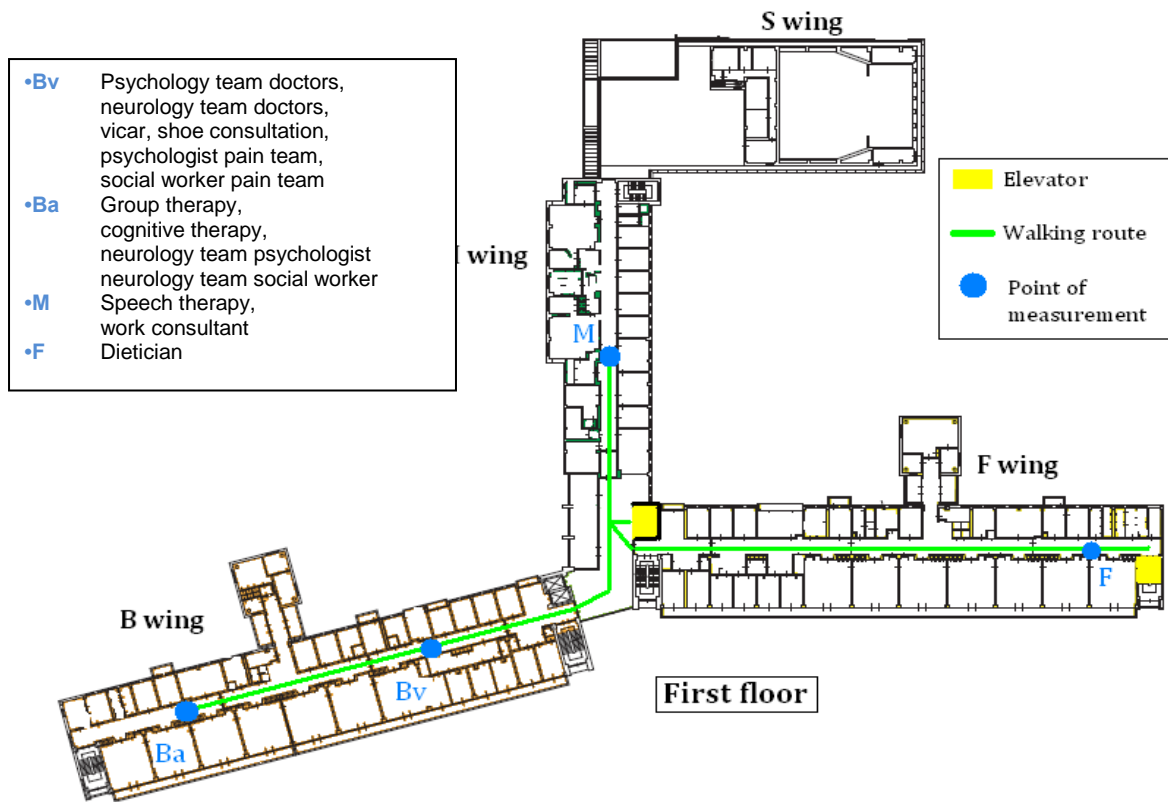
**Sportscomplex**

- HI Main entrance
- U Occupational therapy

- Entrance
- Restricted area
- Elevator
- Walking route
- Point of measurement



**Ground floor**



**Figure B1** Maps of Beatrixoord with measurement points and routes.

Route	Distance (meter)	Frequency
SF<-> I	176	1
SF <-> K	162	14
BA <-> U	160	2
SZ<-> BA	150	1
I <-> SZ	150	1
K <-> U	146	2
SF <-> BV	141	5
SZ <-> K	136	2
I <-> BA	136	7
BV <-> U	125	1
M <-> U	124	1
K <-> BA	122	5
HI <-> SF	119	27
I <-> K	118	49
I <-> BV	101	11
I <-> M	100	3
HI <-> SZ	93	3
HI <-> U	91	8
K <-> BV	87	16
K <-> M	86	5
HI <-> I	79	49
HI <-> BA	79	52
HI <-> FA	74	6
BV <-> BA	71	1
HI <-> K	65	56
M <-> BA	61	2
HI <-> BV	44	36
HI <-> M	43	9
SF <-> SZ	33	1

**Table B1** Routes, distance and frequency.

	Mini- mal	Maxi- mal	Mean	Standard Deviation
<b>Total meter</b>	86	782	276	114

**Table B2** Total distance per outpatient per day.

Distance (m)	Frequency	Percentage (%)
0-100	6	5
101-200	31	25
201-300	37	30
301-400	35	28
401-500	10	8
501-600	2	2
601-700	1	1
701-800	1	1

**Table B3** Distance, frequency and percentage.

<b>Cohen's effect size ratio formula:</b>	(mean X1 – mean X2) / standard deviation = effect size ratio	X1= current total objective distance Mean X1= 276 meter X2= future total objective distance Large noticeable effect: 0.8 Moderate noticeable effect: 0.5
<b>Large noticeable effect</b>	(276- mean X2) / 114 = 0.8 Mean X2 = 184.8 meter	Future total objective distance= 185 meter
<b>Moderate noticeable effect</b>	(276 – mean X 2) / 114 = 0.5 Mean X2= 219 meter	Future total objective distance= 219 meter

**Table B4** Calculation Cohen's effect size ratio.

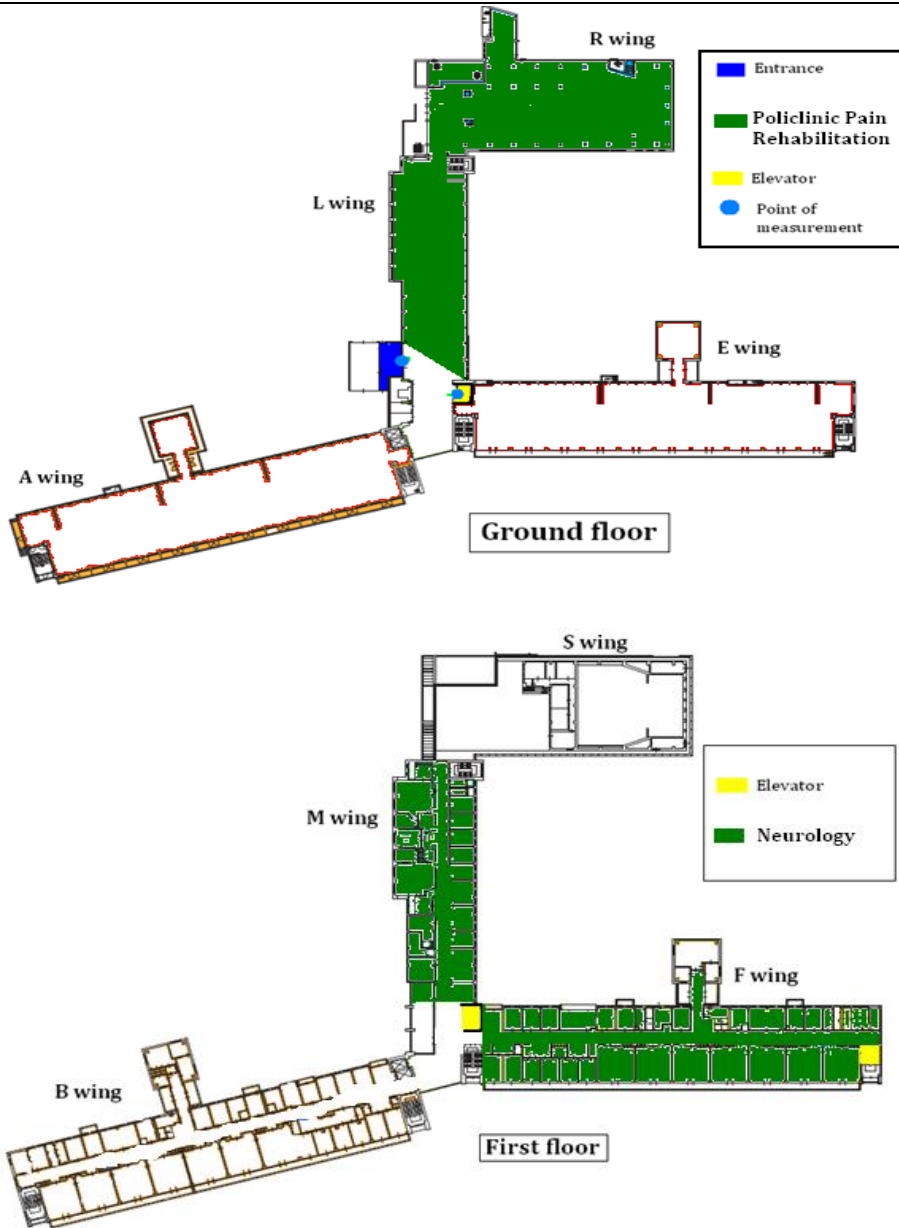


Figure B2 Maps of Beatrixoord future situation.

**APPENDIX C**

(n=102) Variable	Dimension Questionnaire item	Agree (7-5) %	Neutral (4) %	Disagree (1-3) %	No idea (8) %
Perceived service scape	Ambient condition	85.3	9.8	4.9	0.0
	Functional Suitable for rehabilitation	86.3	3.9	7.8	2.0
	Signs & symbols	52.0	4.0	42.0	2.0
Internal response	Feel safe	88.2	8.8	2.0	1.0
Perceived patient flow	Wayfinding				
	Different locations	80.4	7.8	10.8	1.0
	Hard to find locations	35.3	15.7	49.0	0.0
	Perceived distance				
	Locations distant from each other	44.4	17.6	39.0	2.0
	Covering the distance tires me I do not mind the distance	38.3 56.9	13.7 13.7	47.1 28.4	1.0 1.0
Satisfaction	Overall content with building	88.3	6.9	4.9	0.0
	Recommend to others	82.4	2.9	1.0	13.7
	Return to Beatrixoord	94.2	2.9	0.0	0.0

**Table C1** Frequencies per dimension of each variable.

(n=102)		n	Percent of responses	Percent of cases
Variable Dimension	Response option			
<b>Perceived service scape</b>			<b>(n=71)</b>	<b>(n=59)</b>
Not pleasant <i>ambient condition</i>	Temperature	27	37.0%	45.8%
	Air quality	13	17.8%	22.0%
	Rooms too bright	3	4.1%	5.1%
	Rooms too dark	3	4.1%	5.1%
	Corridors too bright	2	2.7%	3.4%
	Corridors too dark	8	11.0%	13.6%
	Noises	15	20.5%	25.4%
	Something else	2	2.7%	3.4%
	Total	71		
<b>Internal response</b>			<b>(n=166)</b>	<b>(n=99)</b>
Atmosphere	Cold	9	5.4%	9.1%
	Business like	15	9.0%	15.2%
	Warm	24	14.5%	24.2%
	Home like	12	7.2%	12.1%
	Relaxed	38	22.9%	38.4%
	Modern	11	6.6%	11.1%
	Old fashioned	22	13.3%	22.2%
	Stressed	1	0.6%	1.0%
	Simple	18	10.8%	18.2%
	Contemporary	13	7.8%	13.1%
Something else	3	1.8%	3.0%	
	Total	166		

**Table C2** Frequencies multiple response sets questionnaire.



APPENDIX D

Concept	Variable	Item	3.1.1	3.1.2	3.1.3	3.1.4	3.2.1	3.3.1	3.3.2	3.3.3	3.3.4	4.1	4.2	4.3
3. Perception	3.1 Perceived service scape	3.1.1 Accessible	1											
		3.1.2 Clean	0.51**	1										
		3.1.3 Suitable for rehabilitation	0.47**	0.16	1									
		3.1.4 Good signage	0.19	0.18	0.11	1								
	3.2 Internal response	3.2.1 Feel safe	0.49**	0.35**	0.28**	0.16	1							
		3.3 Perceived patient flow	0.14	0.10	0.08	0.70**	0.06	1						
	3.3 Perceived patient flow	3.3.1 Hard to find locations	0.12	0.11	-0.02	0.18	0.15	0.32**	1					
		3.3.2 Locations far away	0.05	0.14	0.00	0.03	0.14	-0.00	0.46**	1				
		3.3.3 Covering the distance tires me	0.24*	0.37**	0.10	0.15	0.37**	0.11	0.23	0.64**	1			
		3.3.4 Do not mind the distance	0.16	0.33**	0.08	0.29**	0.32**	0.18	0.05	0.06	0.17	1		
	4. Satisfaction	4.1 Overall content with the building	0.1	0.0	0.1	0.0	0.2	-0.1	0.0	0.1	0.0	0.3	1	
		4.2 Recommend to others	0.07	0.16	0.18	0.22*	-0.01	0.00	-0.10	0.09	0.06	0.27*	0.0	1
4.3 Return to Beatrixoord		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

\*\* = Correlation is significant at the 0.01 level (2-tailed)

\* = Correlation is significant at the 0.05 level (2-tailed)

Note that the items of perception were numbered with a 3 and the items of satisfaction were numbered with a 4.

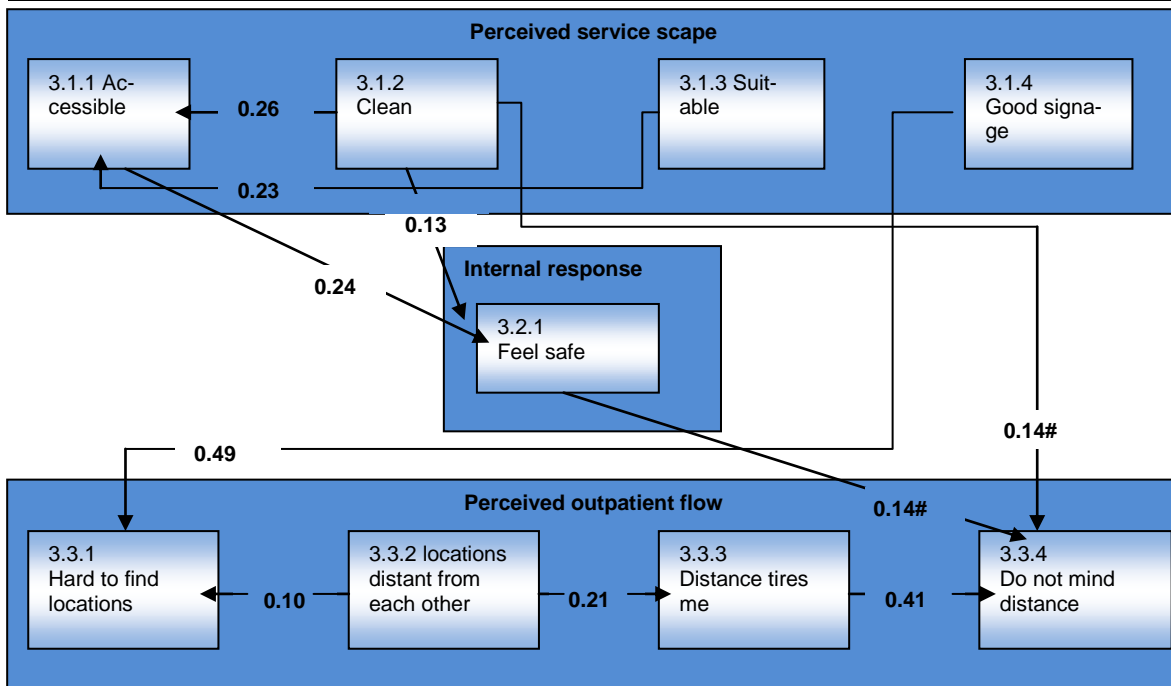
**Table D1** Correlation matrix between all items of the perception and satisfaction variables.

Item	Item	R <sup>2</sup>	F	Sig. of F	Standardized Beta	Sig. of Beta
3.1.1 Accessible	3.1.2 Clean	0.26	31.72	0.000000*	0.51	0.000000**
	3.1.3 Suitable	0.23	26.99	0.000001*	0.47	0.000000**
3.2.1 Feel safe	3.1.1 Accessible	0.24	28.54	0.000001*	0.49	0.000050**
	3.1.2 Clean	0.13	11.99	0.000842*	0.35	0.000000**
3.3.1 Hard to find locations	3.1.4 Good signage	0.49	75.32	0.000947*	0.70	0.000000**
	3.3.2 locations distant from each other	0.10	8.04	0.005989*	0.32	0.000000**
3.3.3 Distance tires me	3.3.2 Locations distant from each other	0.21	19.05	0.000041*	0.46	0.000011**
3.3.4 Do not mind the distance	3.1.1 Clean	0.14	12.39	0.000720*	0.37	0.470072 #
	3.2.1 Feel safe	0.14	12.66	0.000637*	0.37	0.892015#
	3.3.3 Distance tires me	0.41	51.4	0.000000*	0.64	0.000037**

# = Not significant  
 \* = Significant F-value  
 \*\* = Significant Beta

**Table D2** Regression analyses items of perception variables.

58



# = Beta not significant

**Figure D1** Regression analyses items of perception variables (R<sup>2</sup>).

Satisfaction variable	Perception variable	R 2	F	Sig of F	Standardized Beta	Sig of Beta
<i>Satisfaction</i>	<i>Perceived service scape</i>					
4.1 Overall content with building	3.1.1 Clean	0.10	10.08	0.002086*	0.33	0.000000**
4.2 Return to Beatrixoord	3.1.4 Good signage	0.08	7.70	0.006771*	0.29	0.000000**
	3.1.4 Good signage	0.05	4.66	0.033588*	0.22	0.000000**
<i>Satisfaction</i>	<i>Internal response</i>					
4.1 Overall content with building	3.2.1 Feel safe	0.10	10.05	0.002104*	0.32	0.000023**
4.3 Recommend to others		0.06	4.80	0.031479*	0.24	0.000000**
<i>Satisfaction</i>	<i>Perceived patient flow</i>					
4.3 Recommend	3.4 Do not mind the distance	0.09	7.42	0.008111 *	0.31	0.000000**
	#= not significant					
	* = Significant F-value					
	** = Significant Beta					

**Table D3** Regression analyses items of the perception and satisfaction concepts.

## APPENDIX F

---

### Enquête Beatrixoord

In deze enquête wordt naar uw mening over Beatrixoord gevraagd. De vragen gaan niet over de zorg, maar voornamelijk over het gebouw van Beatrixoord. De enquête is anoniem en de resultaten worden gebruikt in een onderzoek van de Rijksuniversiteit Groningen naar patiënt tevredenheid.

De vragen bestaan uit verschillende stellingen. Als u het helemaal eens bent met de stelling kruist u het uiterst linker rondje aan. Naar mate u het minder eens bent met de stelling, kruist u een rondje dat meer naar rechts staat aan. Het uiterst rechter rondje kruist u aan als u het helemaal niet eens bent met de stelling. Als u geen antwoord heeft, of de stelling niet van toepassing is voor u, dan kunt u 'geen idee' aankruisen.

HARTELIJK BEDANKT VOOR UW MEDEWERKING!

Helemaal niet mee eens							Helemaal mee eens		Geen idee
1	2	3	4	5	6	7	8		

**I. Het gebouw**



- |  |                       |                       |                       |                       |                       |                       |                       |                       |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1. Het gebouw is goed begaanbaar voor mij.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2. Er is niet voldoende (behandel) ruimte in Beatrigoord.                                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3. De ruimtes zijn geschikt voor mijn revalidatie.                                       |                       |                       |                       |                       |                       |                       |                       |                       |
| 4. Er is een geschikte ruimte om uit te kunnen rusten.                                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5. In het gebouw is het schoon.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6. In de wachtruimte kunnen mensen horen wat er bij de balie besproken wordt.            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 7. In het gebouw kan ik de locaties waar ik moet zijn <i>moelijk</i> vinden.             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 8. De bewegwijzering zorgt ervoor dat ik de locaties <i>makkelijk</i> kan vinden.        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 9. Ik voel me veilig in Beatrigoord.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 10. Terwijl ik wacht heb ik graag contact met andere patiënten.                          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 11. Ik vind het vervelend dat andere patiënten mij kunnen zien tijdens mijn revalidatie. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

12. Wat ik niet aangenaam vind in het gebouw van Beatrigoord is:  
(meerdere antwoorden mogelijk)

- |   |  |   |   |
|---|--|---|---|
| <input type="radio"/> Temperatuur       | <input type="radio"/> Te lichte ruimtes  | <input type="radio"/> Te lichte gangen  | <input type="radio"/> Te harde geluiden |
| <input type="radio"/> Luchtkwaliteit    | <input type="radio"/> Te donkere ruimtes | <input type="radio"/> Te donkere gangen |   |
| <input type="radio"/> Anders, namelijk: | .....                                    |   |   |

13. De sfeer van het gebouw zou ik beschrijven als:  
(meerdere antwoorden mogelijk)

- |   |                                  |                                  |
|---|----------------------------------|----------------------------------|
| <input type="radio"/> Kil               | <input type="radio"/> Ontspannen | <input type="radio"/> Gestrest   |
| <input type="radio"/> Zakelijk          | <input type="radio"/> Modern     | <input type="radio"/> Sober      |
| <input type="radio"/> Warm              | <input type="radio"/> Ouderwets  | <input type="radio"/> Eigentijds |
| <input type="radio"/> Huiselijk         |                                  |                                  |
| <input type="radio"/> Anders, namelijk: | .....                            |                                  |

14. Welke ruimte gebruikt u in de tijd tussen uw afspraken?  
(meerdere antwoorden mogelijk)

- |   |  |
|---|--|
| <input type="radio"/> Restaurant 'tuincafe'               | <input type="radio"/> Wachtruimte op de afdeling van uw afspraak |
| <input type="radio"/> Computer gedeelte in het 'tuincafe' | <input type="radio"/> Wachtruimte sportcomplex                   |
| <input type="radio"/> Terras van het restaurant           | <input type="radio"/> Wachtruimte begane grond                   |
| <input type="radio"/> Tuin van Beatrixoord                | <input type="radio"/> Rokersruimte                               |
| <input type="radio"/> Anders, namelijk:                   |  |

.....

II. Verschillende locaties

	<b>Helemaal niet mee eens</b>					<b>Helemaal mee eens</b>			<b>Geen idee</b>
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	



- |  |                       |                       |                       |                       |                       |                       |                       |                       |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 15. Ik moet op verschillende plaatsen in het gebouw zijn voor mijn afspraken.                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 16. De plaatsen waar ik moet zijn bevinden zich ver van elkaar                               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 17. Het afleggen van de afstand tussen verschillende plaatsen is vermoeiend.                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 18. Het afleggen van de afstand tussen verschillende plaatsen vind ik <i>niet</i> vervelend. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

19. Op welke plaatsen moet u zijn voor uw afspraken?

**Kelder / -1**

- Centrale hal
- I gang: Fysiotherapie
- T gang "rode stoelen": Ergotherapie, Hartrevalidatie
- V gang: Poli trauma/ MS
- Sportcomplex

**1<sup>e</sup> Verdieping**

- F gang: diabetes, poli revalidatie chronisch zieken
- M gang: logopedie, arbeidsexploratie
- B gang: psychotherapie, maatschappelijk werk, geestelijk verzorger

**2<sup>e</sup> Verdieping**

- C gang: longrevalidatie
- G gang: revalidatie chronisch zieken

**Begane grond**

- R gang: Recreatie "de Uithoek"
- L gang: Planning
- Centrale hal

**3<sup>e</sup> Verdieping**

- D gang: Neurorevalidatie
- Anders, namelijk:

	<b>Helemaal niet mee eens</b>						<b>Helemaal mee eens</b>		<b>Geen idee</b>
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>		<b>8</b>



20. Er zit te veel tijd tussen twee afspraken op één dag.  1  2  3  4  5  6  7  8

21. Er zit te weinig tijd tussen twee afspraken op één dag.  1  2  3  4  5  6  7  8

Tevredenheid

22. Over het algemeen ben ik tevreden met het gebouw van Beatrixoord.  1  2  3  4  5  6  7  8

23. Ik zou Beatrixoord aanbevelen aan anderen.  1  2  3  4  5  6  7  8

24. Als ik de mogelijkheid had om te kiezen waar ik revalideer zou ik weer voor Beatrixoord kiezen.  1  2  3  4  5  6  7  8

Persoonlijke Vragen

25. Bent u een man of een vrouw?  
 Man  Vrouw

26. Wat is uw leeftijd?

18 t/m 24 jaar  25 t/m 44 jaar  45 t/m 64 jaar  65 jaar of ouder

27. Hoe lang bent u onder behandeling in Beatrixoord?

Korter dan 3 maanden  6 maanden tot één jaar  
 3 tot 6 maanden  Langer dan één jaar

28. Voor welke aandoening revalideert u?

<input type="radio"/> Amputatie	<input type="radio"/> Hartrevalidatie	<input type="radio"/> Ontwikkelingsstoornissen
<input type="radio"/> CVA (beroerte)	<input type="radio"/> Longrevalidatie, COPD	<input type="radio"/> Pijn (chronisch)
<input type="radio"/> Diabetes	<input type="radio"/> Niet aangeboren hersenletsel	<input type="radio"/> Reuma
<input type="radio"/> Dwarslaesie	<input type="radio"/> Oncologisch	<input type="radio"/> Spierziekte
<input type="radio"/> Anders, namelijk:		

.....

29. Ruimte voor extra opmerkingen over Beatrixoord:

.....  
 .....

**Hartelijk bedankt voor het invullen van de enquête!**