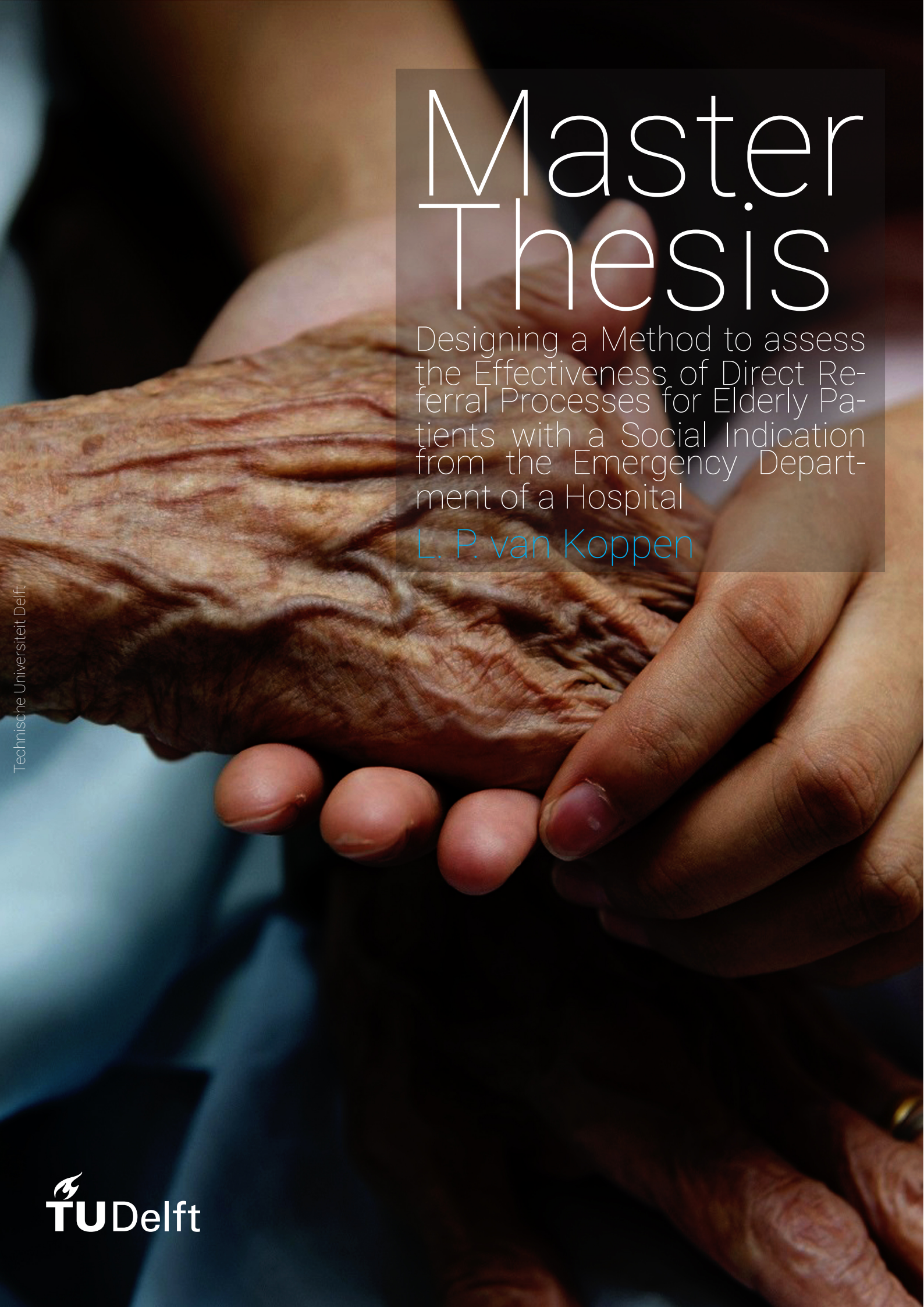

Master Thesis

Designing a Method to assess the Effectiveness of Direct Referral Processes for Elderly Patients with a Social Indication from the Emergency Department of a Hospital

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Technische Universiteit Delft

TU Delft

Master Thesis

Designing a Method to assess the Effectiveness of Direct Referral Processes for Elderly Patients with a Social Indication from the Emergency Department of a Hospital

by

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Preface

Delft, January 25th 2020

Before I started this thesis I had thought of my own criteria for a master thesis. The topic should be within the health care sector and I want to develop the thesis together with an organisation dealing with the problems to research in practice. I found an interesting topic within the Albert Schweitzer Hospital and I met my practical supervisor Marieke Meinardi. Together, we came up with a topic which would be beneficial for practice and suitable as a master thesis subject.

Throughout the process Marieke and I became a very good team in which we learned a lot from each other. I want to thank Marieke and the Albert Schweitzer Hospital to give me the opportunity to learn a lot on the Health Care sector. The interesting talks, discussions and the sharing of frustrations will always stay with me. This project stimulated my interest in the sector and made me decide that I want to find my future within this sector. I not only want to thank Marieke, but also my other colleagues at the hospital, which inspired me and took the time to learn me everything needed on the health care of elderly. And I want to thank the interviewees for investing time in this research.

I could have never achieved this result without of the help of my other committee members. Yilin Huang, my first supervisor, which provided me with honest and useful advise on the master thesis process I was struggling with. My second supervisor, Mark de Bruine, which invested much more time in me than required and helped me with the challenging task of making decisions within my thesis. And the chairman of the committee and professor, Jop Groeneweg, for his honest, sharp and positive remarks always leading directly to the core of the problems at hand.

This master thesis was a challenging journey full of gained knowledge, learning points and conquered self-doubt. Which was not only challenging for me, but also my personal environment. Above all, I want to thank them for the patience, support and countless moments of positive input, which helped me to finish my master thesis.

Luuk van Koppen

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Glossary

Dutch	English	Abbreviation
Zorgverzekeringswet	Health Insurance Act	Zvw
Wet Langdurige Zorg	Chronic Care Act	WLZ
Wet Maatschappelijke Ondersteuning	Social Support Act	WMO
Zorgkantoor	Health Administration Office	-
Centrum Indicatiestelling Zorg	Care Assessment Agency	CIZ
Huisarts	General Practitioner	GP
Geriatrische Revalidatiezorg	Geriatric Rehabilitation	GRZ
Eerstelijns verblijf	Primary Care stay	ELV
Spoed Eisende Hulp	Emergency Department	ED

Table 1: Glossary

Executive Summary

This research provides a design for an assessment method for the effectiveness of direct referral processes for elderly patients with a social indication from the emergency department of a hospital. The aging population in the Netherlands leads to a very large increase in health care costs, which can lead to unaffordable and inaccessible care in the Netherlands. A pilot project in the Albert Schweitzer Hospital in Dordrecht claimed to have a successful direct referral process for elderly patients at the Emergency Department, which have a large risk to be unnecessarily admitted to the hospital. According to the hospital, this referral process should decrease health care costs and increase the quality of care for these patients. However, the actual effectiveness is never researched or substantiated. In order to determine whether it is possible to increase efficiency of the Dutch Healthcare sector, by direct referral processes of elderly, this thesis finds an answer to the following main research question; **How to describe and assess referral processes for elderly patients with a social indication?**. To come to an answer an assessment method is developed to assess the effectiveness of direct referral processes.

From literature, challenges in assessing quality and effectiveness are identified. To deal with these challenges an assessment method is needed, since the assessment is not a straightforward task. The challenges are translated to a set of functional requirements for the assessment method, by determining with which functions a referral process has to have to deal with these challenges. Based on this set of requirements a six-step method is designed. This method is applied to a case within the Albert Schweitzer Hospital and reflected whether the method in practice meets the requirements. The research is concluded with an overall reflection on the assessment method. Within this reflection the researcher describes with which challenges he was confronted and how to deal with these, to what extend the method is generalizable to other assessments and finally design rules are distilled for future design of assessment methods.

The six steps of the assessment method are the Description of the object of study (the referral process), the Stakeholder selection, the Indicator collection, the Indicator selection, the Data collection and the Data analysis. Within the *Description of the Object of Study* the referral process is mapped and visualized. This is done by mapping all potential activities within the hospital which are of interest for the referral of a patient with a social indication. The process starts from the moment a patient is presented at the ED and ends when the patient leaves the hospital. All these activities are visualized within a flowchart. The visualization of the process by a flowchart is very suitable for the creation of overarching insight in parts of the process where stakeholders are not involved with on a daily basis. The flowchart representation is easy to understand and therefor can be used for the communicability of the process. The visualization is also used for face validation of the process by the stakeholders. This was suitable to validate whether the understanding of the researcher and the stakeholders were aligned. If someone wants to validate whether a process is applied within practice, a better approach would be to come up with process indicators. By collecting data on these process indicators, a researcher could determine how often specific steps of the process are neglected, performed poorly or not applicable.

Within the *Stakeholder selection* the visualization is used to determine per process step which stakeholders are involved. The stakeholders are classified in two categories. The first factor is within which of four process phases (A first examination at the ED, a geriatric examination, the arrangement of follow-up care and the intake at the care institute) they are involved. The second factor is whether they are operationally or as a manager involving the patient. This makes it easy to determine which selection of stakeholders was a good representation.

The goal tree method is used within interviews for the *Indicator collection*. This is a method which helps the stakeholders to translate their perspective into measurable indicators. Problems can exist in generating a diverse set of indicators and in fully measurable indicators. The interviewer needs to help the stakeholders with these problems (for example by using themes for creativity and asking further until a measurable indicator is created), but also has to make sure that the stakeholders' perspective is not biased by this help.

The *Indicator selection* is needed to limit the large list of collected indicators into a small set of the most important indicators. This can be done based on importance, availability of data and uniqueness of the indicators. Within the case, the stakeholders' preference and perceived importance on the indicators was not available and therefor this is substituted by the support (the number of stakeholders mentioning a factor).

The indicator selection for the case resulted in a set of five important indicators: 'Availability of hospital beds', 'Fit of the goal of care to the patients care need', 'Fit of the intensity of care to the patients care need', 'Referral Distance' and 'Referral Time'.

The *Data collection* is done within the hospital by a retrospective patient file search over all patients at the ED with a social indication in 2018 (101 patients included of which 83 referred to a care institute, 10 admitted to the hospital, 6 went home with home care and 1 went home without care). Retrospective data collection makes it easy to collect larger numbers of data at once. However, it also made it impossible to ask the patients for permission for the data needed from organisations other than the hospital. It is recommended to ask future patients this permission to make further research possible.

Witih the *Data analysis* the collected data is used to measure the outcome of the referral process per indicator over 2018. When the values for the different indicators are known, these values have to be placed within context to give meaning to them in terms of effectiveness. Within the case this was not possible, since no comparison to similar processes or generally accepted norms were available to place the number in context. Within future research the numbers generated in this research can function as the needed context, which makes measurement of effectiveness in the future possible. Since no comparison can be made with similar processes and no generally accepted norms are available, the meaning to the numbers is given by reasoning of the researcher. On the indicators 'Fit of the goal of care to the patients care need' and 'Fit of the intensity of care to the patients care need' the effectiveness is inconclusive. Based on the reasoning of the researcher, it can be said that the referral process' scores on the other three indicators are relatively good 'Availability of hospital beds' (374 occupant days/year), 'Referral Distance'(average:6.9 km, min: 0 km, max: 19 km) and 'Referral Time' (average: 22.6 hours, min: 2 hours, max: 78 hours).

Overall, the reflection concludes that the assessment method is good in the collection of the multiple perspectives and the translation of these perspectives in a collaborative set of indicators which are well-supported by the different stakeholders.

The assessment method presented in this research could be used in future assessments of the effectiveness of direct referral of patients with a social indications from the ED of the hospital. When assessing the effectiveness of these processes in the future, the assessment method could be used in three different ways. Depending on the similarity of the referral process to assess in the future and the referral process used within this research on two factors a researcher could use three approaches. These factors are the scope of the process (ED of a hospital as start point, leaving the hospital as end point) and the scope of the perspectives taken into account (Operational and managerial actors within health care institutes). If these are not similar a researcher is recommended to take approach 3. Otherwise a researcher is recommended to take approach 1 or 2 dependent of availability of data on the indicator set and the degree to which the stakeholders in the referral process to assess agree with the set chosen in this research.

1. Take the set of the five selected indicators in this research and determine the values for the indicators for the process to assess.
2. Take the full list of collected indicators, choose a set of indicators based on the specific context of the process to assess and determine values for these indicators.
3. Visualize the process, select the important stakeholders, collect the indicators which the stakeholders perceive important, select a set of indicators and determine the values for these indicators.

The reflection resulted into the most relevant design rules for assessment methods for processes of direct referral of patients with a social indication from the ED of the hospital to care institutes:

- A visualization of the process is required, in such a way that it can be used to determine whether the understanding of all important stakeholders is the same and to come to a collective agreement of the stakeholders that the described process is the process to assess. (Paragraph 3.5)
- The identification and selection of important stakeholders have to be implemented in such a way that the perspectives of these stakeholders together form a representative perspective on system level. A representative perspective is reached when the stakeholders are spread out over the process in both the phase of the process they are involved in and the kind of role (operational or managerial) they play in this phase. (Paragraph 4.4.1)
- It is required to map and translate the perspectives of the most important stakeholders into measurable indicators in such a way that it is possible to create a construct of indicators which can be quantitatively analyzed. (Paragraph 4.4.3)

- A selection of the most important indicators is needed in order to form the construct space of effectiveness in such a way that the construct represents the most important indicators which data is available on and which do not overlap in the effects they measure. (Paragraph 4.4.5)
- Data collection and data analysis of the indicators in the indicator set is needed in such a way that numbers on the indicators are created which make it possible to conclude the effectiveness of the process on these indicators. (Paragraphs 5.6.1 and 5.6.3)

There are three main recommendations from this research. *More evidence-based management for pilot projects*, since for objective conclusions on effectiveness and success of processes data analysis is needed and this is often not the case within current pilot projects in the hospital. *The creation of a research framework for norm-setting in society* to create the context needed for objective conclusions on the effectiveness, such as a benchmark or a generally accepted norm. Since much of the effects leading to effective referral are not researched, these effects first have to known before the society can conclude on acceptable norms. *Expansion of the referral process to other patient-groups.* Since by preventing more unnecessary admissions of other patient-groups, such as patients with a long-term care need and patients which need care in a care institute after an admission to the hospital, future health care can be more cost-efficient. This is needed to keep Dutch health care affordable and accessible for the people with a care need.

The main scientific contributions of this research lie within the gained knowledge from the description of the system which leads to unnecessary admission for patients with a social indication, the categorisation of Dutch primary care indications, the reflected assessment method, the visualization of the referral process and in the first assessment data of referral processes which could lead to a benchmark and norm-setting.

The societal contribution lies in more awareness for patients with a social indication, the insight in the broader process for healthcare professionals, clarification for new employees in both the referral process and care indications, the understanding of the effects of professionals their own 'way-of-working' on the rest of the system by the Causal Relation Diagram and the possibility for managers to assess their own referral processes and come up with improvements of their process.

From the start of the research the goal of this thesis, to determine the effectiveness of direct referral from the ED of an hospital for patients with a social indication, seemed relative straightforward. However, looking at the final conclusions on the effectiveness these are not fully satisfactory yet.

This study took place in a double explorative nature and therefor can be described as a pilot-pilot study (a new method applied on a new research subject). Although the goal of the research seemed relative straightforward, reaching this goal within an explorative research was far more challenging than expected. There are a couple of reasons why an easy assessment of the effectiveness was impossible. At first, there was a lack of easy-to-understand and accepted descriptions of the referral process. Secondly, no generally accepted set of indicators was available to base the effectiveness on. Thirdly, the data needed to assess the effectiveness was not available. Fourthly, the context needed to conclude whether the process was effective was not available. This also leads to a disclaimer on the conclusions within this research. It reflects on the used method and the subject, however it cannot be concluded that the effectiveness is objectively determined and it also cannot be determined whether other methods to assess effectiveness would be more successful in delivering satisfactory conclusions on the effectiveness of these referral processes.

But, when satisfactory conclusions on effectiveness cannot be reached, the question arises what the actual value of this research is. This research started untangling a large problem in the current health care sector. To the opinion of the researcher, elderly which should be cared for are not receiving the right care at the moment. This thesis creates awareness on problems with patients with a social indication, which cannot be neglected. Besides that, it shows that very much is still unknown on these patients and on potential solutions for the problems. Even relative basic data, needed to analyze the health care provision for this group of patients, is missing. This thesis has opened a Pandora's box by showing these unknowns and on the same hand this box cannot be closed by neglecting the need to deal with these problems. The general value of this research is that it made first steps in the recognition of the problems for these patients and that it creates first insights in the system and processes affecting these problems. These steps and insight create the needed attitude to, eventually, come to the needed knowledge to create actual solutions for these patients. This research should be seen as the first push, which should set the health care sector in motion to take the steps to deliver the right care for these patients.

1 Introduction

1.1. Problem Introduction

Within this section is explained how the complexity of the care system led to a situation where frail elderly patients have a risk of falling between two stools. These patients have too severe problems to stay at home, but do not require hospital care. Because of entry barriers to long-term care and complexity of primary care profiles it is hard for practitioners to find the right form of care for the patient. A large number of these patients are presented at the Emergency Department (ED) of the hospital and due to a lack of good processes to deal with these patients a high number of avoidable hospital admissions is present. Within this section this problem is elaborated on.

1.1.1. Increasing number of elderly at the Emergency Department

Within the Netherlands the population is aging and the current aim of the Dutch Government is to let citizens live as long as possible at their own home(Ministerie van Volksgezondheid, Welzijn en Sport, 2018b, p.5). Due to this aim the population which still lives at home becomes older and therewith becomes more frail. At this moment 38 percent of the 75+-population living at home in the Netherlands are frail elderly(Ministerie van Volksgezondheid, Welzijn en Sport, 2018b). These elderly people have a higher demand for emergency care compared to the average Dutch citizens (Gray et al., 2013; Aminzadeh and Dalziel, 2002). The combination of an aging population and the higher demand per elder patient leads to an increase in the number of elderly people presented at the emergency department(ED) and this increase in presentations at the ED gives high pressure on emergency care capacity within the Netherlands. Within figure 1.1(Rijksinstituut voor Volksgezondheid en Milieu, 2018) can be seen how big the expected impact of the aging Dutch population is on the population health and the health care sector. This figure shows the predicted changes within the population between 2015 and 2040. The most important message from this figure is the size of the foreseen increase. The most exemplary numbers for the increase of the problem at hand are a 191 percent increase[1] in elderly people above 90 years, an increase of 114 percent of patients with dementia, a 143 percent increase in the number of visits at the ED by patients older than 85, a 117 percent increase of elderly patient with a nursing home indication for dementia care and an 157 percent increase in costs due to elderly care. In the budget of the Netherlands for 2020 the health care system is responsible for 82.2 billion euro's, which is 27,2 percent of the total expenditure of the government. In 2040 the expected health care expenditure is increased to 174 billion euro's. Given the fact that the health care expenditure is a substantial proportion of the total expenditure of the Netherlands, the government has to deal with this cost-increase, otherwise the national debt will rise, taxes will have to be increased or care will be affordable and available for less people. A change in the current provision of health care to decrease costs is one of the options to keep health care in the Netherlands affordable.

Since it is impossible to change the full health care provision for elderly in one master thesis, a choice is made to scope on the emergency care provision for elderly at the hospital, since experts at the Albert Schweitzer Hospital in Dordrecht (2018) claim that a change in the emergency care setting could save costs per patient and increase quality for the patient.

[1] An increase of 191 percent means that the amount of elderly people above 90 years becomes almost three times as big (291%), this is not an index.

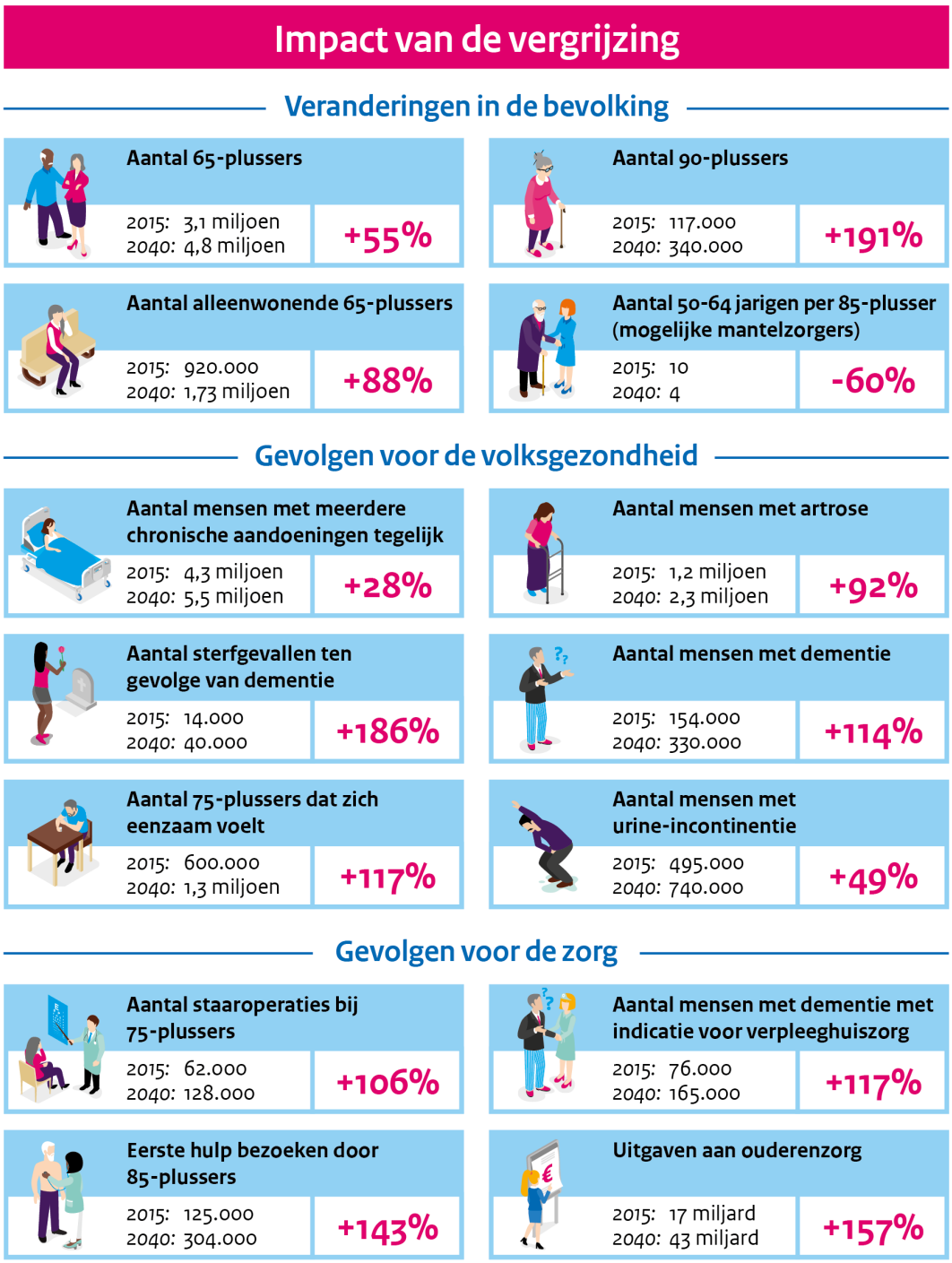

Figure 1.1: The expected impact of the aging population in 2040 within the Netherlands when the situation remains unchanged(Rijksinstituut voor Volksgezondheid en Milieu, 2018)(in Dutch)

1.1.2. Emergency care provision for the older patient

In case of an acute emergency situation most people will contact the general practitioner (GP) or the emergency number. Based on the information given on the situation, the GP or the employee of the public-safety

answering point will decide if hospital care is necessary. When it is decided that these frail elder patients need hospital care, they first will be presented at the ED of the hospital. These frail elderly however are different in comparison with the average person.

Most frail elderly patients have multiple health problems, so-called multimorbidity. A holistic view has proven to result in better medical outcomes regarding these multimorbid elder patients (Fallon Jr et al., 2006). The view that these elder patients need other processes when presented at an ED is well-grounded in literature, given the large extent of research on how to screen these patients (de Gelder et al., 2016; Staudenmayer et al., 2013; van Hensbroek et al., 2009; Fan et al., 2006; Rutschmann et al., 2005; Phillips et al., 1996) and the identified need for geriatric[2] emergency departments (Brooks and Peetz, 2017; Hwang and Morrison, 2007). Within these geriatric emergency departments not only the screening is adjusted to the elder patient, but the whole setting is less hectic in comparison with an average ED. More time is reserved for the patient, more room is created for family and the specialists available have more expertise on older patients. This literature shows the adjustment of processes specific for the needs of elderly can increased quality for these patients. So adjusting the processes for elderly is not only an option to decrease costs, but also to increase quality. As mentioned before, the experts at the Albert Schweitzer Hospital (2018) claim to have done both in one changed process for elderly patients presented at the ED.

1.1.3. Unnecessary hospitalization

A way to decrease the cost and increase the quality of the health care for the elderly is to prevent unnecessary hospitalization of these patients. Unnecessary hospitalization of a patient is unwanted from societal and patient perspective. A hospital admission is more costly than an admission to a nursing home (Kramer et al., 1997), leading to higher overall health care costs. And during an admission to the hospital the risk of adverse events for the patient, such as the incidence of delirium, infection, mortality, and the prescription of potentially inappropriate medications, is high for hospitalized frail elderly (Leape et al., 1991; Szlejf et al., 2012).

The number of potentially avoidable or unnecessary admissions is high within this group of frail elderly people. Mytton et al. (2012) reported 20 to 32 percent of hospital admissions in elderly is avoidable. However, finding an objective definition for the distinction between necessary and unnecessary admissions is not a simple task. 'Necessary' is a subjective term and is dependent on the opinions of different people and on the context of the hospital. As Cardona-Morrell et al. (2017) described, estimates for inappropriateness of admissions can not be standardized due to the heterogeneity of subjective parameters and the justification of these admissions from local context.

The Dutch minister made a statement on the necessity of hospital care: *"Too much care is delivered within the walls of the hospital or within a care institute. Care should be provided within a hospital only when necessary."* (Bruins, 2018). From this statement, it can be concluded that care, from a governmental perspective, only should be provided in the hospital if the needed care can not be delivered at home or within another care institute. Within this thesis a necessary admission will be defined as *An admission based on a need for diagnosis, observation or treatment which only can be provided at the hospital.* Based on this definition which admission is necessary differs based on regional, temporal and personal factors. The provision of care by other care providers in the region of hospitals determines which care can only be given inside the hospital, due to innovation over time technical products and services make more care out-of-the-hospital possible and a specialist at the ED determines based on expertise and personal opinion if the need for diagnosis, observation or treatment is really present. However, further in this research the ambiguity of the term unnecessary admission must still be taken into account.

A distinction can be made between *clinically necessary* and *socially necessary*. A socially necessary admission in the context of older people is defined as: *"an admission due to mitigating social circumstances that by and large are occurring because of a structural gap in the health system, where older frail patients without prospect of improvement in their clinical condition cannot otherwise be cared for."*(Cardona-Morrell et al., 2017, p.46). The patient has no other place to go. This definition also implicitly shows a way to avoid social necessary admissions by closing structural gaps in the health system. If such a group of patients can be defined and a solution for this gap can be found admissions previously seen as socially necessary can be avoided. Patients admitted to the hospital under a social indication are these patients which are admitted to the hospital, only because this is socially necessary. These patients have a care need which makes it impossible to go home, but the care need is not severe enough for a hospital admission to be needed. Since

[2]Geriatrics is a medical specialty focusing on the treatment of elderly

there is no other place to go these patients are admitted under a so-called social indication. The definition of elderly patients with a social indication are those *elderly patients with need of care from a care institute other than the hospital, presented at the emergency department.* Since this indication is not an official hospital indication and an indication is needed to get funding from the healthcare insurer, the most applicable hospital indication will be applied. This is not allowed, but this is seen as the only way to provide care for the patient.

From the statement of the minister ("Too much care is delivered within the walls of the hospital.") it can be concluded that a group of patients exists which are not at the right place within the hospital. In practice, such a group is identified within the acute presenting elderly. One example of problems found in these elderly patients leading to a social indication, is a hip contusion. If someone has a hip contusion this patient has mobilization problems, since he or she cannot move from bed to toilet due to pain. Due to this problem the patient needs support with mobilization from bed to toilet, which makes a return to home impossible. On the other side a hip contusion cannot be cured by medical specialized treatment (such as a surgery or medicine with a need for supervision of a specialized doctor), but needs time and rehabilitation to heal. The need for treatment cannot only be provided in the hospital, since this needed rehabilitation and support are forms of care which can also be given within a primary care institute. Given this situation such a patient preferably goes to a nursing home. However in practice, these patients are often admitted to the hospital or send home with the message that the GP should arrange the care.

There are three main reasons why such a patient is not referred to the nursing home. (1) The patient is not identified as a patient with a social indication, since the hospital staff is primarily only answering the question 'Is there a medical reason for hospital admission?' and not investigating if the patient can go home or not. (2) Hospitals do not have quick processes to refer such patients to other care facilities and since arranging a place in a nursing home is time-consuming the admission is the easy way out. (3) Hospitals are under financial pressure and referring these patients to nursing homes leads to less income for a hospital. Since, at the moment such a patient is admitted under a hospital indication the hospital gets paid for the care delivered. Because of this three reasons not all hospitals recognise the current situation as a problem.

1.1.4. Big cultural and judicial influence

A notion has to be made on this thesis. The arrangement of elderly care is highly affected by cultural and judicial factors. The perception on the states' responsibility on elderly care differs per country(Haberkern and Szydlik, 2010). Between countries it differs to which extent elderly care is seen as a family matter. In some cultures it is very normal as child or grandchild to take care of your elder parents or grandparents. Elderly go living with their children when living apart becomes impossible and they become a part of their child's household. Within many western countries the provision of elderly care is seen as the responsibility of the government(Haberkern and Szydlik, 2010). This has an influence on the necessity of a hospital admission. In countries where elderly care is seen as a family matter, family will provide more care at home. The role of family is a way to close gaps in the formal health care provision(O'Hara et al., 2019). In countries were the degree of informal care is higher, this will lead to a smaller number of socially necessary admissions, since gaps in the health care system are closed by family instead of the hospital. Within countries where the perceived responsibility lies within the state more use is made of care in institutes (Haberkern and Szydlik, 2010). If the supply of beds in this institutes is not big enough, this leads to capacity problems. This capacity problem can cause a structural gap in the healthcare system. The care which should be provided in the nursing home cannot be delivered anymore, leading to more patients with a social indication in the hospital. This thesis is only applicable to countries where a gap in care between hospital care and nursing home care exists, but for big parts of the world this structural gap is closed by the use of family members of the elderly to provide informal care.

Countries describe how the health cares system for elderly are arranged within the law of that specific country. These laws dictate who is responsible for the care, who should pay for the care and/or under which conditions the care is arranged. The structural gap leading to unnecessary hospitalization as is mentioned within subsection 1.1.3 exist between health organizations, more explicitly between the hospital and other care institutes. The differentiation of health care providers is dependent of how the health care system is designed. In health care systems with a high number of differentiated defined health providers a potential for structural gaps between these defined health provides exist. Compared to health care systems where only a small number of different health providers are present this chance is much bigger. For example, the Dutch health care system has specific roles and tasks defined for a GP, hospitals and care institutes, while in less developed countries, health care is available via regional clinics. In the Netherlands gaps can occur at every interface between health providers, while if all the care is delivered at the same spot, these kind of structural

gaps do no exist. Logically differentiation of health care providers also has a lot of positive point, such as the possibility to specialize in different forms of care and entry barriers to specific forms of care. Although when reading this thesis it is important to know that the design of the health care system, as is defined within national laws, is a factor which influences the chance of structural gaps occurring. And this thesis is only applicable to those countries where the differentiation of health care providers in the defined system is in such a way that this structural gap between hospitals and care institutes occurs.

1.1.5. Complexity of care within the Dutch health care system

This thesis is focused on the solution for the structural gap in care between hospitals and nursing homes within the Dutch healthcare system. To understand why this unnecessary hospitalization occurs and what the exact difficulty of the problem is, knowledge on the Dutch Health care system is needed. The Dutch healthcare system is highly differentiated, with a lot of different forms of health care defined within different laws. The healthcare system itself scores among the best of Europe and the world with a second place in the Euro Health Consumer Index of 2018 (Health Consumer Powerhouse, 2019) and a global 15th place on the Bloomberg Healthiest Nation Ranking (Miller and Lu, 2019). However the high degree of differentiation and specialization also has led to a situation where a lot of different indications for different forms of care exist. Determining the correct indication for a patient and arranging the matching care to the indication is not an easy task.

Since the 1st of January of 2015 the healthcare system in the Netherlands is described within three different laws; the Health Insurance Act (Zorgverzekeringwet(Zvw)), the Long-Term Care Act (Wet Langdurige Zorg(WLZ)) and the Social Support Act (Wet Maatschappelijke Ondersteuning(WMO)). This system of different laws is complex, but this construction is chosen for to improve the quality of health care, to increase the responsibility of the citizens in care and to make sure health care stays affordable (de Vries, 2014). Different forms of care are arranged in different laws. An elaborate explanation on the Dutch healthcare system is published by the Ministerie van Volksgezondheid, Welzijn en Sport (2018a). Within this thesis only the application of this laws on elderly care will be discussed. Important to know is that the care under the Zvw is paid by health insurance companies, care under the WLZ is paid by the national government and care under the WMO is paid by municipalities. For some forms of care it is easy to determine within which law the care falls. For instance, all care given in a hospital is covered within the Zvw[3].

However for other forms it is much harder to distinct which law covers that form of care. An example is intensive homecare[4]: Intensive homecare is covered within the WLZ if three conditions are met. (1) The patient needs the care due to a somatic disease or disability, dementia, a mental disorder or a physical disorder, (2) it is clear the patient needs permanent (livelong) care, and (3) the patient has a need for permanent surveillance or 24 hour per day care nearby. However this same care can be delivered under the Zvw if a patient meets three other criteria. (1) The patient is capable of judging when to call for help, (2) the patient is physically able to call for help, and (3) if the patient needs to wait for help this will not immediately cause an unsafe situation (Ministerie van Volksgezondheid, Welzijn en Sport, 2019). On paper this sounds like a clear distinction, however a grey area exist where there is doubt if the care is lifelong or if waiting for help will immediately cause an unsafe situation. And next to that, frail elderly become more frail gradually over time and not a clear moment in time can be pointed out from which a patient does need permanent surveillance. Since a shift from care covered by the Zvw to care covered by the WLZ entails that the central government has to pay care instead of the health insurance, this shift causes bureaucratic hassle and uncertainty for the patient, dealing with new organisations for the provision of needed indications and approval for care. The care itself is often delivered by the same organisation as before. More examples can be given to show it is not always easy to determine which law covers which kind of care and therewith which organisations are responsible for the provision and approval of the care.

Within the acute care setting of elderly the WLZ and Zvw are the main applicable laws. The WMO describes material and informal support for people with disabilities, such as adjustments to a house to improve mobility, adjustments to decrease fall risk and the arrangement of domestic help. The aim of the WMO is to ensure that people can continue to be productive members of society and to continue living at home (Ministerie van Volksgezondheid, Welzijn en Sport, 2018a). The care covered by the WMO is not sufficient within acute care settings and is not applicable to patients with a social indication, since these patients cannot go home due to a need for medical care. In general the WLZ covers all forms of long-term care[5]. The Zvw covers

[3] some small exemptions exist, but these are negligible for this thesis

[4] Intensive homecare is care where a care provider provides care to the patient on average 4 or more times a day

[5] long-term care is the official term to describe permanent care, so when a patient receives long-term care the expectation is that the

all forms of curative care[6]. However in practice, this distinction is not always easy to make, as is shown in the example on intensive home care.

As is mentioned before, within the health care system different forms of health care are determined. The way these forms of cares are described differ on the institute which delivers the care. All forms of care delivered in a hospital are described within Diagnose-treatment-combinations (Diagnose-BehandelCombinaties (DBC'S)). Within the Netherlands around 4400 DBC's are described. A DBC is a trajectory with a maximum of 120 days and within this DBC is decided what the total number of activities (needed for diagnosis, treatment and monitoring) to deliver the needed care for the patient is. The doctor or practitioner determines which DBC is most applicable for the needed care of the patient and the chosen DBC determines the amount of money the hospital gets paid. The main reason DBC's are described by the government is transparency. In this way policy can be made on uniform information independent of which hospital delivers the care. So, when a patient is being diagnosed at the ED by a medical specialist, a medical specialist does not only determines the needed care for the patient, but also which DBC will be opened. Since for patients with a social indication no hospital care is needed, no DBC will be applicable.

1.1.6. Forms of care within a care institute

If for such a patient is determined the patient cannot go home, the correct form of care needs to be determined. For the care delivered in the community and in care institutes the distinction in forms of cares is made in care indications. Some of these care indications are described within the WLZ, while others are described within the Zvw. The WLZ covers all the forms of long-term care. When someone is indicated under a WLZ-indication, this indication is livelong, since this indication is based on a livelong care need. If the expectation is that the care will not be livelong patients are not eligible for a WLZ-indication. The Zvw, on the other hand, covers the indications for short-term care needs. These are, in general, forms of care with the aim to let the patient regain strength or to rehabilitate the patient. One special category of care, often needed within elderly, is palliative care. Within palliative care, also called end-of-life care the life expectancy of the patient is less than 3 months. Palliative care is livelong, but also short-term, which makes it not clear by which law it is covered and therefor where the form of care is described. Palliative care for those patients not yet indicated under a WLZ-indication is arranged within the Zvw and thereby financed by the health insurance company. If a patient already is indicated under a WLZ-indication the palliative care will be covered within this indication and is therewith funded by the national government. In general three categories of care indications are applicable for elderly: long-term care, short-term care and palliative care.

All of these categories consist of care indications which cover care given in a care institute or at home. Within this thesis is only focused on the care which can be given in an institute, since the patient with a social indication by definition cannot go home. Diving further into these care indications can show the complexity on the determination of what the correct indication for a patient is, besides the sometimes hard to answer question whether a care need is livelong or short-term.

Within the WLZ a lot of livelong care indications exist. Since most indications within the WLZ are defined for patients with mental or physical disorders not all are applicable to the older patient population at hand. Looking at the older patient six different care indications are mostly applied, the so-called nursing-and-caring-indications (Verpleging en Verzorging (VV)). The six indications (WLZ VV4, WLZ VV5, WLZ VV6, WLZ VV7, WLZ VV8 and WLZ VV9b) differ in the intensity and content of care needed. A broad description on the dimensions of this care indications is given here, since the official descriptions of these care profiles given within the Regeling langdurige zorg (2019, Bijlage A) are one page long per indication and to extensive to discuss within this thesis. The law defines six different dimensions of disabilities: Social dependency, psychosocial/cognitive functions, activities of daily living, mobility, need for nursing and behavioural problems. The law also describes the purpose of the care and the dominant basis for the care need. Named purposes are stabilizing, support with deterioration and rehabilitation. Where defined dominant bases are psychogeriatric, somatic and 'psychogeriatric or somatic'. The main problem within determining the correct WLZ-indication lies with patients which do not exactly fit one of six indications. Which predominantly exists when a patient has a care need with a basis in both the psychogeriatric and the somatic domain and therefor the patient needs support in mental and physical deterioration at the same time.

patient needs this care lifelong.

[6] curative care are all forms of care with the aim to cure someone

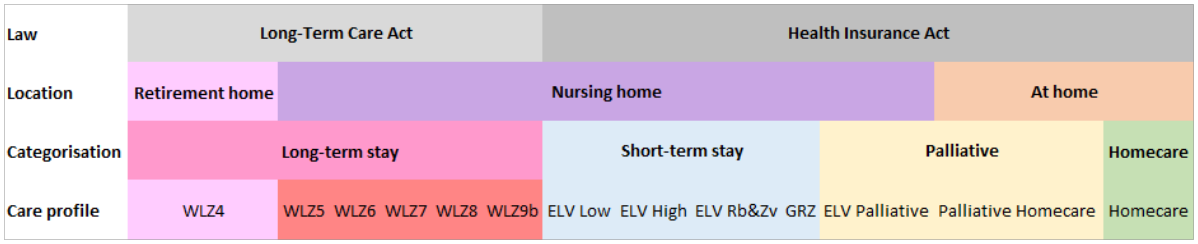

Figure 1.2: Different forms of primary health care in the Netherlands

Within short-term care indications five care indications are applicable for elderly: Primary care stay low complex (Eerstelijnsverblijf laag complex (ELV Low)), Primary care stay high complex (Eerstelijnsverblijf hoog complex (ELV High)), Primary care stay psychogeriatric observation (Eerstelijnsverblijf psychogeriatrische observatie (ELV PG Obs)), Geriatric Rehabilitation Care (Geriatrische Revalidatie Zorg(GRZ)) and Primary care stay Performance-related pay and Care-Innovation (Eerstelijnsverblijf Resultaatbeloning en Zorgvernieuwing (ELV Rb&zv)).

ELV Low and ELV High are applicable when a patient is temporarily to weak to live at home. Under this indication patients get the care to regain strength within a care institute. The difference between both care indications lies within the complexity of the patients problems. If a patient has multiple problems which influence each other ELV High is applicable, if this is not the case ELV Low is applicable. The basis of for the care need within ELV is always somatic, except for on special subform of the 'ELV High'-indication; ELV PG Obs. The purpose of this form of care is a special form of stabilizing, the main goal is to observe if cognitive problems of patient are caused by a delirium, and therewith short-term or caused by dementia, and therewith long-term. After a period of three months at maximum the patient returns home when the confusion is decreased enough or should be indicated under a WLZ-indication if the confusion is livelong.

The fourth short-term care indication is GRZ, which also has the purpose rehabilitation. However, the intensity of care for the patient is much higher in comparison to the forms of ELV-care. A GRZ-indication is only possible when the patient has (1)multiple problems which influence each other and (2) has possible goals for training. The second mentioned condition entails the difference with ELV-indications, within GRZ-care the patient gets therapy to reach this goals. Due to therapies a bigger amount of resources is needed within GRZ-care in comparison with ELV care, therefor the budget for GRZ is higher in comparison to ELV. The basis of for the care need within GRZ is also always somatic.

A fifth less defined care indication is ELV rb&zv. This indication makes it possible for care providers to make special agreements with the health insurance companies for innovative forms of short-term care given in institutes. If a care provider aims to improve short-term care in the region by providing care in a different way which is not in line with the current care indications and the health insurance company agrees that this improves performance, they could arrange a different budget for the patients receiving this care. An example of care given under this indication is a bed for somatic triage of patients to determine if somatic care is short-term or long-term. Within the four other short-term care indications this is not made possible, however in some regions these beds now exist due to regional agreements. The main questions which arise when determining which ELV- or GRZ-care indication is applicable are whether the complexity of the patient consists of multiple dependent problems or not, whether there are reasonable training goals and to what intensity a patient can receive therapy. For patients which have both psychogeriatric and somatic issues, for instance a patient with dementia and a hip contusion combined, needs to be considered if the dementia is not a problem for the treatment of the patient within GRZ-care, no special indication exist for people needing somatic rehabilitation but also suffering with cognitive problems.

Within palliative care only one care indication exists, which is ELV palliative. A patient can be indicated under this indication if the life expectancy of this patient is less than 3 months. This can be indicated by a GP, a medical specialist in the hospital or the Nursing home doctor. As mentioned before, patient already indicated by a WLZ-indication receive the palliative care within the budget of that indication.

Concluding can be said that a lot of questions which can be hard to answer within more complex patients need to be answered to determine what the correct care indication for a patient is. As is described by de Klerk et al. (2019) the high number of different forms of care have led to a complex system where it is hard to find the right type of care. Looking at the problem with unnecessary hospitalization of patient with a social indication in an acute setting the previous complexity in the system could be a reason for hospital personnel to chose the easy way out. In comparison to determining the correct form of care in a care institute, which could

be quite complex, hospitalization is an easier alternative. In that case the complexity of finding the correct care indication itself becomes an entry barrier for the right form of care in the right place as is described by de Klerk et al. (2019).

1.1.7. Entry barriers to care institutes

One of the foundations of the Dutch health care system is the earlier mentioned aim to let Dutch citizens live as long as possible at their home. The main drivers behind this idea are patient satisfaction and costs(Ministerie van Volksgezondheid, Welzijn en Sport, 2018b). To prevent disproportional use of care by elderly people entry barriers are in place. These entry barriers can be seen as the first line of defence against unwanted hospitalization. Within the Dutch healthcare system this function is covered by two actors; the GP's and, for emergency situations, the staff of the public-safety answering point together with ambulance staff. Within working hours GP's will execute this function for their own patient population, outside of working hours patients with a non-emergency acute need for care have to contact the general practice center in the region, mostly located in a hospital. Within the general practice center GP's of the region take shifts to fulfill the gatekeeper function for acute care for a bigger region than their own dedicated patient population. GP's, when an acute care need presents in- or outside working hours, can deliver low-complex care and have to diagnose if a referral to care not expected to being carried out by the GP is necessary. Examples are specialized hospital care, home care or care in a nursing home. To determine if GP's are expected to provide the care themselves or not different protocols per disease or symptom exist. Within this protocols the expert opinion of the GP has an important function.

For some of the earlier mentioned forms of care extra entry barriers are in place. Reasons to put this entry barriers in place are to make use of the expertise of medical specialists to determine whether the care is applicable and to prevent disproportional use of health care resources. For the ELV-indications the GP refers the patient to a nursing home doctor, which determines if the indication is applicable. To obtain the earlier mentioned GRZ-indication, not only a diagnosis by a GP and a nursing home doctor have to be carried out, but also a Geriatric Assessment, performed by a geriatrician or specialist geriatric nurse, is mandatory. The GP refers to the geriatrician, which refers the patient to the nursing home doctor. For every indication covered within the WLZ a doctor from the Care Assessment Agency (CIZ) has to diagnose the patient in addition to the GP's diagnosis. This all together leads to a system where not only the care profiles themselves enhance complexity, but also the entrance to these care profiles and the amount of different actors associated with these entrance processes.

Another entry barrier to follow-up care is the capacity within care institutes. If a patient needs a spot in a care institute the hospital needs to find a care institute with a free spot on the correct indication. Some factors limit this capacity in practice. Care institutes negotiate on the maximum funding they get per year for the amount of care they are allowed to deliver per care indication. For short-term care they make this agreements with the health insurance companies and for long-term care they do this with the Health Administration Office (Zorgkantoor). When the amount allowed to deliver is reached at a point during the year, care institutes will not be paid for the delivered care above the maximum amount. At that point most care institutes decide not to accept new patients for that care indication. Since they make one annual budget agreement per health insurance company, it can exist that patients insured by a specific health insurer are not accepted any more, while patient insured by another are. Two other factors limiting the possibilities to expand capacity, as mentioned by Dutch Health Minister de Jonge (2019), are real estate and the amount of personnel. Within a situation where capacity is limited, it takes more time to find a free spot for the specific care indication needed.

Due to the complexity of determining the right form of care and the entry barriers to arrange this care referring patients to a care institute is not always easy. Especially in an acute situation the time needed to fulfill this tasks is not always available. To make quick referral to care institutes possible hospitals have to design a process which assesses patient needs and redirects them to the right form of care. At the moment the patient presents itself it is not yet clear if this form of care has to be delivered inside the hospital, at home or in a different care institute. The assessment of the need of care, the determination of the right care indication and the arrangement of needed follow-up care combined is called a referral process.

1.2. Research Objective

The main objective of this research is to assess the effectiveness of referral processes. As is mentioned in section 1.1 direct referral could prevent unnecessary hospitalization. While complexity within this kind of

referral exists, the Albert Schweitzer Hospital (2018) claimed direct referral is possible. This research is the first to do fundamental research on the direct referral from the Emergency Department to other Care institutes to see if it is effective or not. Since there is very limited research on these processes, assessing the effectiveness is not an easy task. As is described within this introduction the problem clearly lies on system level, since the nature of the problem lies between different stakeholders. Which makes the assessment even harder, since the effectiveness itself of such a process is perceived differently by different stakeholders. The effectiveness of a referral process therefore can be constructed in different ways and therefor when assessing the effectiveness on system level these different perspectives needs to be taken into account. Besides that, there is also a lack of a clear description of such processes. The first step to come to clear recommendations for improving such processes is to make the processes clear to all stakeholders. The second step is to identify if such a process is effective or not. Only when the degree to which a referral process is effective is assessed, can be researched what barriers prevent better effectiveness of referral process and how to improve this referral process. This thesis will focus on the first two steps and will leave further improvement of the referral process out of the scope of this research.

Therefor the research objective of this research is twofold:

1. To find a description of a referral process in such a way that stakeholders can understand and agree on the process
2. To design a method to assess the effectiveness of a referral process.

To achieve these objectives a main research questions and different sub questions need to be answered. The main research question to answer with this research is:

How to describe and assess referral processes for elderly patients with a social indication?

This research question needs to be divided into easier to answer sub-questions. These sub-questions together answer the main question of this research.

1. How to measure the effectiveness of a referral process from a systemic perspective?
2. How can a referral process be visualized for communicability and to what degree do stakeholders agree to this desciption of a referral process?
3. How do stakeholders perceive indicators of effectiveness of a referral process?
4. What is the current effectiveness of the referral process in the Albert Schweitzer Hospital in Dordrecht?

1.3. Research methodology

An assessment method without a clear description of the process is impossible, therefor the main goal of this research is to design a method to assess direct referral processes for frail elderly from the ED of the hospital, which takes the multi-perspective context of the system into account. Within the description of this research approach the terminology could lead to a lot of confusion. Therefor firstly a clarification is needed on the terminology within this research approach. A distinction has to be made between the *design approach* and the *assessment method*. The *design approach* is the approach which is chosen by the researcher. It generates a method to assess referral processes. The *assessment method* is the product of the design approach. It consists of a step-by-step method which determines the effectiveness of a process when applied on referral processes. The referral process itself is the actual execution of referral of a frail elderly.

1.3.1. Dealing with exploratory research requires preparation and flexibility

In this research the design approach is a way to design an object which fulfills the goal of the research. However, an analogy can be made with physical ways, although someone can theoretically think of the ideal way to a destination, sometimes barriers prevent an explorer from taking this route. In that case shortcuts or detours need to be taken to come to the destination. Within explorative endeavours, such as this research, no clear ways to the destination exist yet. To make sure that the design approach eventually leads to a fulfillment of the goal of the research it not only has to deal with the barriers known beforehand, but also with unknown barriers which could be encountered on unknown terrain. Exploratory research asks for a combination of good preparation on one hand, by considering beforehand which barriers are expected and how to deal with

them and flexibility on the other hand, by dealing pragmatically with barriers along the way. The main goal of this research is not to assess the effectiveness of a referral process, but to design and reflect on an assessment method to do this. Or as American poet Ralph Waldo Emerson once said: "It's not the destination, it's the journey."

1.3.2. Design approach

The design approach of this thesis very much influenced by the specific context of this research. Very limited information and literature or prior research on direct referral of frail elderly from the ED of a hospital is available at the start of the research. However, on the other hand a practical project where this form of referral is implemented is available. Therefor it makes more sense to gather the information on the effectiveness from practice, rather than from literature. The expected information from a very large literature search on this specialized topic is very limited, since prior research hardly exist. Broader literature on assessment of effectiveness in general or within the health sector is available. Therefore is chosen for a two-step design approach. This is an iterative approach which uses both literature on assessment methods for effectiveness, but also the practical data available. The first step can be seen as the preparation-phase, while the second step implements the flexibility needed in explorative research.

The first step consists of a small literature search to determine requirements for assessment methods for effectiveness. By looking at the complications within the assessment of effectiveness in general and determining the impact of these complications on the assessment of the effectiveness of the referral process different steps can be designed to deal with this complications. Also the available information from the case project will be taken account into this design. A step-by-step design of an assessment method can be created which deals with the complications and eventually leads to an assessment of the effectiveness.

The second step is used to determine whether the designed prototype of the assessment method is feasible in practice and to determine further complications in the application of this method. It can be considered as a testing phase of the assessment method. To do this the assessment method will be applied to the Zorgtransferium-case in Dordrecht. In this way both general information on assessment of effectiveness within the first step and the specialized information on this topic is used by applying it to the case and dealing with the complications specific within this topic. Within this testing phase the assessment method is applied step-by-step and per step is determined what the complications for application are and how to deal with this complications. Based on this complications alterations are made to the prototype method to come to a final assessment method.

Overall this approach deals with the lack of specialized theoretical knowledge on the assessment of effectiveness of referral processes. On the other hand the available knowledge, which consists of both general theoretical knowledge on assessment of effectiveness and the specialized practical knowledge from the case, is used to come to the best method which not only is theoretically sound, but is also applicable in practice. In the following paragraphs will be explained in further detail what every step in the design approach entails.

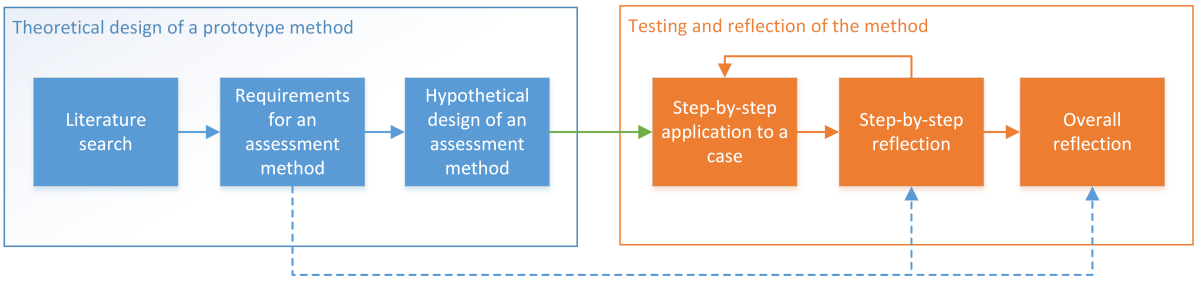

Figure 1.3: Two-step design approach to come to a tested assessment method for the effectiveness of direct referral of patients with a social indication from the ED of the Hospital

1.3.3. Literature search on assessment of effectiveness in health care

As is explained, no literature is available on the assessment of effectiveness of direct referral of patients with a social indication from the ED of a hospital. However, literature on effectiveness assessment in general and within health care is widely available. Since it is easy to lose yourself as a researcher in the large extend of literature available, the choice is made to do a relative small literature search to find largely cited articles or authors on effectiveness and quality assessment. This is done within google scholar. The search starts with the search terms: ((Assessing OR Evaluating) AND (Quality OR (Quality AND Care)) en ((Assessing OR

Evaluating) AND (Effectiveness OR (Effectiveness AND Care)). From there the researcher searches for interesting articles which focus on the challenges within effectiveness assessment to come to requirements for an assessment method. To come to a list of requirements which represents the core challenges within effectiveness assessment, articles which address multiple generic challenges will be chosen. The chance that more specialized challenges described in literature do not apply to the problem at hand is too big and therefor these are not included within the requirement list. Within the search the researcher had a special focus on challenges within assessment of processes with multiple stakeholders or organisations involved.

1.3.4. Requirement creation

From what is found within literature can be concluded which different purposes should be incorporated within an assessment method. Also can be concluded with which challenges an assessment method has to deal. The purposes and challenges to deal with can be transferred into functions an assessment method has to perform. These can be described within functional requirements which an assessment method should fulfill. These requirements together form an overall overview of what an assessment method should do. An example on how to do this: A challenge for high buildings is that on higher altitude more wind is present, which could lead to failure of the construction of the building. The functional requirement in that case would be that "a building at least has to withstand wind speeds of X number km/h".

1.3.5. Design of an assessment method

Based on the requirements a step-by-step method can be designed, which deals with the requirements in the right order. As example it does not make sense to first assess and then describe the process. So the method will consists of the different steps to take in the right order to come to an assessment of the effectiveness. Per step a tool will be chosen to fulfill this step. The tool will be chosen based on the fit to the context of the referral process in the hospital. Familiarity by the stakeholders and evidence that it is suited for the purpose of the step of the method are important factors for choosing the right tool.

1.3.6. Step-by-Step testing

A case will be used to test the assessment method with the goal to reflect whether the assessment method is not only feasible on paper but also in practice. The Zorgtransferium at the Albert Schweitzer Hospital will be used as proof of concept that the assessment method is feasible. More on the case will be explained within paragraph 1.3.9.

1.3.7. Step-by-Step reflection

After every step will be reflected on this step, otherwise nothing can be said on the feasibility of the step. Within this reflection will be reflected to what extent the step meets the purpose of the step or the requirements the step should fulfill. New challenges found by executing the step will be elaborated on and a way to deal with these will be explained. Reflection concludes in design rules for further design of assessment methods of referral processes. It summarizes the learning points of this research in order to help further researchers deal with the found challenges and to prevent them from making mistakes made in this research Based on this reflection the method step is tested and from that moment it is known how to make it a feasible method step in practice.

1.3.8. Overall reflection

Based on the different reflections of the individual method steps it can be said under what conditions the method is feasible to use in practice. Besides that some overall reflection is needed to explain what the overall quality of the method is and to what extend the assessment method can be used in the future to assess the effectiveness of direct referral processes from the ED of the Hospital. The collection of design rules should function as a good overall overview.

1.3.9. The case: the Zorgtransferium at the Albert Schweitzer Hospital

To test whether this research method is feasible a case will be used as a proof of concept. As case is chosen for the Zorgtransferium-process at the Albert Schweitzer Hospital in Dordrecht in the Netherlands. Within Dordrecht a project team developed the Zorgtransferium within 2017 to make quick referral of patients from the Emergency Department to nursing homes possible (Albert Schweitzer Hospital, 2018). The process first started as a pilot and since this pilot was, according to the different stakeholders, successful, the process is

now implemented as a standard on the ED. This process is already seen as an improved referral process and overall the different stakeholders are very enthusiastic about the project. However, the real effectiveness of the process is never researched. The statement that this process is a success is more of a hunch of the different stakeholders than the conclusion of proper research based on actual measurements. This makes this case specifically interesting to research. The stakeholders have insight in the process itself, since it is explicitly designed in cooperation with these stakeholders and because of their involvement, clear stakeholder perspectives on effectiveness exist. Both factors help in validating the process and in collecting indicators.

1.4. Thesis Structure

Within Chapter 2 the found literature on the assessment of effectiveness is presented (2.1) and based on this literature an assessment method is designed (2.2). Within Chapters 3, 4 and 5 the method presented in Chapter 2 is applied to the case and per chapter a section is added to reflect on the application of the method. Within Chapter 3 a visualization of the referral process of the case is visualized as part of the assessment method. Within Chapter 4 the stakeholders are selected and indicators for effectiveness are identified and selected. Within Chapter 5 data on the effectiveness is collected and analysed to come to conclusion on the effectiveness of the referral process. Within Chapter 6 the design rules per step of the assessment method are concluded, the research questions are answered, the contributions of this research are explained, is reflected on the generalizability of the assessment method and recommendations for further research is presented.

Within Appendix A the interview guide used to interview the stakeholders is displayed, within Appendix B the Goal trees constructed in the interviews are shown and within Appendix C a Causal Relation Diagram shows the different relations between the generated indicators. Appendix D and E give more insight in the data collected for this research. Within Appendix D the data is presented in an overview-table and within Appendix E the data is further explained.

2

Designing an assessment method

2.1. Challenges within the assessment of effectiveness

As is mentioned, an assessment method will be designed based on known challenges on assessment of quality and effectiveness. Within this section the challenges will be substantiated and translated into requirements.

2.1.1. A general assessment method

In general assessing something can be divided in some simple steps: (1) Determine which object has to be assessed, (2) determine what you are going to assess of the object of study, (3) determine how to assess it and (4) assess it. The topic of this research is the assessment of the **effectiveness** of **referral processes.** Which are the direct conclusions of respectively step 2 and 1. Unfortunately, no assessment method exists on how to do this (designing such a method is, after all, the main goal of this thesis). There is a need for an objective assessment and preferably this is done by measuring the actual effectiveness. These measurements can be clearly described, which will lead to an objective outcome of the effectiveness. So step 3 exists of two simple steps, determine an indicator for effectiveness and determine a way to measure this indicator. To come to this indicator of effectiveness a search on effectiveness within health care is performed within literature.

2.1.2. Definitions of Successful, Quality and Effectiveness

From literature can be found that three different concepts are intertwined on the assessment of health care: *successful, quality* and *effectiveness.* When looking at the Oxford dictionary to give basic definitions of these concepts the following definitions are found: Effectiveness is *the fact of producing the result that is wanted or intended; the fact of producing a successful result*, Quality is *the standard of something when it is compared to other things like it; how good or bad something is* and Successful is *achieving your aims or what was intended.* Given these definitions they all say something about the performance of something on an intended goal. Since they are all measures of the performance of an object of study on an intended goal, these concepts are all seen as the same concept within this thesis. The main term used in this thesis will be effectiveness, however this is interchangeable with the other two concepts. In search for a clear objective of effectiveness the three different concepts are all included to have a broader insight from literature and not only focus on the limited set of published literature on effectiveness. The description used to define effectiveness is in line with research of Cameron (1981) on effectiveness and the research on quality of care by Donabedian (1966).

2.1.3. Subjectivity of effectiveness

As Cameron (1981) already mentioned in the early 80's, when he described organizational effectiveness, effectiveness is inherently subjective. Cameron also states effectiveness is *"a construct which cannot be observed directly (p.107)"* and cannot be defined objectively, since constructs have no basis in reality. Construct is defined by the Oxford English Dictionary (2019) as: *"An object of perception or thought, formed by a combination of present with past sense-impressions."* Cameron describes effectiveness as an abstraction that gives meaning to an idea or a notion. Donabedian (1966) described that: *"... the definition of quality may be almost anything anyone wishes it to be, although it is, ordinarily, a reflection of values and goals current in the medical care system and in the larger society of which it is a part."* Given these descriptions of effectiveness and quality, the question arises how to assess these concepts, since they are described as fully subjective to the person or

organization determining it. And how can we measure these concepts, when their is no single well-accepted unit to measure them?

2.1.4. Effectiveness as a construct of indicators

An ideal situation, where extensive research has led to globally accepted units to measure an effective referral, is not present. Therefor the research method has to come up with a way to determine one or multiple units to measure an effective referral. Cameron (1981) presents a way to come up to these units, since he described a construct space of effectiveness can be defined by answering the question: *"What is and what is not an indicator of effectiveness?"* Also Donabedian (1966) states implicitly that, to define quality, a multitude of possible dimensions and criteria can be selected. Since the effectiveness consists of multiple indicators, these individual indicators can be measured and together give a comprehensive impression of the effectiveness.

Given the different definitions of effectiveness, quality and successful mentioned above, the definition used in this paper is: *Effectiveness is the construct of individual indicators perceived important, which describes the extend to which the intended result is achieved.* Where it is important to notice that multiple indicators combined are the effectiveness and that which indicators are part of the effectiveness and which are not, are based on a perception of importance by a person or organisation.

However, given that it is possible to identify indicators perceived important two new questions arise: *What different indicators in general are suited to assess effectiveness?* and *Which perceptions have to be included and excluded when defining indicators for effectiveness?*.

2.1.5. Different levels of indicators for Quality of Care

When looking at which indicators are suited to assess effectiveness, one of the main paradigms found on the quality within the health care sector is the Quality of Care Model described by Donabedian (1966). Donabedian introduced three levels of indicators to assess quality in the paper *Evaluating the Quality of Medical Care*. These three levels of indicators are different in what aspect they are measuring: *Outcome*, *Process* or *Structure*. The outcome-indicators are those indicators which measure the extent to which the actual purpose of the care given is reached, process-indicators are those indicators which assess whether a defined process is applied correctly, while structure-indicators asses the setting in which the care is given (looking among other things at the facilities, qualifications of medical staff and the administrative structure).

According to Donabedian (1966) measuring the outcomes of care is preferable above the other two levels, as he states indicators on outcome-level are *the ultimate validators of the effectiveness and quality of medical care*. Assessing quality by examining the process is useful when the interest of assessment lies in whether *what is known to be "good" medical care has been applied.* It assumes that since the process has proved to give good outcomes, applying the process correctly also gives good outcomes and therefor leads to high quality of care. Assessing the structure of care makes sense due to the *"assumption that given the proper setting and instrumentalities, good medical care will follow."*. Measuring indicators on structure-level will only be chosen if no data is available on the indicators on the other two levels and acquiring data on these levels is not possible.

Looking at the Zorgtransferium, it is not yet known whether the new process to deliver care to elderly patients with a social indication eventually leads to good medical care. The interest of the assessment of this research lies both with the question whether the process delivers good outcomes and whether the process is applied as described. Since when the process applied is different as the process described it can not be concluded that the described process leads to the outcomes measured. So the argumentation consists of two steps: (1) If the process as described is the process as applied and (2) the applied process leads to good outcomes, than the process as described leads to good outcomes. Preferably process-indicators for the argumentation in the first step, while outcome-indicators are used for the second step. Beforehand, it is known that data whether the process is applied correctly, in this case is spread over different systems or not documented at all. Documenting each step fully would have been useful for research purposes, however it would harm the efficiency of the referral process if the actors executing the process would have to do this with every step. A way to deal with this lack of data is for the researcher to acquire this data by analysing the actors when executing this process. However, since time for the research is limited and the task of acquiring this data is very time-consuming, a choice is made to rather collect data on outcome-indicators than on process-indicators. To deal with the lack of data on process-indicators a shortcut has to be taken. Within this research is chosen to validate the process by asking actors whether they agree if the process on paper is the process as applied. However, if data on process-indicators is available the recommendation it to built the argumentation on this data rather than on face validation by the stakeholders.

2.1.6. Perception of individuals

The next question to answer is which perceptions to include within the research. Because, as is stated by Donabedian (1988, p.1743): *"Before we attempt to assess the quality of care, either in general terms or in any particular site or situation, it is necessary to come to an agreement on what the elements that constitute it are."* However, four problems exist within the perception of effectiveness by individuals (Cameron, 1981):

1. Different stakeholders have different (sometimes conflicting) preferences for indicators. Even within a stakeholder group the preferences can differ.
2. Preferences of stakeholders change over time.
3. Contradicting preferences can be preferred simultaneously within a single stakeholder.
4. Individuals have problems with identifying their (preferences on) criteria for effectiveness.

The research method has to deal with these problems. The first characteristic emphasizes it is important to take the perspectives of different stakeholders into account, since indicators can differ from one stakeholder to the other. Since preferences change over time it is important to take the change of indicators over time into account. Contradicting preferences within a single stakeholder is expected within greater organizations of departments. To diminish this effect the perspectives of individual persons will be looked at, instead of the perspectives of organizations. And because individuals have problems identifying their own criteria, techniques need to be used to help individuals to identify their own preferences on indicators. So before the actual assessment on the indicators of effectiveness can be executed, the assessment method not only has to decide what the important stakeholders are, it also has to deal with the perspectives of the important stakeholders to come to a good set of indicators defining the construct space of effectiveness used in this thesis.

2.1.7. Requirements for assessment methods for referral processes

Based on the prior information some requirements for assessment methods are determined. The requirements are split into functional requirements, requirements the method has to do, and secondary requirements, requirements which should be taken into account when performing the method. Secondary requirements are assigned to functional requirements to show within which function of the method the requirements have to be taken into account.

- The method has to clearly describe the object of study.
- The method has to take the perspectives of different stakeholders into account.
- The method has to determine which stakeholders to take into account.
- The method has to collect indicators determined important by different stakeholders.
  - The method should focus on indicators of output, rather than indicators of process or structure.
  - The method should take the change of indicators over time into account.
  - The method should take the perspectives of individuals rather than organizations into account.
- The method has to produce a set of indicators as the construct space of indicators.
  - The method should help individuals to identify their preferences on indicators.
- The method has to measure the chosen indicators.

2.2. Assessment method of Effectiveness

Given the information above a process for the assessment of the effectiveness is designed. This process, shown in figure 2.1, consists of five different steps: description of the object of study, indicator collection, indicator selection, data collection and data analysis. The first three steps are there to deal with the perspectives of individuals, while the last two steps are built in to determine values for the indicators of effectiveness. Per research step a tool is used to execute this step and a deliverable is the output of that research step. This deliverable is the input for the next process step.

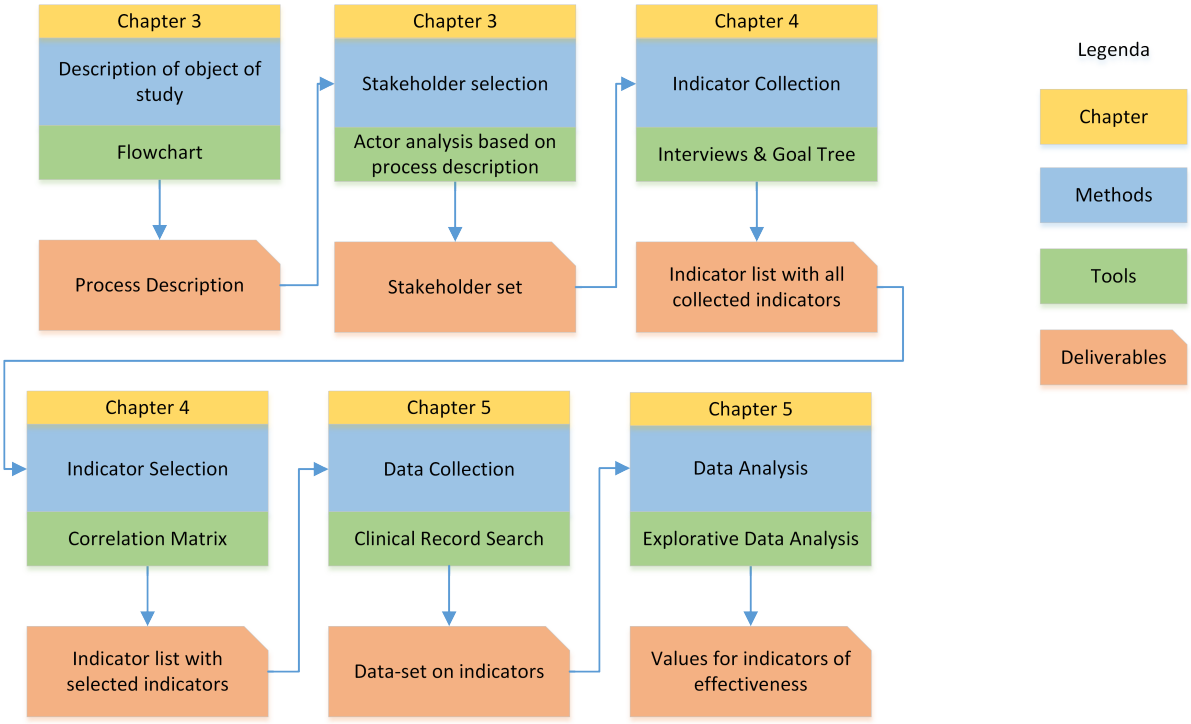

Figure 2.1: Research methodology for assessing the effectiveness of a process

2.2.1. Describing the object of study

At first the object of study, in this case the referral process, needs to visualized or clearly described to the stakeholders. This becomes even more important when the object of study is a process and therefor consists of multiple steps, because this makes it harder for individuals to grasp the whole object of study. Thinking about indicators of effectiveness for abstract ideas is a design exercise which requires a lot of imagination and abstract thinking of the stakeholders. This makes it hard to come up with clear indicators. While, when the object of study is clearly visualized the identification of indicators becomes a much clearer and more practical exercise, because individuals can think of the different steps instead of the process as a whole. For the referral process within this research a process description has to be made.

To do this, a widely used method for visualizing processes will be applied to the case project. Within the choice for a visualization method the goal of the process description is an important factor. As mentioned before, the main goal of this process description is to make the process understandable for the stakeholders. In order to do this the description should be as easy as possible, without the visualization method being so simplistic that it loses the ability to grasp all important aspects of the process. A method which reaches these requirements is the Flowchart method (Edraw, 2019). A Flowchart is a visualization language used specifically for processes. The main advantage of flowchart over other process visualization methods is that flowcharts are widely used within the medical sector. Since all stakeholders are working within the medical sector this familiarity with the method helps for understandability. Other methods such as IDEF0 (Lightsey, 2001, p.51) or a BPMN Swim lane diagram (Genexus, 2018) give the possibility to add extra components to the process, such as control elements or roles of stakeholders, but these methods also add extra complexity which is unwanted for the communicability of the diagram. Therefor the Flowchart method is chosen as visualization method. This application will eventually lead to an easy-to-understand visualization of the process.

In the case the chosen starting point of the process is the moment an elderly patient is presented at the ED. From that point is examined what happens with the patient. The further application of the flowchart method can be found in Chapter 3.

2.2.2. Determination of important stakeholders

As is mentioned in section 2.1.3 objective effectiveness does not exist. It is a construct of perceptions of stakeholders. However to come to a widely supported construct of effectiveness, the perceptions of different stakeholders need to be identified and out of these perceptions a general construct of effectiveness needs to

be composed. The decision which stakeholders to interview determines which perspectives are represented within the final construct space of effectiveness. Therefor the researcher has to make sure that the set of stakeholders is a good representation of the perspective chosen to take in the research. For instance, if a researcher researches the effectiveness of a company selling a product different perspectives can be taken. The first research could focus on the effectiveness of the selling process for the buyer, while a second one could research the effectiveness from the seller perspective and even a third research can be done on the combined buyer-seller effectiveness. The stakeholders to involve in the identification of indicators follows from the perspective of the research. When only a buyer perspective is taken, there is no need to involve the seller of the product.

Also within this research a decision has to be made whether to include only the perspectives of the suppliers of cares, the patient or both. Preferably, to get a very comprehensive support within the construct, both perspectives are included by interviewing not only care givers, but also the patients. However, interviewing elderly patients with a social indication is a hard exercise. A high degree of patients have a form of dementia or are so weakened that it requires a lot of experience with these patients to do so. Another indirect possibility is to interview the family members of the patients, however one could debate whether they are better representatives in comparison to the care providers working every day with these patients. As with all research, but especially with explorative research, a researcher can not research everything. Due to the mentioned difficulties on interviewing patients, it is chosen to take only the perspective of the care providers into account. But, since the patients perspective could not be fully neglected, the patient will be included as a talking theme, when asking the care suppliers about the indicators for a good referral process.

To determine which care providers are important the process description will be used. Within each step of the process it will be examined which care providers are involved in the step. It is important not only to think of the actors executing the step directly, but also of the actors affecting the step indirectly within an organizational or managerial role or function. If the list of actors is too extensive to interview them all, the researcher has to make a well-explained decision, which set of stakeholder is wide enough to represent the perspective of the research and limited enough to make it possible to collect their perspectives.

2.2.3. Indicator collection

When the set of stakeholders is decided on, the perspectives of these stakeholders have to be translated into indicators of effectiveness. Within this paper individual interviews are held with the important stakeholders. Besides interviews, other techniques to collect indicators are: a workshop with the different stakeholders and a survey. Because of the problems with stakeholder perspectives mentioned in section 2.1.3, interviews is chosen as technique. Within the interviews there is the possibility to use techniques to help the stakeholders identify their preferences for indicators, which makes it preferable above surveys. In one-on-one interviews stakeholders do not have to think about what other stakeholders think about the indicators they are mentioning, this helps in identifying conflicting indicators, which makes it preferable above a workshop with the stakeholders together. A survey can be preferable if their is limited time or the stakeholder set is very large. A workshop is also less time-consuming and it can help stakeholders inspire each other in thinking of a broad set of indicators. Within interviews the interviewer has to inspire the stakeholder, but on the other side he or she has to make sure that the stakeholder is not influenced to much.

Within the interview the goal tree technique will be used, as explained by Enserink et al. (2010, p.66), to deal with the identification and operationalization of indicators. How this exactly is applied is explained within paragraph 4.2.1. The full interview guide which is used to execute the interview can be found in Appendix A. The goal tree consists of different levels of goals. The highest goal is the most abstract, in this application this is 'an effective referral process', while lower goals are operationalized into more concrete goals. In this way, the lowest level consists of indicators for an effective referral process. Within every single interview a goal tree is constructed. By combining the indicators mentioned in the lowest level of the different goal trees an indicator list can be constructed. This list consists indicators from the perspectives of the different stakeholders.

2.2.4. Indicator selection

When these indicators are collected, a set of indicators has to be chosen out of all indicators. It is expected that the list of indicators is too broad to work with, measuring all the indicators would be too much. The choice which indicators to include has to represent the effectiveness from the combined perspective of the stakeholders. Within this choice the degree to which different actors agree on indicators has to be taken into account, but also uniqueness of indicators is important. Indicators should not overlap. For instance when

measuring the effectiveness of a company it doesn't make sense to take both revenue and profit as indicators, since these are two indicators measuring the same aspect of the company. A too limited choice of indicators would leave out important outcomes of the process, while a too large set would lead the assessment away from the core of the process. This decision therefore needs to be well argued, however since no single correct choice of indicators exists this choice could always be debated.

The choice of indicators in this research will be determined on support, availability of data and uniqueness. The support is based on the number of stakeholders mentioning the indicator. In stead of support, another approach was to use the importance of an indicator. This can be done by asking the stakeholders to give weights to the indicators or to let the stakeholders rank the indicators on importance and to let these rankings together determine which indicators to include. Due to limited time for the interviews, because of the added complexity by rankings and since it is expected that both approaches give the same insights, it is chosen for the more simplistic approach. The availability of the data will be determined per indicator. Within the hospital data is available on some of the indicators, on other indicators the data is unavailable. Indicators where it is impossible or an unreasonable effort is needed to make this data available will not be selected. The uniqueness will be determined on a causal relation diagram designed by the author. In this diagram is shown how different mentioned indicators influence each other. It does not make sense to use two indicators which are heavily influencing each other. The causal relations will be based on logic and assumptions by the researcher. The explorative nature of this research makes it impossible to base the causal relation on literature, since this is unavailable. The mental model of the research is expected to be good enough to select indicators which do not heavily influence each other.

2.2.5. Data collection

When the indicators are collected and a decision is made on which indicators to include. The data to analyse these indicators has to be collected. In this phase two approaches are possible. The researcher could collect only the data necessary to analyse the indicators or the researcher could do a broader collection of patient data to make further analysis on the effectiveness possible. If solely the data on the indicators is collected and in further research an investigation on what factors influence the effectiveness is wanted, the patient records have to be opened again to collect further data on the factors. A more broad data collection could give more insights on for example effectiveness per patient group, however it is not necessarily needed for the assessment of the overall effectiveness of the process. Because this research is expected to be the first of many, since effectiveness of referral processes has not been researched before, the choice is made to do a broader data collection to make further research on the topic possible. The data will be collected by looking into the patient records of those patients identified by the medical staff as patients with a social indication. The data of the year 2018 will be used, since the Zorgtransferium started in September 2017 and before that date this patient group was not identified as a specific patient group. Within the period from September 2017 to January 2018 the project was in a startup phase, where the professionals where still exploring which patients belong to this group of patients with a social indication. Therefor the data over the year 2018 is taken. Per patient the values of interest will be collected, leading to a dataset with all patients over 2018 presented at the ED with a social indication. The values of interest consist at least of all the indicators and within this research values of interest if the medical staff are added to the research.

2.2.6. Data analysis

The data analysis focuses on the calculation of the indicator values. Exploratory data analysis (EDA) will be used to visualize the values of the specific indicators. EDA consists of a large number of basic data visualization methods, such as, but not limited to, histograms, box plots, pie charts and scatter plots, but also includes more advanced techniques. All techniques with the aim to visualize findings in data can be classified under EDA. The EDA will be done in such a way that it gives easy-to-understand insights in the performance of the referral process on the selected indicators. The main purpose of this visualization is that it is easy for stakeholders to see whether a referral process is effective or not and on which indicators. It also would give the possibility to compare referral processes with each other. The main goal of the data analysis is to make the data easy presentable to stakeholders. Based on the specific chosen indicators is determined what insight can be created from the data.

Choosing the right data visualization technique is a challenging exercise. No single best data visualization technique exists and visualizing data is more about telling a story to an audience. Therefor it is always important that the technique chosen fits with the audience. To give an idea what a designer of a data visualization should think of four important traits of a great data visualization are mentioned by Yarmuluk (2019):

Graphical Integrity, Design, Interactivity and Color. Where the graphical integrity is the degree whether the message delivered with the visualization also is supported within the data. For instance, if small changes in the data are visually increased to show big impact, where it is not supported in the data, the visualization lacks graphical integrity. Within the design trait a designer should keep a balance between memorable and effective. The audience should on one side be able to remember the visualization, but also should be able to relate to the meaning of the visualization. Interactivity with visualization is a relatively new trait. Where previously visualization of data was mainly represented on paper, digitalization has lead to dashboard and other forms of interactive data visualization techniques. Interactivity creates the possibility for the audience to fit the visualization to their needs. However, it is not a case the more interactivity the better, at some point the audience may be overwhelmed which damages the message of the visualization. And last but not least, use of color is an interesting choice. Color can help, but can also overwhelm the user. Some colors are associated with specific feelings (green is good, blue is neutral), which needs to be taken into account. The four choices a data visualizer needs to consider are just an example of a larger set of dilemma's a data visualization has to deal with. Given all these dimensions to tweak a data visualization for the best fit on the audience, every data visualization is unique and no data visualization technique exists as objective best solution.

An important notion has to be made on the data analysis. It sounds logical to combine the indicator-values to a single value for effectiveness. This would make it easy to compare different processes with each other. However, since effectiveness is subjective and the perspectives on the importance of indicators differs this is impossible. The indicators should be presented separately, in such a way that individual stakeholders can decide how they prioritize the values and which weight they give the indicators. This also helps when the assessment is used on multiple different processes to compare them in terms of effectiveness. While one process could be better on one indicator, an second scores better on another indicator. It gives much more insight than a single effectiveness-value. If one really wants to combine the different indicators into a single value the importance per indicator always have to be taken into account. Three techniques to do this are presented by Dym and Little (1999): the numerical evaluation matrix, the priority check-mark method and the best-of-class chart. This techniques will not be further discussed, but can be interesting for those who want to compare the effectiveness of different referral processes.

Another important notion is that during this EDA it is still possible to iterate on the indicators. For instance, if two specific patient subgroups with large differences on an indicator exist within the bigger group of patients, a researcher can decide to specify an indicator further. For instance if patients with dementia (subgroup) have a much longer recovery time (potential indicator) in comparison to patients without dementia (second subgroup), the researcher could choose to split this indicator into the recovery time for patients with dementia and the recovery time for patients without dementia. This would give added value to the insight in the effectiveness. However, this only makes sense if it helps to reach the purpose of the research. In this research the main purpose is to design a good method for assessing effectiveness and to see if it is applicable to a real-life case. For that purpose further specification of indicators is not needed and therefor the choice of indicators is fixed after the 'indicator selection'-step of the research. For researchers using this method to assess a referral process, this possibility has to be noted, since it could help in getting a better assessment of the effectiveness.

3

Referral Process

3.1. Referral processes in the Netherlands

3.1.1. The previous situation

As is mentioned within chapter 1, a group of patients with a social indication exists which is presented at the ED of the hospital. Before this group of patients was acknowledged as a separate patient category, hospitals had two approaches to deal with this patients:

1. Send the frail elderly patient back home and let the General Practitioner (GP) arrange the extra care needed, or
2. Admit the frail elderly to the hospital under a medical indication.

Within Figure 3.1 this old process of dealing with frail elderly patients is visualized.

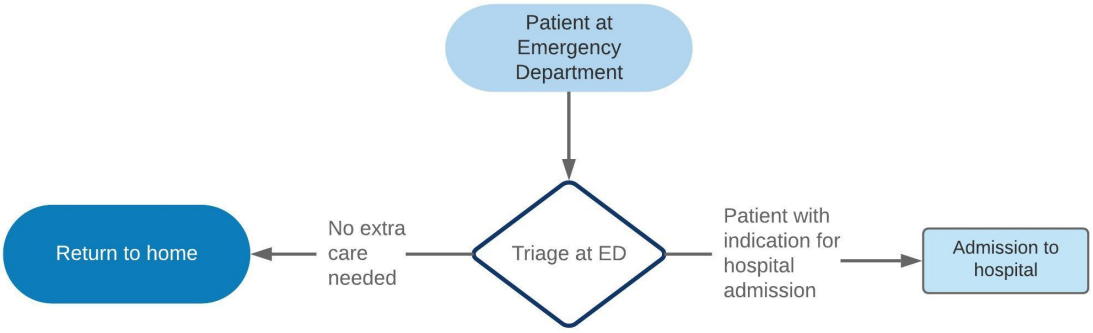

Figure 3.1: The old approach to frail acute-care patients

However, some hospitals acknowledged that there was a group of patients which did not benefit from this approach. Patients were send home, because they did not need an admission, but returned to the ED the next day since they had extreme amounts of pain. On the other hand, admitting these patients to the hospital would result into high costs and adverse risks for these patients. So these hospitals concluded there was a lack of good care for this group of patients when presented at the ED. To provide better health care, these hospitals started pilot projects to arrange quick referral for this frail elderly patients from the emergency department.

3.1.2. Differences within referral processes

Most of these pilot projects were developed separately in different hospitals. Multiple solutions are available and hospitals make their own decision which solution is preferable. Therefor these pilot projects on cooperation with primary care providers differ on some aspects. Firstly this projects focus on finding the right

destination for the patients and therefor mostly are organized in cooperation with primary care institutes. The hospitals make a choice on which institutes to cooperate with. As is mentioned before, primary care can be provided in nursing homes or by home care organizations. Hospitals mostly chose for one of both to cooperate with, which creates a so called 'default option' in deciding on the right care institute for the patient. Since this option is widely known within the hospital staff and the paths within this option are well paved, hospital staff are more likely to choose for this option. For instance, when the hospital closely cooperates with nursing homes it is more likely to choose for care within a nursing home, as is done within the Zorgtransferium Project at the Albert Schweitzer Hospital in Dordrecht. While if there is a special nurse at the ED appointed to arrange home care for the patient, the instinctive reaction will be to use this resource and send this patient home with home care.

Secondly the responsibility for arranging the follow-up care after a presentation or admission to the hospital differs between the hospitals. Most hospitals have their own transfer unit to arrange this care, while within some regions, hospitals and primary care institutes work together and established a cooperative transfer unit. For instance in the north of the Netherlands, near Groningen, 24 hospitals and care institutes are member of the ZorgnaZorg cooperative(ZorgnaZorg, 2019). This cooperative monitors the amount of patients with a request for transfer and the available places in the regional primary care institutes. When a spot is available the cooperative arranges the follow-up care for the patients leaving the hospital.

Thirdly the processes differ in responsibility for the identification of the needed follow-up care of the patient. In some hospitals this responsibility lies with the main practitioner, which can be of different specializations, such as a cardiologist, a neurologist, a surgeon or a pulmonologist. Some hospitals always involve a geriatrician or the nurse practitioner to do a comprehensive geriatric assessment (CGA). A third option is to involve a specialized home care nurse at the ED, which can identify the need for care in the home situation and arrange the needed home care as quick as possible. While a fourth option is to involve a nursing home doctor which addresses which care profile for primary care would be most suited for the patient and arrange the care within a nursing home.

3.2. A case: Zorgtransferium at the Albert Schweitzer Hospital

One of these hospitals is the Albert Schweitzer Hospital in Dordrecht and the project of better referral is called the Zorgtransferium. The flow of frail elderly through the Zorgtransferium is visualized in Figure 3.2. The main change is the addition of the identification of patients with a social indication and the execution of the related referral. For this referral three main routes are possible. A patient can return to home with home-care, a patient can be send directly to a nursing home from the observatory of the ED or a patient can be admitted to the hospital if direct referral is impossible. In the last case the patient will be referred, but this referral is delayed.

In practice the stakeholders are very enthusiastic about this project and the hypothesis is that this is a large improvement in comparison with the previous situation. However it is unclear whether this hypothesis in general is true and if it is true, how large the improvement is in terms of effectiveness and duration of the process. At this point no method to measure this is available. A need for research to this topic is identified to measure the (improved) effectiveness. On the other hand, for hospitals without this referral process, this research can give a clear description of a way to implement a cooperative referral process. In the end this all will lead to the main goal, to provide better care to frail elderly by giving them the right kind of care as quick as possible.

3.3. The Zorgtransferium project described

A full process description of the referral process gives clear insights in the potential routes for patients. These pathways always start by the presentation at the ED and end at home or in a care institute. The referral process within the Albert Schweitzer hospital consists of two distinguishable parts. At first there is the assessment within the Emergency Department, which determines whether patients have to be admitted to the hospital, can go back to origin or have a social indication as shown in Figure 3.3. The second part is the process where the right form of follow-up care is identified and arranged for the patient, as shown in Figure 3.4.

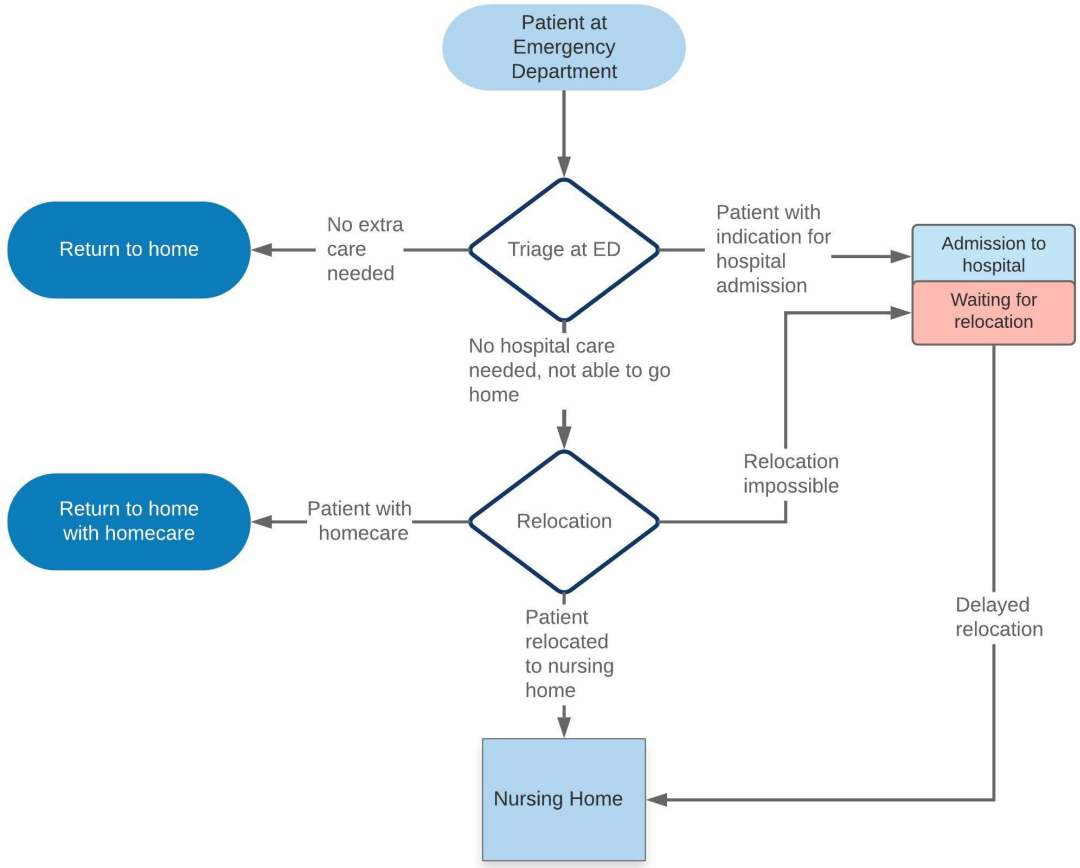

Figure 3.2: The patient-flow of frail acute-care patients within the Zorgtransferium project

3.3.1. Assessment at the ED

The first part of the process starts when a patient is presented at the ED. The first step within this process is done by an ED-nurse. He or she assesses, by applying the Manchester Triage system[1], the urgency of the problems of the patient. When a patient has severe problems, the patient first gets the treatment needed to stabilize[2] the patient and afterwards is admitted to the hospital to receive further treatment. With less severe problems the ED-nurse first performs some basic diagnostics on the patient. The results of these diagnostics are communicated to a resident. This resident visits the patients and determines if further diagnostics are needed to conclude on the needed medical care. The resident checks with his or her supervising specialist whether the proposed medical care is correct. Within this conversation, especially when the patient is multimorbid, other specialists can be consulted to determine the correct care.

In some cases is concluded that admission is unwanted or unnecessary. An admission is only appropriate if the needed care is specialized medical care, which only can be given by a medical specialist. This is the case when the reason for presentation requires further diagnoses, observation or treatment which only can be given at the hospital. If all of these requirements are not present, no admission is needed.

In the case no admission is needed, an assessment is made whether the patient can go back to location it came from (eg. an independent home or a nursing home). The resident decides if further consultation of a geriatrician on the return to origin is needed. In some cases the ED-nurse has concerns on the patients' safety when going home and they notify the resident of this concern. Especially with frail elderly there are a lot of factors which influence if a patient can go home or not. The main question to answer is if it is safe to send a patient back to origin. This can be done by examining five different domains: Somatic, psychological,

[1] A tool of 50 different flow diagrams, 1 per category of symptoms, which concludes in five different categories of urgency.
[2] The ED defines a stabilized patient based on the *Airway, Breath and Circulation* (ABC)-protocol. A patient is stabilized when the airway is free, the breathing is adequate and the patient has sufficient (blood)circulation.

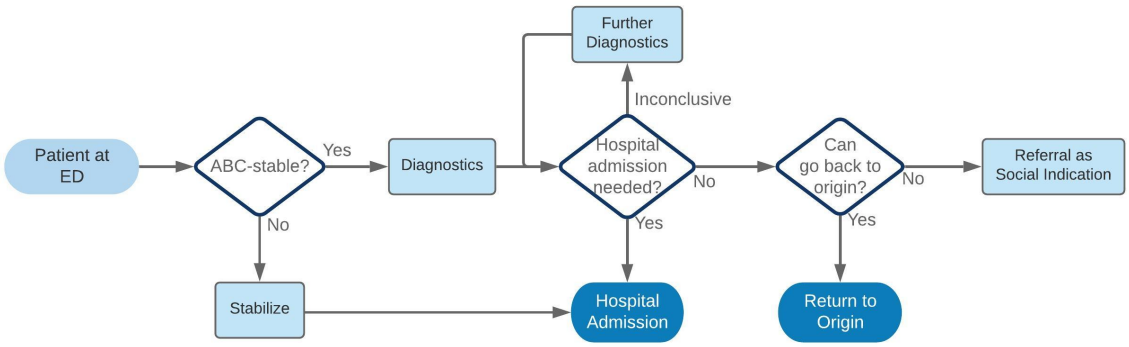

Figure 3.3: The decision tree for frail acute-care patients within the ED

functional, social and nutritional. However, in most cases, the geriatrician makes an expert decision without the time-consuming process of examining all the domains in total. The somatic domain is always examined, to make sure there are no somatic issues. A frail elderly patient which is indicated as potentially a social indication, always gets a body examination. This consists of a blood pressure test, an ECG, different lab researches on blood values, a body temperature check and a bladderscan.

The other domains are not always checked explicitly, but are taken into account by the geriatrician. Within the psychological domain the cognitive function of the patients will be checked. If the patient has cognitive dysfunction it may be unsafe to let patients return home, because such a patient, for instance, can leave the gas on after cooking. Within the functional domain the overall functionality for the patient is checked. For instance, if the patient is unable to move himself or herself from bed to toilet, the patient has a mobility problem, which leads to functional problems and therefor can not go home. Within the social domain the social safety net of a patient is identified, sometimes the social contacts of the patient can provide care for the patient which allows them to return home. And within the nutritional domain is checked if the patients eats and drinks enough. Based on these factors a doctor can make an expert decision if it is safe to let a patient go home or not. Sometimes the conclusion is that the patient can go home, but needs extra home care to help in functional disabilities.

For the somatic domain and the functional domain other experts can be consulted. For the somatic domain these are other specialists within the hospital such as a cardiologist, a neurologist, a surgeon or a pulmonologist. For the functional domain these experts are the physiotherapist and the occupation therapist.

If a patient will not be admitted, but it is also unsafe to go home, the patient is indicated as a social indication. The hospital has two beds at the acute ward reserved for these patients. Officially this is also a ward of the hospital, so this can be seen as an admission to the hospital. But since no specialized care is given to the patient and the main function of this ward is only to observe people, it is not defined as a hospital admission within this paper.

3.3.2. Arranging Follow-up Care

The second part of the process can start when it is clear that the patient could leave the hospital. For patients with a social-indication this is at the moment they got this indication. For patients who received specialized medical care this is the moment they are so-called 'medically ready', there is no further need for specialized medical care. The goal of this part of the process is to determine which kind of care the patient needs and to arrange this care. In general the patient can go home without extra care, home with home care or can be transferred to a primary care institute. This process starts when a nurse, from the ward where the patient is held for observation, sends an application to the transfer unit of the hospital. From the moment the application is received a transfer nurse checks if the application is filled in correctly and searches if the patient already has a WLZ-indication. If this is the case, such a patient does not qualify for short-term care and the possible care profiles for such a person only consists of WLZ-care. For these patients is decided if the current WLZ-care profile is sufficient. When the care profile is sufficient this patient is presented to a care institute with a potential free bed for this care profile. If the indication is not sufficient an assessment of which WLZ-care profile should be indicated is executed.

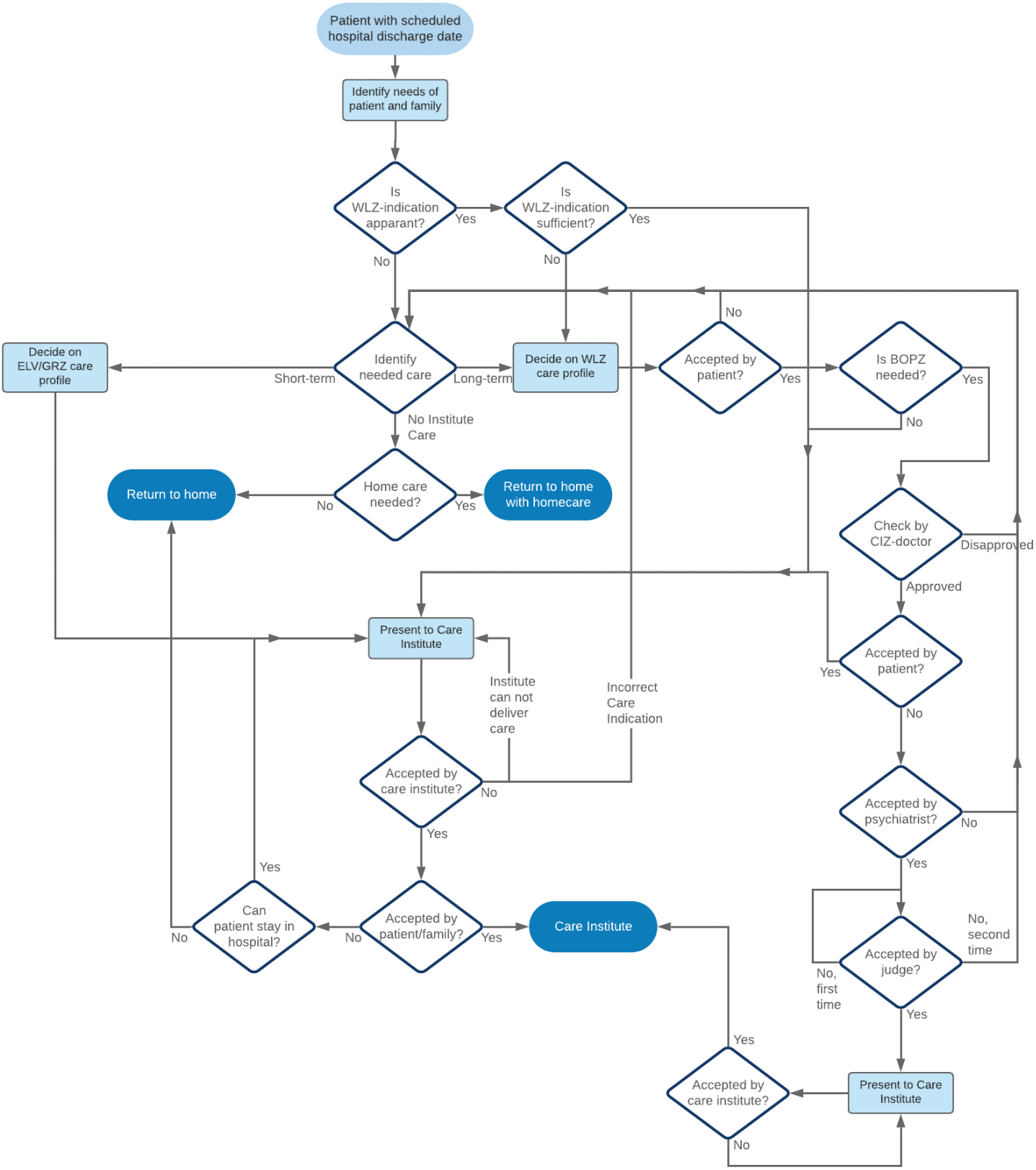

Figure 3.4: The decision tree for frail acute-care patients within the Transfer Unit

When a patient does not have a WLZ-indication firstly it is identified if a patient should best fit with short-term care or long-term care. The main question which needs to be answered is: "Is the needed care permanent?" If the answer to this question is yes a patient needs long-term care, if the answer is no the patient should receive short-term care. If a patients' state improves over time short-term care is more applicable. However, the identification of the improvement of this state over time has to be done within a relatively short period of observation in the hospital. This could potentially lead to a lack of insight to assess the patient correctly.

3.3.3. Arranging a Long-term Care Indication

To determine which WLZ-indication is applicable the care need is categorized in care profiles. This categorization is defined within Appendix A of Article 2.1 of the Ministerial Regulation "Langdurige Zorg". Based on this categorization the transfer nurse and the geriatrician decide together what is applicable. The ward nurse asks the patient[3] for permission to send an application for the care profile to the CIZ. When the patient or representative does not accept the application, the nurse will first try to convince the patient it is the best option. When the patient still does not accept, the geriatrician and transfer nurse will search whether another care profile or short-term care could be applicable. When this is the case the patient will be asked whether it accepts that form of care. If the patient still does not accept or when no other form of care is applicable the patient has to go home, potentially with extra home care.

When the patient accepts the application of the WLZ-care profile the application is send to the CIZ by the transfer nurse. For most WLZ-care profiles the CIZ accepts the application based on the information given by the hospital. If there are further questions or where further inspection is needed, the CIZ sends an inspector. When the CIZ approves the application, an application is send to a care institute which can deliver the needed care. However, in some cases the patient needs an admission to a locked ward for the safety of the patient. This so called application for a 'Bijzondere Opneming Psychiatrische Ziekenhuizen (BOPZ)' is send to the CIZ. In this case the CIZ always sends an inspector to examine if this is needed and how big the willingness of the patient is to go to this ward. Three different outcomes of the willingness of the patient are possible:

1. The patient is willing to go to a locked ward. In this case voluntary admission is possible.
2. The patient is not capable to express his or her willingness. In that case is spoken of 'willingness nor resistance'. Article 60 of the law BOPZ is applicable, which describes that the patient will be involuntarily admitted to a locked ward.
3. The patient is not willing and resists against admission to a locked ward. Long-term admission is only possible with a judicial authorization (in Dutch: Rechterlijke Machtiging (RM)).

In the first two cases the patient will be presented to a care institute with a locked ward, in the third case the hospital starts to prepare for a judicial process. This is done by the psychiatrist, he or she will make sure that a locked ward admission is needed by examining the patient and gathering the information needed for the trial. Only when the psychiatrist thinks there is a more than fair chance the hospital will win the trial the admission to the judge is send. If the psychiatrist assesses that the chance of winning the trial is low, the transfer nurse and geriatrician will look for ground to apply for another care profile or for short-term care.

In the case an RM is needed a lawyer will be appointed to the patient and a judge will determine within a trial whether an admission to a locked ward is grounded within the law. If the judge decides the RM is applicable the hospital has the obligation to arrange a locked ward admission within a care institute within two weeks from the moment of verdict. Because of this obligation the transfer unit already starts arranging this care before the judge decided on the RM. In the case the judge decides the RM is not applicable, a second trial is possible. If this second trial also determines the RM is not applicable, a ground for other forms of care has to be identified by the transfer nurse and geriatrician. In practice, it almost never occurs that a judge decides an RM is not applicable.

3.3.4. Arranging a Short-term Care Indication

If a patient needs short-term care within an institute, three different care profiles are applicable: GRZ, ELV low complex and ELV high complex. The geriatrician and transfer nurse determine together which care profile is best applicable. The Dutch Government have published a tool to determine which form of care is applicable

[3] For elderly patients which are not mentally competent to make decisions this can be a formal representative for the patient, mostly a family member.

(Remmerswaal et al., 2016). The first four questions within the tool (is there a need for admission?; Is there a need for care?; Can this care be delivered at home?; and Is the care need permanent?) are already answered at this point in the process. The next step is to determine if GRZ or ELV is applicable. Care within the GRZ-profile is described within Article 2.5c of the 'Besluit Zorgverzekering'. The factor which determines GRZ or ELV is applicable, is whether there are reasonable goals (within six months) for rehabilitation or not. Within this assessment trainability or learning capability, strength and motivation of the patient need to be taken into account. If the assessment determines there are reasonable rehabilitation goals the patient should be indicated with GRZ care.

If this is not the case two different indications remain: ELV low complex and ELV high complex. ELV low complex care is applicable when the patient has a single disorder, while high complex is for those patients with multiple dependable disorders. As is mentioned within the tool only at 80 percent of the patients the doctor can make the right consideration to determine if the patient needs low or high complex care. The advice within the tool is to send patients where it is unclear if they need a low complex or a high complex admissions to a care institute where both forms of care are provided.

3.3.5. Arranging an Admission to a Care Institute

When the needed care is identified, the dossier of the patient will be presented to a care institute. Within a care institute, beds and units are appointed for a specific care profile and not every care institute can deliver every care profile. Within the transfer unit of the hospital it is known which care institute provides which forms of care. However, it is not fully known how many beds per care profile are available within the care institutes. When searching for the right care institute the patient and the family of the patient can name a care institute of preference. The transfer nurse will always (unless the institute does not provide the needed care) contact this care institute first.

The nursing home doctor (in Dutch: Specialist Ouderengeneeskunde (SO)), will take a look at the dossier of the patient to determine if the patient is eligible for the available bed. The care institute can choose if they accept the patient or not without reason. The dossier can only be presented at one care institute at the same time. If a care institute does not accept the patient, the transfer nurse makes a consideration what care institute to present the dossier to next. This is, among other things, based on the distance to home, the distance to family, the relation with the care institute and the estimation of the fit of the needed care of the patient with the care provision of the care institute. This process of presentation to different care institutes keeps repeating until a care institute has accepted the patient.

The main reason for care institutes to refuse the patient is the lack of available beds in the institute. It is also possible that the SO communicates that the indicated needed care is incorrect and that the care institute can only accept the patient on a different care indication. In this case the transfer nurse determines if he or she agrees with the SO. In the case the transfer nurse agrees, a new indication is arranged for the patient and the dossier of the patient is presented to the same care institute. If the transfer nurse disagrees the dossier is presented to a different care institute under the same indication.

When a care institute has accepted the patient this will be communicated with the patient and his or her family. They can decide to refuse the spot in the care institute, although the hospital staff does not explicitly communicates that there is a decision. Obviously, when a patient has to go to a locked ward and a RM is applicable, this choice is not available. When the patient refuses to go to the assigned care institute the main practitioner has to decide if the patient can stay in the hospital or not. If the doctor decides it is impossible for the patient to stay in the hospital the patient has to go home. When the doctor decides the patient can stay, the transfer unit will try to find a different care institute for the patient.

When the patient accepts, the transfer of the patient to the care institute will be arranged by the ward secretary. This includes providing the actual medication list to the care institute and arranging the needed transport.

3.4. Large number of stakeholders

Throughout the process a large number of care professionals is involved with the patient. Different nurses, specialist and in rare cases even a judge steer the pathway of the patient. These professionals are highly specialized, but this specialization has also led to a lot of fragmentation in knowledge. This fragmentation together with the multidisciplinary approach needed for the multimorbid elderly patient, caused the large number of stakeholders involved with these patients. Since these professionals are human beings and have, next to their own expertise, their own opinions and believes, their assessment of the patient does not always

conclude in the same outcome. Multiple professionals can have different opinions on the same patient, but still these professionals need to make a shared decision. This decision-making is part of the process and we can not neglect that the pathway of a patient is heavily affected by the opinions and decisions of these professionals.

3.5. Reflection on the visualization of the process

The main reasons for the visualization of the process by using the flowchart method was twofold. Firstly it should create insight into the process and secondly it made the validation of the process by stakeholders possible.

The method is very suitable for the creation of insight in the process for both the researcher and for the involved stakeholders. For the stakeholders it is very useful to get overarching insight in parts of the process where they are not involved with on a daily basis. It helps to create a broader perspective for specialists involved. So this method is especially useful for large processes where stakeholders only are involved with parts of the process. The flowchart method is less useful for the creation of very specialized insight due to the simplistic nature of the method. The use of flowchart methods to processes in the hospital is not new. It is widely used within protocols as a manual for the professionals themselves on what their individual tasks entail. The application of a flowchart to get insight into other professionals' processes and therewith improve understanding and communication throughout the health chain is new for the involved stakeholders.

The visualization was suitable for face validation by the stakeholders. Within this research this was sufficient to determine whether the stakeholders and the researcher had the same understanding of the process. However, if a researcher wants to validate to what extend a process described on paper is applied into practice, a better approach would be to come up with process indicators. These are certain gateways to check whether a health professional has performed a specific step in the process. By collecting data on these process indicators a researcher could determine how often specific steps of the process are neglected, performed poorly or not applicable. Within this research the interviewed expert-stakeholders validated that their belief is that the process is applied as shown on paper. However, this is not proven by data and therefor not fully certain.

It is the first time that a referral process is clearly documented in literature. The documented process could serve as a starting point for other researchers within this topic. It could be shown to the involved professionals to ask whether other organizations have the same process or if they organize referrals differently. It could help the hospital to create quick insight for new employees and for managers to see where in the process alterations could be made to improve the process and how these alterations would affect the rest of the referral process.

3.5.1. Design rules based on the visualization of the process

- A visualization of the process is required in such a way that it can be used to determine whether the understanding of all important stakeholders is the same and to come to a collective agreement of the stakeholders that the described process is the process to assess.
  - A process visualization needs to be implemented for face validation by stakeholders to determine whether an assessor and the stakeholders have the same understanding of a process and to make a collective agreement possible by the stakeholders on what the process to assess is.
  - When a researcher wants to validate to what extend a process is applied into practice face validation is not enough, in that case process indicators should be collected.

4

Indicators for Effectiveness

As is mentioned within Chapter 1, stakeholder interviews are conducted to collect indicators for an effective referral process. This is done to deal with the different perspectives which exist within different stakeholders on what a 'good' referral process should be and should do. Within that same Chapter 1 the goal tree technique is named. A goal tree (Enserink et al., 2010) is a technique to define high-level conceptual goals into measurable indicators. In this case the highest goal within the goal tree will be 'an effective referral process for elderly patients'. Within an interview it is possible to construct a goal tree together with the interviewee. The interviewer is responsible for the correct application of the technique, while the interviewee is responsible for the content of the tree. The goal trees identified within the different interviews can be found in Appendix B. Within Appendix A the full interview guide describes all questions asked.

4.1. Stakeholder selection

To ensure that the set of indicators is a representative for the perspective of this research, a variety of the most important actors need to be chosen. The perspective of the process starts with the presentation at the ED and ends with the placement in a nursing home. To identify these actors, it is investigated which people are affecting this process. Within this investigation not only the professionals affecting the patients directly 'at the bed', but also the managers which have indirect effect, are included. These managers are expected to have a broader view, including the financial aspect and the effect on the overall patient population, while the executing professionals are expected to focus on individuals and therefore can have different opinions on what is important within the referral.

The patient flow is indicated to start from the moment the patient arrives at the ED. Here the patient is examined by a resident and the ED-nurse. An ED-doctor is responsible for this process and the diagnosis. When the patient is indicated as a social indication a Nurse Practitioner or a Geriatrician examines the patient more broadly. The physiotherapist or occupational therapist can be consulted to determine the functional capabilities of the patient. A transfer nurse is asked to find the right follow-up care based on the examination of the geriatric department. In special cases the psychiatrist or a judge are needed to determine if a patient should go to a locked ward. When a patient is transferred to a nursing home, a nurse does an intake on the required need of the patient under supervision of a nursing home doctor. Generically this process consists of four different stages: the first examination at the ED under supervision of an ED-Doctor, the broader examination mostly done by a nurse practitioner, the arrangement of the follow-up care by the transfer nurse and the intake in the nursing home under supervision of a nursing home doctor. At least one actor per stage needs to be involved in the interviews. Within figure 4.1 the different actors described are indicated per phase. The actors in orange are chosen to be interviewed.

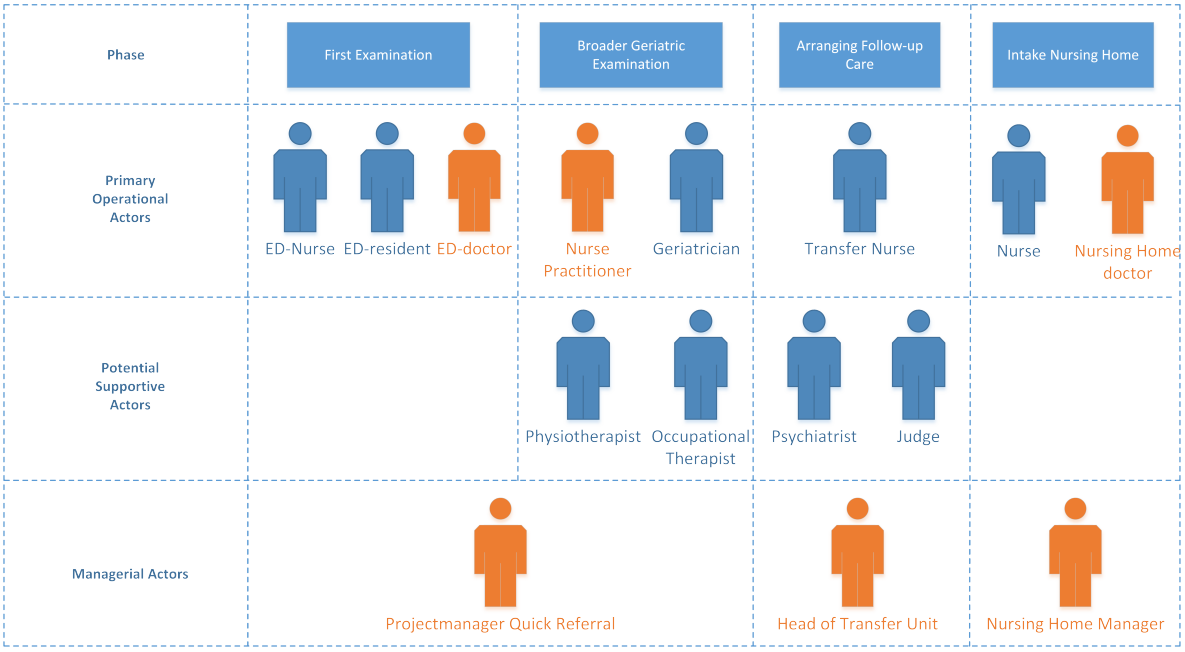

Figure 4.1: Actors involved in the patient process from arrival at ED to intake in the Nursing Home

Chosen is to do a total of six interviews with an ED-Doctor, a nurse practitioner and a nursing home doctor as executing professionals and a manager involved in the coordination of the referral processes, the head of the Transfer Unit and a manager of the Nursing homes representing the managerial side (orange actors in Figure 4.1). All four stages are covered and there is an equal spread of executing professionals and managers.

4.2. Indicator collection

4.2.1. Interviewing as a method to collect indicators

The main goal of the interview is to identify indicators for an effective referral process, since these are necessary to determine to which degree the zorgtransferium is an effective alternative to prevent unwanted hospitalization. To come to these indicators it is important to ensure that the interviewee has the same understanding of the process as the interviewer. As mentioned within Chapter 3 the interviewees have all validated the process description by their understanding of the process. Therewith the understanding of the object of study is covered for. Before the goal tree itself is constructed, some general questions are asked to come up with indicators for success of a process.

Firstly the degree to which the process is satisfying for the interviewee is asked by asking the question: "Why are you or are you not satisfied with the Zorgtransferium?". Secondly the degree to which the process is a success is asked by asking the question: "When is or was the Zorgtransferium a success?". As mentioned within chapter 1 effectiveness and success are the same within the scope of this thesis. While success and effectiveness reflect on the degree to which the general aim is reached, satisfaction reflects on the degree to which someones personal wishes are fulfilled. If the general aim of something and someones wishes are perfectly aligned, these questions reflect the same factors, but by asking both questions it might help interviewees to come up with different indicators and it helps to identify differences in someones personal aim with the process and what the person perceives as the global aim of the process.

After these broader questions the goal tree is constructed by adding the sub-goals mentioned in the answers given to the previous two questions in the goal tree as lower branches. This is done to give the interviewee insight in how the exact technique of a goal tree works. After that the interviewee is asked to mention more sub-goals of an effective referral process, the interviewer writes this goals down and organizes the goal tree. When a sub-goal is not operationalized enough to make the sub-goal measurable, the interviewer asks how to measure the sub-goal. When the interviewee is not able to make the sub-goal measurable, the interviewer can come with suggestions. However, this is not preferable since it is best for the interviewer not to interfere with the content of the goal tree, since this could influence the perspective of the interviewee. To make sure that no important aspects of a referral process are missed, the interviewer identified seven themes

for the interviewee to think about. These themes can not be sub-goals in itself, because that would influence the interviewee too much. The themes identified are: the content of care, process speed, finance, logistics, the patient, knowledge and communication. Also the mentioning of the themes has to be limited, since this can also be seen as interference with the content. The lowest level of the goal trees can be included in the indicator list, leading to a list of all perceived indicators. Some of the indicators are mentioned once, others are mentioned multiple times.

4.2.2. The collected indicators from the interviews

Since one goal tree is constructed per stakeholder a total of six goal trees is compiled. These individual goal trees can be found in Appendix B. Within all goal trees the lowest level consists of operationalized indicators for a good referral process. The number of indicators mentioned by the stakeholders differs, fully dependable of the stakeholders preferences for indicators. This leads to a long list of potential indicators. In a first attempt to come to a categorization of the indicators the seven talking themes are used. The mentioned indicators are classified under these talking themes. Indicators which can not be classified under these talking themes are classified under 'Other'.

Some aspects of the referral process are easier to describe in indicators compared to others. *Quicker Referral, Higher availability of beds for patients with a medical indication, Less adverse effects of hospital stay on patient, Lower referral distance and Lower costs per patient over the whole care chain* are mentioned three times or more in the exact same words. These are relative straightforward indicators and can relatively easily be described. Within both the themes Content of Care and Communication, different indicators need to be combined into overarching indicators, since the formulation of the indicators by the stakeholders are in fact different descriptions of the same aspect of referral processes.

Especially within the Content of Care theme, a lot of indicators are named, which slightly overlap each other. It is hard to operationalize what high qualitative care within a care institute is. A classification is needed out of the mentioned indicators to come with less indicators which describe more broader important aspects of high-quality care, instead of very detailed aspects. The indicators *Better fit of goal care, Quicker decrease of functional dependability of patient and Correct form of care focused on function retention* all state something on the goal of the care within a care institute and therefor are combined under the indicator: *The fit of the goal of the care provided with the patients' care need.* The indicators *Higher competence and expertise of care professionals, High quality of care professionals and Right facilities of care* all state something on the means to reach the chosen goal. The means used (both facilities and health professionals) should fit with the patient needs, but also with what the patient can endure. This combination of means is defined within this study as the intensity of care. The intensity of care is the amount of resources used to come to the specific goal of care. Therefor the mentioned indicators together with the indicator *Better fit of intensity of care* are all combined under the indicator: *Better fit of the intensity of care provided on the patients' care need.*

Based on the extra information given in the interviews, the four indicators mentioned within the communication-theme can be combined into two main indicators *Better communications with patient and relatives, Better communication of perspectives and More clear communication to family* can be combined into *Clearer communication on the continuation of care*, while *Quicker clear communication* can be better formulated as *Quicker communication on the continuation of care.*

This combination of different indicators leads to the list of indicators displayed in table 4.1. Within this table, not only the list is displayed, but also the number of stakeholders which mentioned the indicator (used for the colouring), whether data is available on the indicator and how hard it is to collect data on the indicator. This information will be used for the selection of the indicators.

Indicator	Support	Availability of Data	
	Times mentioned	*Available*	*Easiness to collect*
Content of Care			
Adverse effects on patient due to hospital stay	3		Medium
Referral Distance	3	Yes	Easy
Fit of the goal of care with the care need	3		Medium
Fit of the intensity of care with the care need	4		Medium
Process Speed			
Referral Time	5	Yes	Easy
Finance			
Costs throughout the care chain per patient	3		Hard
Logistics			
Availability of hospital beds	4	Yes	Medium
Capacity in care institutes	1		Medium
Patient Perspective			
Patient Satisfaction	2		Very hard
Attention for wishes of the patient	2		Very hard
Patient Trust	1		Very hard
Degree of control of patient	1		Very hard
Reassurance of patient	1		Very hard
Knowledge			
Insight in availability of care	2		Medium
Insight in patient pathway	1		Medium
Number of correct determined indications	1		Medium
Communication			
Clearer communication of continuation of care	3		Hard
Quicker communication of continuation of care	1		Medium
Other			
Unnecessary Admissions	1		Hard
Care Institute Satisfaction	1		Medium
Cooperation between domains of care	1		Medium

Table 4.1: Indicators mentioned by interviewed stakeholders with support (measured in the number of stakeholders which mentioned the indicator) and availability of data (by current availability and easiness to collect)

4.3. Indicator selection

A large list of different indicators is collected by interviewing the stakeholders. Out of these indicators, a set of indicators needs to be selected, which will be used for the actual assessment of the effectiveness. As is explained within paragraph 2.2.4, three important factors to decide which factors to include in the assessment are support, availability of data and uniqueness.

4.3.1. Support of indicators

One of the reasons to interview different stakeholders is to get a systemic view on the effectiveness of referral processes. Indicators which should be included in this systemic view have to be supported by multiple stakeholders. The degree of this support over the different stakeholders will be used to select which indicators to include. This support will be decided upon the number of stakeholders which named the indicator. Within Table 4.1 the number of stakeholders, which mentioned the indicator is shown. Indicators chosen in the final indicator selection are coloured green. The explanation why these indicators are shown follows further in this chapter. Based on the support the total set of 21 indicators is decreased to a selected set of eight indicators, which are the indicators mentioned three times or more. The researcher has checked whether the excluded indicators represent aspects too important to leave out and decided that this was not the case.

4.3.2. Availability of data

The next step is to look at the availability of data on indicators, since one can only use an indicator when it is possible to retrieve data on that specific indicator. When an indicator is very interesting to look at, but the

data on that specific indicator is not available and not possible to collect, it is simply impossible to measure the indicator. There is a difference between indicators of which the data is unavailable, but possible to collect and those where it is impossible to collect data on that specific indicator. All factors can be categorized based on availability and the needed effort to get the data available.

In Table 4.1 the availability and the effort needed to get the data available is shown. Concluding from this list, it can be said that currently almost no data is collected within the hospital to determine the effectiveness of the process. Which is an interesting finding, since the hospital has claimed that the pilot project was a success. Without data, the question arises whether they can prove this or not. What also can be concluded is that most of the data is unavailable at the moment, but with the right effort can be made available.

One of the important factors on which no data is available are the costs of the patient over the whole chain. To calculate costs for the patient is a very extensive task. Depending on the precision needed for the determination of the costs, a precise calculation or a calculation partly based on assumptions can be applied. A well known technique is to divide the whole patient pathway in individual activities and to determine a cost price per activity. By adding the costs for the different activities the total costs per patient can be calculated. Since the cost-indicator is from a system perspective, the activities over the whole care chain, and not only the activities within the hospital, should be taken into account. This includes costs in the care institute and the costs for the activities related with the referral. The process within the hospital is described within chapter 3, however not yet on such a detailed way that can be spoken of individual activities (an example of an activity is a call between the hospital and a care institute to determine whether a referral between both on a specific patient is possible). The process for the physical transfer and the activities within the care institute are not known and also the care activities within the observatory ward are not exactly known. Even if the activities were known it is not precisely known what the costs per activity are. And to make the calculation even more difficult, even indirect costs, such as the costs for a bed not used but needed to assure care, needs to be calculated back to a patient. To fully research these costs per activity, the precise activities per patient and the indirect costs for such a patient takes a very large amount of time and even then the question remains whether a researcher is fully capable of determining an exact number per patient. Therefor the calculation for costs is not possible within this research and costs will be excluded as indicator.

Within the theme on the patient perspective a lot of factors exist, which no data is available on. This data could only be available by collecting the patient perspectives within interviews or a survey. As is mentioned within the paragraph 4.1 interviewing frail elderly requires a high amount of expertise on this group and therefor researching patient satisfaction, patient trust and the degree of control is assumed impossible within this research. If a researcher wants to research this, a separate research on perspectives within frail elderly and techniques to identify these perspectives needs to be executed. This research should especially focus on dealing with those patients which suffer from dementia or are mentally incompetent, since these are a substantial part of the total population of frail elderly patients. Due to this reason also the indicator, 'clearer communication' is excluded.

Based on the availability of data 2 extra indicators are excluded: Costs throughout the care chain per patient an Clearer communication of continuation of care. Based on this exclusion 6 indicators are left within the selection: Adverse effects on patient, Referral Distance, Fit on the goal of care, Fit on the intensity of Care, Referral Time and Availability of Hospital Beds.

4.3.3. Uniqueness of indicators

Within Appendix C and Figure 4.2 a causal relation diagram (CRD) shows how the different indicators are affecting each other. This CRD is a creation by the researcher based on the expected causal relations between the indicators. Because of the novelty of this problem as research topic, most effects are not researched yet and therefor can not be proven based on literature. Therefor this diagram should not be seen as it is a theoretical framework. This is especially true for the patient perspective and patient satisfaction (visualized by the grey cloud). Patient satisfaction can be influenced by a very large number of factors (such as the coffee in the waiting room or the taxi to the hospital not being on time), therefor it is too bold an assumption to see the mentioned relations as the truth or to assume total completeness of this CRD. This CRD is built upon the mentioned indicators of the stakeholders and it shows the assumed relation between these indicators, it is not a total and complete overview of all factors involved in the referral of elderly with a social indication. It is an attempt to show the relations between the different potential indicators based on logic and assumptions. The arguments and explanation behind this CRD can be found in C.

A decision has to be made on what indicators to include. Three factors are only being influenced by other factors and not influencing other factors: Care Institute Satisfaction (in light blue, low in the center), Costs

(in red) and Patient Trust (in yellow). These can be seen as the final outcomes of a referral process. The other indicators have a value of their own, but are also affecting other indicators for effectiveness. When including both the influenced indicator and the influencing indicator in the final indicator set, the researcher is assessing the effectiveness on the same effect twice. It only makes sense to include both indicators, when the researcher expects that the effect of the influencing indicator on the influenced indicator is very small and the researcher agrees with the fact that adding the influencing factor could give significant extra insight in the effectiveness. In the end this is a subjective decision, however this decision can only be made if the researcher knows what the individual effects between indicators are.

The five indicators from the patient perspective class (in the top right in yellow) consist within a cluster which is only being influenced by other factors. Taking one of these indicators would immediately include the effects of all the indicators. However, as is mentioned within paragraph 4.3.2, collecting the data on patient perspectives is not possible within this study and therefor will not be included.

Since these indicators are not included, it is interesting to look at those indicators which directly affect this cluster of patient perspectives. This includes the following indicators: 'Adverse effects of hospital stay', 'Referral Time', 'Referral distance', 'Better fit to the goal of care' and 'Better fit to the intensity of care'. These are all relatively easily measurable indicators and therefor is a feasible set of indicators. However, a direct effect exists from 'Referral Time' to 'Adverse effects of a hospital stay', since the longer a patient is at the hospital the higher the risk of adverse effects for the patient. Since the 'referral time' is mentioned more often as important indicator in comparison to 'adverse effect of a hospital stay' and taking the 'referral time' would include both the direct effect on 'patient satisfaction' and the indirect effect via the 'adverse effects of a hospital stay' the researcher chose to take only 'referral time' as indicator and not both 'referral time' and 'adverse effects'. 'Adverse effects' is excluded since the same effect would have been included twice in the final indicator set.

Besides both effects described in previous paragraph, referral time also includes an effect on the 'Costs for a patient over the whole chain', since a shorter referral time means a shorter time in the hospital which is more costly in comparison to other institutes. The main assumption of the decrease in costs within the experts of the hospital and also shared within this research is that a hospital bed is more expensive in comparison to a bed in a care institute. A short referral time leads to a shorter time in the hospital, since someone is referred quicker to another institute. This referral of the patients leads to a lower costs for these days. Therefor the referral time can be taken as an indicator for the costs within these referral days. However, another effect can be in place which causes the costs over the whole chain to increase. An example is given to show this effect. If a patient is admitted for ten days in the hospital and after these ten days the patient can return home with a cost of 1000 euro per day (including all the activities), the costs for these patient are 10.000 euro. If a referral after one day in the hospital (1000 euro) to a care institutes concludes that the patient has to stay for 20 days in the care institute for 500 euro per day, the total costs are 11.000 euro. So, a longer time needed to recover could still lead to cost increase, the expected decrease in costs due to the quicker referral only is applicable if the time for recovery stays the same. According to the spoken experts, the patients receive care with a higher fit to their care need and therefor is expected that the recovery time stays the same or decreases. Due to this assumption it is legitimized to select the referral time not only as an indicator for the quality of care aspect, but also as an indicator for the costs.

4.3.4. Final selection based on support, availability of data and uniqueness

Based on both support, availability of data and uniqueness the set of indicators used to assess the effectiveness within this research consists of the following indicators:

Referral time measured in time between the moment the patient arrives at the ED and the patient leaves the hospital

Referral distance measured in the distance between the home address of the patient and the location of the care institute the patient is referred to

Fit of the goal of care provided on the patients' care need measured in the percentage of patients which is referred to a spot in a care institute which fits the goal of the patients' care need

Fit of the intensity of care provided on the patients' care need measured in the percentage of patients which is referred to a spot in a care institute which fits the intensity of the patients' care need

Availability of hospital beds measured in the amount of prevented occupancy days of a hospital bed

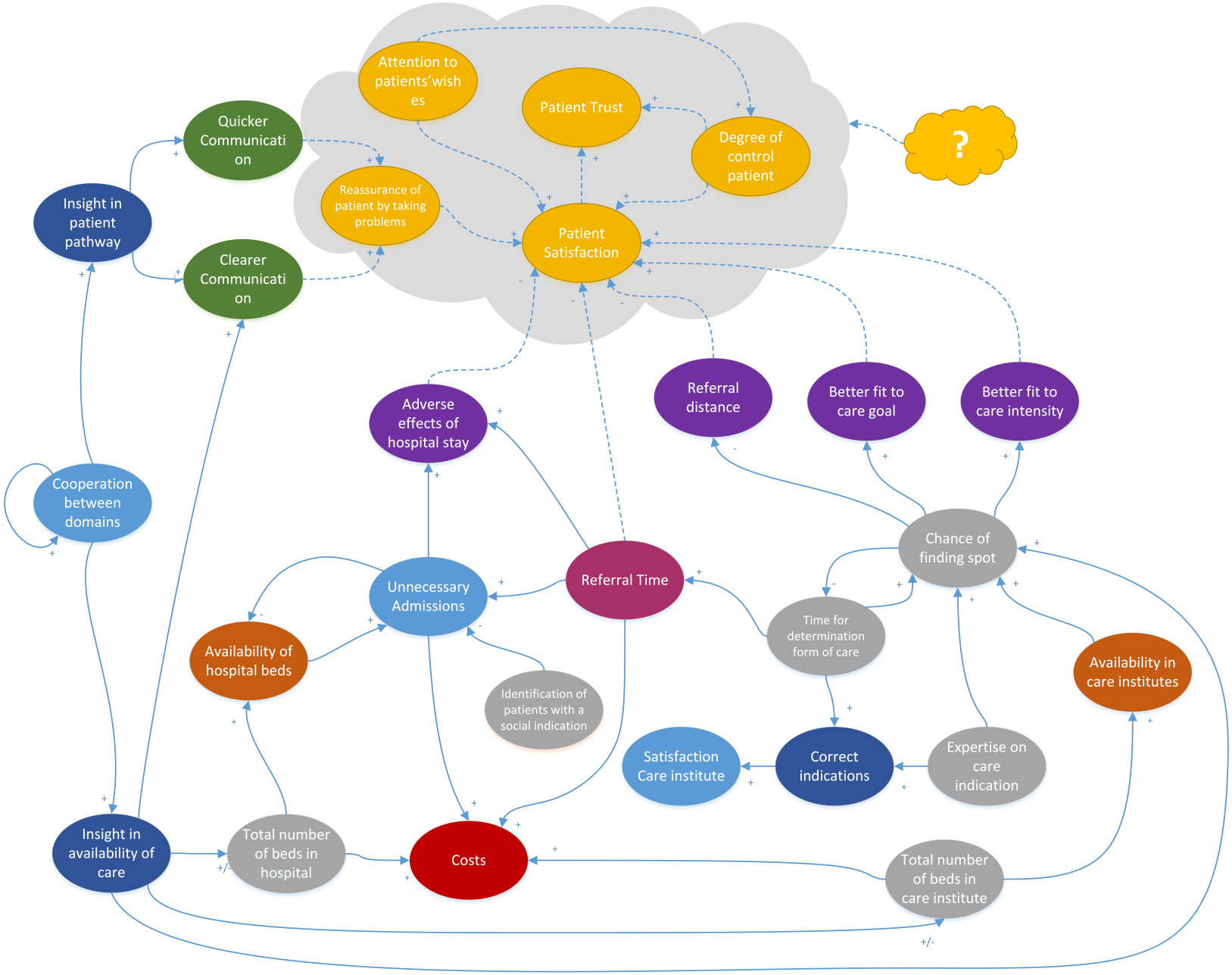

Figure 4.2: Causal Relation Diagram

4.4. Reflection

Within this section is reflected on the three assessment method steps explained within this chapter: The stakeholder selection, the indicator collection and the indicator selection. The process described within Chapter 3 is needed for both the Stakeholder Selection and Indicator Collection. Besides that, extra reflection is possible on the process by combining the conclusions from this Chapter with the process described. This is explained within section 4.4.7.

4.4.1. Reflection on the Stakeholder Selection

The visualized and validated process was used to decide which stakeholders are a good representation to form the system perspective on the referral process. The use of the process description from Chapter 3 makes it relative simple to identify the stakeholders which are involved with the process. It is much easier to determine per process step which stakeholders are involved instead of determining this for the whole process at once.

The classification of the stakeholders in both the process step involved and their role within the step gave a very clear overview, which made it easy to determine which selection of stakeholders represents all steps of the process and both direct and indirect involvement in the referral process.

The selection process does not take into account whether the person who fulfills the selected role is capable of coming up with good indicators. This is a small risk when a stakeholder is chosen. However, no better way to deal with this problem is available and therefor this is the best way to deal with this.

Obviously more stakeholders could have be chosen and interviewed. In that case more indicators could have been collected and more perspectives could have been taken into account. However, more is not always better. With a stakeholder group size between five to ten people the research stays within reasonable size. When the method is applied as in this research, the selection of stakeholders still has wide spread over all different stakeholders involved. The only reason to make the stakeholder group bigger is when a referral process has more steps or phases and not selecting a stakeholder would leave out an important step of the process.

4.4.2. Design rules based on the Stakeholder Selection

- A process visualization is useful in identifying stakeholders influencing the process, by determining per activity which stakeholders are influencing that activity.
- A process visualization is helpful in selecting a representative set of important stakeholders, by choosing a set of stakeholders which are equally spread over the different phases in a process and which are representing all different perspectives (such as operational or managerial) on the process.
- A set of stakeholders should by of such a size that at least all different steps of a referral process and all perspectives included in the research are represented.

4.4.3. Reflection on the Indicator Collection

Within the indicator collection the goal tree method and the Process Description from Chapter 3 are used in interviews to translate the perspective of the stakeholders into clear indicators. The main purpose of this step is to help the stakeholders to generate indicators which are perceived important by them.

The process description was an easy tool to talk about the indicators of a good referral process, since it made clear to the interviewees what the interview was exactly about. Within some of the mentioned indicators the stakeholders immediately addressed within the process where this indicator sometimes leads to problems. For example, one of the stakeholders mentioned that care institutes sometimes do not agree with the care indication a hospital presents a patient with and that therefor it was important that a patient in the end receives care under the right indication.

The stakeholders reflected at the end of the interviews that the goal tree method helped them in getting more insight in their own perspective and to translate their hunch of what a good process is into real measurable indicators. For the research it created a large list of indicators perceived important and therefor is very suitable for the purpose of the step.

Within most interviews the themes thought up by the researcher were needed for the stakeholders to come to a more diverse set of indicators. This influence by the researcher is unwanted, since it could bias the interviewees perspective. However, it was needed to help the stakeholder to be inventive in the generation of indicators. Most stakeholders needed some time to become inventive in creating indicators and therefor the themes are needed. Another method which could be used to warm up the creativity of stakeholders is to

make a goal tree as an example of a relative easy subject, before starting with the referral process itself. It is recommended to do this in further research. When all indicators were written down the researchers checked whether the stakeholders really thought that all indicators generated were important for the stakeholder to make sure that the influence of the interviewer did not lead to unwanted indicators in the goal tree.

It also took some time for the stakeholders to come to indicators which were fully measurable. Most of the stakeholders started with broader concepts or aspects, so the researcher needs to be sharp whether the named aspects could be measured or not and needs to ask the stakeholder how to measure such aspects. With enough effort of the interviewer, in the end, all stakeholders came to good measurable indicators.

4.4.4. Design rules based on the Indicator Collection

- A process visualization is useful in helping stakeholders to map their perspective and generate indicators, since it makes the indicators easy to associate with activities in practice instead of an abstract exercise.
- A tool, such as the, proven to be useful, goal tree, should be used to translate the perspective of stakeholders into measurable indicators.
- Brainstorming tools, such as the themes to associate indicators with, should be used to help the stakeholders to generate a diverse set of indicators.
- Indicators should always be measurable factors.

4.4.5. Reflection on the Indicator Selection

The indicator selection is a very important part of the method. The main purpose of the indicator selection is to limit the large list of collected indicators into a chosen construct space of effectiveness. This set of indicators, forming the construct space, is a set which reflects the most important indicators, but also is chosen in such a way that it is possible, within the available time and effort, to determine values for the indicators.

Besides that a lot of insight in the different indicators, and therewith associated aspects for a good referral process, is generated. For instance, within the CRD, a first insight is given in how the different factors influence each other and therewith, how some indicators are nearly measuring the same aspect of a referral process. It shows whether the chosen set of indicators is a good representation of the total effectiveness of referral processes.

The table with availability on data gives the hospital insight in which data already is available, but also which data could be made available with which effort. It helps in making decisions on which data to collect in the future, since it not only shows the availability, but also the needed effort to get the data.

The main point of improvement for the indicator selection is the lack of knowledge on the preference or importance of indicators. Within the interviews the stakeholders should have been asked to put the generated indicators within the interview in order of importance. Another possibility is to give weights to them based on their importance. This would have given better insight in the most important indicators in comparison to the support used for the selection. The use of the support is a good alternative to use when the importance itself is not available since it gives a good notion on whether indicators are supported by the full selection of stakeholders or by only an individual, which tells whether it represents an individual or a system perspective.

The indicators are selected on three factors: support, availability of data and uniqueness. Besides the mentioned remarks on the support, these three factors can be easy generalized to researchers or health professionals choosing their own set of indicators. An improvement on the method can be found by reflecting on the order of how the factors are used. Within this research, firstly the support is used to exclude less supported indicators, afterwards the availability of data is used and lastly the uniqueness is investigated. Within further research it is recommended to first investigate the availability of data on all the generated indicators. This has to be done, since no matter how much support or importance an indicator has, if it is impossible to measure, it can not be used. Also the influence of factors on each other need to be made visible to the stakeholders. To do this, creating a CRD is recommended, since it is an interesting tool to discuss with the stakeholders. The list of indicators with the needed effort to make data available and the causal relations should be presented to the stakeholders in a short and simple second round of interviews/workshops. Within this interview or workshop the stakeholders should be asked what their preference and perceived importance of the factors is. Hereby the stakeholders can take the needed effort into account, since one would consider to put more effort in an important factor than in a less important factor. Also the insight in how factors are related can

be taken into account by the stakeholders. By giving these insight, the stakeholder can make their own reasoning on why to include or exclude some of the indicators and from this reasoning a researcher can make a more substantiated decision on which indicators to include. In this way the method of selection can easily be generalized to other researches on the effectiveness of referral processes.

It also should be noted that the chosen set of indicators, could be used by further researche as a set to determine effectiveness. However, the set is not fully generalizable to all other processes. When a referral process is assessed, the assessor should be critical whether the indicator set chosen in this research is representative for the system perspective of the referral process to assess. If the set is not representative, an assessor can choose his or her own indicator set from the list of collected indicators. A more elaborated method on how to do this is presented within section 6.3.3.

4.4.6. Design rules based on the Indicator Selection

1. An indicator set should represent the perspectives of all stakeholders in the stakeholder set together, since in that case the set represents the systemic perspective on the referral process
2. Indicators in the indicator set should always be supported by multiple stakeholders of the referral process to assess in that specific assessment.
3. On the indicators in the indicator set data should be available or the effort to make it available should be reasonable otherwise measurement is impossible.
4. Indicators in the indicator set should be unique in such a way that two indicators do not measure the same aspect of the system, which is the case if on of two indicators have a direct causal effect on the other indicator.
5. Within two assessment methods where the referral processes have the same scope of the process and the same scope of the perspectives the same set of indicators can be used, under condition of design rule 2 and 3.
6. For the selection of the indicators it is best to present a list of all collected indicators combined with the effort needed to make the data available and the causality between the indicators to the stakeholder set and to let them reason on which indicators to include to the indicator set.

4.4.7. Reflection on the Process by looking at the Set of Indicators

The concluded indicator set and the process described in Chapter 3 make reflection of the process in a more detailed way possible. Within the process described different activities are identified. Some of these activities have a clear and direct effect on one or multiple of the indicators. For example, the fit of the goal of care and the patients' care need is mainly affected by the identification of the care need within the described process. If this identification is done wrong, logically the fit of the goal with the actual care need will be wrong. When researchers and/or health professionals wants to increase the performance of a process on a specific indicator, the activities affecting this performance can easily be identified. This creates more detailed insight on where to make alterations to the process to improve the process' performance.

4.4.8. Design rules based on combination of the Visualization of the process and the Indicator Selection

1. The combination of the process visualization and the indicator set could be used to identify which activities effect the performance of the referral process on a specific indicator, which makes alterations to the process to improve the process' performance possible.

5

Effectiveness Assessment

As concluded in the previous chapter there are five main indicators for an effective referral process: High availability of beds in a hospital, Good fit of the goal of care provided on the patients' care need, Good fit of the intensity of care provided on the patients' care need, Low referral distance and a Quick referral. To come to a conclusion on these factors a database is created with all patients presented at the ED of the Albert Schweitzer Hospital and indicated as a social indication within 2018. The values of the different indicators will be calculated based on this data-set. To give insight in this specific patient group the demographic data of these patients will first be described. Secondly per indicator will be explained how to determine the value of that indicator and will this found value be presented. Found difficulties with assessing the value will be explained and the assessment method will be adjusted when necessary.

5.1. Data description

Within 2018 a total of 101 patients were identified as patients presented at the ED with a social indication. The medical experts determined that these patients had a need for care which prevented them from returning home, but not severe enough for an admission to the hospital. Within the database created a large set of attributes per patient was collected. The database consists of demographic data (age and gender), data on the situation of the patient before presentation (kind of home, mobility state, indicated dementia, use of home care, associated GP, Carlson Comorbidity Index and an initial care indication), data on the presentation itself (reason for presentation, way of presentation, first-line specialty) and data on the situation of the patient after presentation (referral outcome, referral location, identified care indication, representations to the ED, re-admissions in the hospital and, if applicable, a disease date). Not all these attributes will be used for the assessment of the effectiveness. Some of the data can be useful for further research on the effects of the associated factors on the effectiveness and therefor is described within Appendix E. Also for those readers interested in this specific group more insight on these patients can be retrieved from the appendix.

5.1.1. Description of patient demographics

To give a general insight in the patients within this database the demographic data on age and gender are presented. Within figure 5.1 the age of the patient population is shown. Most patients are between 70 and 100 years old. One patient younger than 65 years old (the age of the patient is 59 years) stands out in the data, since officially geriatrics is a specialization for older people. Although this patient is younger, the problems existing in this multi-morbid patient with high use of medicine are comparable to geriatric patients and since the geriatrics department has most expertise to diagnose such a patient, this patient is diagnosed by a geriatrician. The median age is 87. The distribution per age category is visualized in table 5.1. It becomes clear that the patient population is very old and all have an age of 70 years or older, while most global research on elderly defines the elderly population as 65 years or older. This difference can be explained by the higher average healthy life expectancy(HALE) of the Netherlands in comparison to other countries. In 2016 this was 72.1 years on average, while the global average is 63.3 years World Health Organization (2016).

Age	Number	Percentage
<65	1	1%
65-69	2	2%
70-74	6	6%
75-79	11	11%
80-84	22	22%
85-89	24	24%
90-94	27	27%
95-99	6	6%
100-105	2	2%
Total	**101**	**100%**

Table 5.1: Age within patients with a social indication

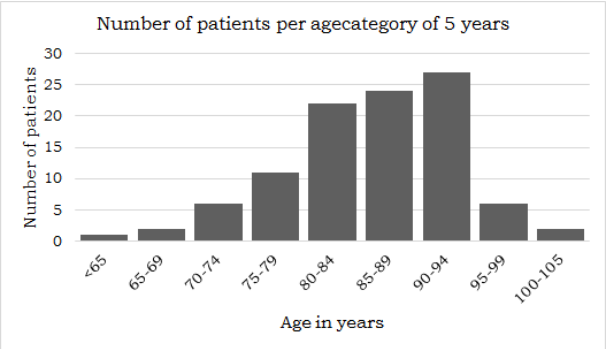

Figure 5.1: Histogram of age within patients with a social indication

Looking at the gender of the patients, 26 patients are male and 75 patients are female, almost three quarters of the total patient population are female. In the Netherlands the life expectancy(LE) of women is 83.2, which is higher in comparison to the 80.0 LE of men. Also the difference between the HALE and LE is bigger with women, which is 10.5 years(83.2-72.8), compared to the difference with men, which is 8.7 years(80.0-71.3) World Health Organization (2016). In average women have more years of unhealthy life, which leads to a higher fraction of women in the fragile elder population of the Netherlands. This is also found within the data-set at hand on the elder patients presenting at the ED. However in average 58% of the 75+-population living at home is female, the number found in this research of 75% is higher. But it is known that women make more use of care in comparison to men(Plaisier and de Klerk, 2004).

Gender	Number	Percentage
Male	26	26%
Female	75	74%
Total	**101**	**100%**

Table 5.2: Gender within patients with a social indication

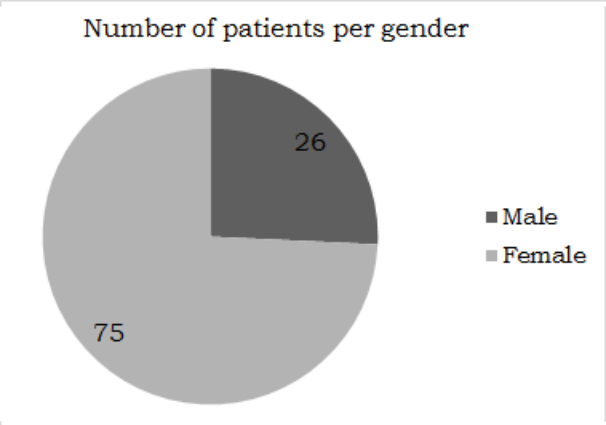

Figure 5.2: Pie chart of gender within patients with a social indication

5.2. Availability of hospital beds

As is mentioned, the availability of hospital beds is one of the main indicators for a good referral process, since a good process prevents unnecessary admissions. This prevention creates extra availability in the hospital for those patients with a need for admission. Different methods to assess the availability of hospital bed exist. A method is to determine the utilization rate of the hospital beds over the year by looking at how many days per year a bed is used by a patient. However, doing this for the whole of the hospital and finding the effect from a good referral process would be looking for a needle in a hay stack, since much more effects are in place within the hospital. A second way is to look only at the wards of the most affected specializations, however utilization rates in the hospital are quite high and hospital staff takes the amount of free beds in consideration when determining whether a patients' care need is sufficient for admission. Generally said, since a high number of patients is presented at the hospital, hospital staff is pressurized to keep the number of admissions low. This leads to the situation where patients in which a doubt for the need of admission exists will not be admitted and sent home when there is very limited space in the hospital, although they could benefit from a hospital admission. Availability created by the prevention of unnecessary admissions

within frail elderly could be filled by this group of patients with a debatable need for admission and therefor the beds will still be used. Availability created will therefor not be found in the utilization rate.

Another approach to determine the created availability by the referral process is to determine the amount of patients which otherwise would have been admitted, but are referred to another care institute via the process. When looking at the outcome of the referral process for the 101 patients, 84 patients were referred to a care institute, 10 were admitted to the hospital, 6 went home with the arrangement of extra home care and 1 patient went home without any extra arrangement of care. Within a total number of 91 patients a hospital admission was prevented, but only if all these patients otherwise would have been admitted to the hospital and not would have been send home without the referral process. This is too bold of an assumption to make and no research is available to determine the amount of unnecessary admissions in patients identified under a social indication when no quick referral process is present.

Outcome	Number	Percentage
Care Institute	84	83%
Hospital Admission	10	10%
Home with Home care	6	6%
Home without Home care	1	1%
Total	**101**	**100%**

Table 5.3: Outcome of the referral process for patients with a social indication

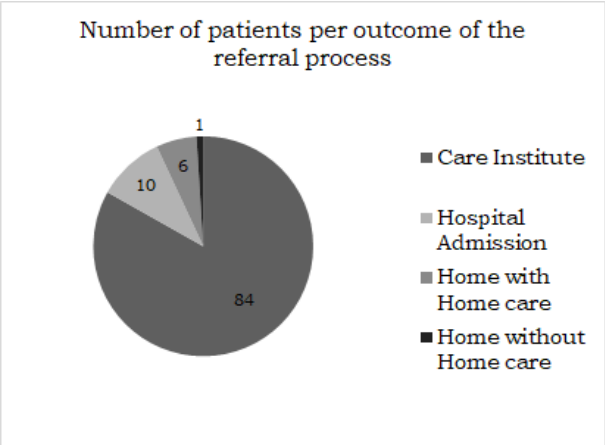

Figure 5.3: Pie chart of the outcome of the referral process for patients with a social indication

To determine this percentage of unnecessary admissions within this group two approaches can be used: (1) to take the data from the data-set and ask the hospital staff what they would have chosen if quick referral was no option, however this will always be very hypothetical and is very time consuming or (2) to start a research with the use a control group in which the referral is no option. However since this referral process is already implicated as a standard process in the hospital this research is executed and the stakeholders agree that it delivers better care it comparison to the old situation, such a setup has the notion of denying good care to a specific group of patient. The best option available is to accept the assumption mentioned before and to make this assumption very clear to those who re-use the number.

Another important part of the created availability is the amount of days the referred patient otherwise would have used a bed in the hospital. To determine this the amount of days an average patient with a social indication but admitted to the hospital is examined. A total of 10 patients were admitted to the hospital due to different reasons: 4 patients because there was no bed available for long-term care in the care institutes, 3 patients because there was no bed available for them at the observatory ward and 3 patients because there was no bed available for short-term care in the care institutes. Within the group of patients which were referred to the care institute only 2 out of 84 patients were referred to long-term care. Therefor the patients admitted due to shortage in capacity in long-term care are not representative for the group which is referred. The average duration of stay of the 6 patients which where admitted due to shortage in capacity in the observatory ward or to shortage in short-term care within the care institutes is 4.11 days.

Concluded from these numbers can be said that the increased availability of hospital beds by preventing unnecessary admissions is 91 admissions of an average of 4.11 days, but only under the assumption that these patients without the quick referral process would have been admitted to the hospital. Under this assumption the availability of the hospital increased with a total of 374 days/year in which beds where not used. To give a sense of the order of magnitude of this number, the hospital has a total number of around 350 beds (this number fluctuates around the year), which concludes in a potential of around 125.000 days of bed use per year.

5.3. Right spot in a care institute

Three different indicators can be seen as aspects of the care a patient is referred to: The fit of the goal of care, the fit of the intensity of care and the referral distance. Together these three form the right spot in a care institute for a patient.

5.3.1. Right goal of care

Three different purposes or goals of care in a care institute are explained in Chapter 1: stabilizing, rehabilitation and support with deterioration. Stabilizing is mainly needed when a change in a patients' daily situation has led to confusion of the patient. Stabilizing, by giving the patient a calm daily routine and needed medicine, could be a possibility to get the patient less confused and to see whether the patient is able to go back home. During the stabilization the patient is observed to determine whether it is safe to send the patient back home or if it the patient will not recover and therefor needs long-term care. The stabilizing goal can therefor also be seen as a observation goal. In general can be said that the goals therefor are in line with the length of care needed in a care institute. Rehabilitation is for those patients needing short-term care, support with deterioration is for those patients needing long-term care and stabilizing or observation is for those patients where it is unclear whether they need short-term care or long-term care.

The basis of a patients' problems determine which goal is used. There is no official indication for rehabilitation of patients with cognitive issues. There are two general diagnoses for patients with cognitive issues: delirium (which is temporarily) or dementia (which is permanent). Since it could be hard to determine from which of these two disorders the patient suffers, reasonable doubt is accepted and a special indication (ELV-PG Obs) is created to observe these patients under stabilized circumstances. Since no official indication for cognitive rehabilitation exists, this indication is also used for patients where it is almost one hundred percent clear that they have delirium. It that case it can be seen as a form of rehabilitation by stabilization. However the original goal of this indication is to observe whether the care need is temporarily or not. Within patients with cognitive issues a health professional referring a patient always has to chose between observation (doubt for short- or long-term care) or support with deterioration (long-term care).

An indication to observe whether a somatic issue is temporarily or permanent does not exist, although this doubt does exist within patients. Within patients with somatic issues a health professional always has to chose between rehabilitation (short-term care) or support with deterioration (long-term care).

		Basis of Problems	
		Cognitive	***Somatic***
Goal of Care	***Rehabilitation***	-	ELV Low, ELV High and GRZ
	Observation	ELV PG Obs	-
	Support with deterioration	WLZ5 and WLZ7	WLZ6 and WLZ8

Table 5.4: Care Indications categorized by Goal of Care and Basis of Problems

To see whether a patient ends up in the care with the right goal it would be interesting to investigate which percentage of somatic patients are referred to a care institute under a rehabilitation indication from the ED of the hospital, but are referred internally in the care institute to a long-term care indication. These patients are not rehabilitated enough to go home and therefor were referred to care with the wrong goal. Based on the expert opinions of the nursing home manager, geriatrician and the nursing home doctor can be said that it never happens that patients which are referred to long-term care are being referred internally to short-term care.

To investigate the percentage of patients internally referred, data from the different care institutes is requested. However, privacy regulations prevent the care institutes to release this data to the hospital without consent from the patients themselves. Retrieving this data would therefor require to contact the patients from 2018 to ask per patient whether this data could be shared with the hospital. But, due to the characteristics of the patient group, a large proportion of the patient group is at the moment of research diseased or mentally incompetent to give this consent. Therefor it is unable to determine this percentage within this research.

The only way to investigate this percentage is to let the care institute ask the patients to give consent to share information about the care received in the care institute with the hospital at the moment they arrive at the care institute. Or to do this research within the care institute and not within the hospital, however in that case the amount of directly referred patients would be not large enough to make clear conclusions due to the fact that the patients are distributed among different care institutes.

Looking at a recent research 21 percent of all patients receiving ELV-High complex care were referred to a long-term care indication, within ELV-Low complex care this percentage is 7 percent (Q-consult Zorg, 2018). Another research reports a care institute where almost 50 percent of the patients receiving ELV-care are referred internally to WLZ (van den Heuvel, 2016). Because of this differences this could be a very interesting indicator to benchmark different referral processes, but also has a potential to benchmark the different care institutes patients are referred to.

5.3.2. Right intensity of care

To achieve the intended goal with a patient a different intensity for care is needed. Intensity is defined as the amount of resources used within the delivery of care. Where resources are the facilities, the amount of personnel, the kind of health professionals and therewith the amount and kind of therapy. With the intensity a distinction can be made between the indications with the same goal and basis of problems, the indication which appear in the same table cell within Table 5.4.

For example three indications exist with rehabilitation for somatic issues as main goal: ELV Low complex, ELV High Complex and GRZ. Within ELV Low complex patients are cared for which have a single somatic issue and mainly need a bed and basic care to regain strength. Within ELV High complex patients with multiple dependable somatic issues are cared for, so called co-morbidity, which leads to more complicated care under more intensive supervision of a nursing home doctor and more specialized medicine use. Within GRZ patients with somatic issues which need active therapy to recover are cared for, a nursing home doctor is included for specialized pain medication and physiotherapists perform therapy with these patients. This difference can also be seen in the amount of money a care institute receives for the patient per day, where the compensation for GRZ is higher than ELV and where the compensation of ELV High complex is higher than within ELV Low complex. The main problem with this distinct indications is that there are patients where it is unclear which care intensity is the right care. Or, as is stated within the 'Considerationtool ELV' (Remmerswaal et al., 2016): "Within around 80 percent of the patients the responsible doctor can estimate correctly whether the patient needs low or high complex care within ELV care." For the other 20 percent this is less clear.

Within long-term care also a difference in intensity exists between WLZ5 and WLZ7, which are both indications for permanent care for cognitive issues, but WLZ7 has an extra component to deal with extra intensive care needed for this patients. This care can be needed due to behavioural problems, therapy needed to let family deal with the situation or severe problems with orientation or memory. In general can be said that more support is needed for these patients in comparison to the average patient needing support with deterioration due to cognitive issues.

The same difference also exists within WLZ6 and WLZ8 for patients which need support with deterioration due to somatic issues. WLZ8 patients do not only need help with all their daily living activities and with mobility both in- and outdoors, but they also need specialized medical help of nurses to prevent more severe issues such as decubitis, infections or pneunomia. This specialized medical help is the main difference between WLZ6 and WLZ8.

<table>
<tr><td colspan="2"></td><td colspan="4">Basis of Problems</td></tr>
<tr><td colspan="2"></td><td colspan="2">Cognitive</td><td colspan="2">Somatic</td></tr>
<tr><td rowspan="5">Goal of Care</td><td rowspan="3">Rehabilitation</td><td rowspan="3" colspan="2">-</td><td>Intensity-Low</td><td>ELV Low</td></tr>
<tr><td>Intensity-Medium</td><td>ELV High</td></tr>
<tr><td>Intensity-High</td><td>GRZ</td></tr>
<tr><td>Observation</td><td colspan="2">ELV PG Obs</td><td colspan="2">-</td></tr>
<tr><td rowspan="2">Support with deterioration</td><td>Intensity-Medium</td><td>WLZ5</td><td>Intensity-Medium</td><td>WLZ6</td></tr>
<tr><td>Intensity-High</td><td>WLZ7</td><td>Intensity-High</td><td>WLZ8</td></tr>
</table>

Table 5.5: Care Indications categorized by Goal of Care, Basis of Problems and Intensity

To research whether patients are referred to the correct intensity the same approach could be taken as within the goal of care: investigate those patients referred to the care institute under a ELV- or GRZ-indication and see which of the patients are referred internally to a different ELV- or GRZ-indication as presented for. The same can be done for WLZ5-patients presented and internally referred to WLZ7 and viceversa and for WLZ6 and WLZ8 presentations. However, the same problems with privacy as with the research on the care goal are present within this research and therefor the same approach is needed to research this. Within this research

this investigation is impossible.

5.3.3. Deterioration over time

Important within both proposed researches is the aspect that patients improve or deteriorate over time. Therefor not all internal referrals are a case of bad presentation by a hospital. For instance some patients are too weak to receive therapy and therefor firstly receive care under an ELV-indication to regain strength and afterwards are referred to a GRZ-spot to receive therapy. Also a cognitive patient referred to a WLZ5 can deteriorate in such a way that the patient needs extra care which only can be given under a WLZ7-indication. Therefor, when researching the percentage of internally referred patients the time between the moment they are presented at the care institute and the moment the referral is set in motion needs to be taken into account. It is advised to take the moment the internal referral is set into motion for the research and not the moment of the internal referral itself, since the arrangement of the internal referral can take a lot of time and this time will affect the results. All referrals with a switch within three days after presentation can be seen as a presentation under a wrong indication. Dependable on which internal referral has taken place can be determined whether a patient was presented under the wrong goal, the wrong intensity or both.

5.3.4. Distance between home and a care institute

One of the indicated important indicators for an effective referral is the referral distance. The referral distance is the route-distance between the origin (the home) of the patient and the referral location. This distance is based on the calculation of the route-planner of Google Maps. The postal code of the home address is taken as starting point and the postal code of the care institute the patient is referred to as destination. On purpose is chosen for the route distance instead of the direct distance. Within the region of the Albert Schweitzer Hospital a lot of rivers are located. Since it is not possible to cross the river at every point, two locations on each side of the river can be closely nearby, although the route from one point to the other could be relatively long. Since the main reason to include the referral distance is that a referral location further away is harder to visit for friends and family, the route is a better indicator.

Out of the 84 patients directly referred to a care institute, 1 patient is indicated as an outlier, since this patient is referred to a care institute 162 kilometers from home on request of the family. This referral location was very close to relatives living further away and made easy visit of family possible. Out of the remaining 83 patients, 30 patients are referred to a location less than 5 kilometers away from home, 33 patients have a referral distance between 5 and 10 kilometers, 16 patients have a referral distance from 10 to 15 kilometers and 5 patients are referred between the 15 and 20 kilometers away from home (visualized in figure 5.4. No patients were referred further than 19 kilometers from home. The average referral distance is 6.88 kilometers.

Referral Distance	Number	Percentage
0-5 Kilometers	30	36%
5-10 Kilometers	33	40%
10-15 Kilometers	16	9%
15-20 Kilometers	5	4%
Total	**83**	**100%**

Table 5.6: Referral distance for patients with a social indication referred to a care institute

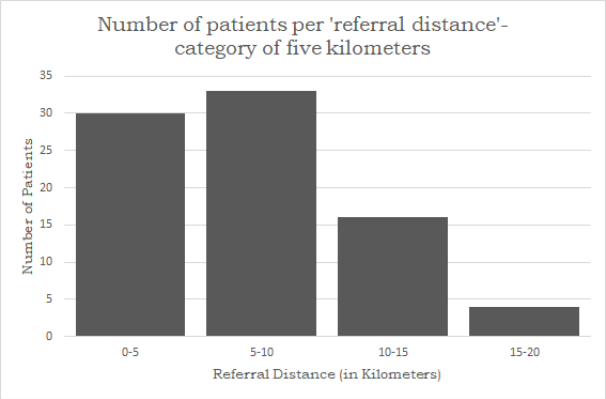

Figure 5.4: Bar chart of the referral distance for patients with a social indication referred to a care institute

To have an idea whether this distance is acceptable for inhabitants or not, context is needed. Since the Netherlands is densely populated, people are used to short distances. For example, the average commuting distance for the municipality of Dordrecht is 21.3 kilometers, which gives an idea what acceptable distances are within the region. No prior research is available to place the referral distance found into context. However, since the longest referral distance is shorter than the average commuting distance, the referral distances concluded from the referral process are assumed to be good.

5.4. Referral Duration

The referral duration is the time needed from the moment the patient arrives at the ED of the Hospital until the moment the patient leaves the hospital. Time stamps are added to a patients dossier when the patient enters the ED, when a patient leaves the ED to go to the observatory ward, when a patient is admitted and when a patient leaves the hospital. The number of hours between the arrival at ED and when the patient leaves the hospital is measured as the referral distance.

Out of 84 patients referred to a care institute, 17 are referred within less than 12 hours, 33 are referred between 12 and 24 hours, 25 patients are referred between 24 and 36 hours, 6 patients are referred between 36 and 48 hours and 3 patients had a referral time longer than 48 hours. The minimum referral time was 2 hours and the maximum referral time was 74 hours. The average referral duration is 22.6 hours.

Referral Duration	Number	Percentage
0-12 Hours	17	20%
12-24 Hours	33	39%
24-36 Hours	25	30%
36-48 Hours	6	7%
>48 Hours	3	4%
Total	**84**	**100%**

Table 5.7: Referral duration for patients with a social indication referred to a care institute

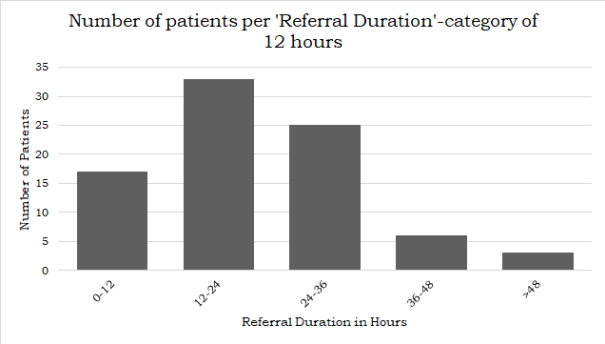

Figure 5.5: Bar chart of the referral duration for patients with a social indication referred to a care institute

5.5. Conclusion on the effectiveness of the zorgtransferium

As is said the total effectiveness of the referral process is assessed and can now be shown by showing the individual scores per indicator.

Availability of hospital beds The amount of extra availability of hospital beds is a total of ***374 occupant days/year*** under the assumptions that all patients referred where otherwise admitted to the hospital.

Fit of goal of care ***Inconclusive*** due to privacy regulations.

Fit of intensity of care ***Inconclusive*** due to privacy regulations.

Referral distance The average referral distance is ***6.9 kilometers*** with a minimum of 0 kilometers and a maximum of 19 kilometers.

Referral duration The average referral duration of ***22.6 hours*** with a minimum of 2 hours and a maximum of 74 hours.

At this point the question arises what these indicator scores tell about the effectiveness of the referral process. It has to be determined to what extend the 374 available occupant days, the referral distance of 6.9 kilometers and the referral duration of 22.6 hours are effective or not. For the referral duration norms exist by the government and the organisation involved had determined there own goal. For the other two indicators no official norms are determined by the government or branch organisations and the organisations involved in the process have no goals for these indicators. On all the indicators a lack of data from other hospitals exists, which makes it impossible to benchmark the scores.

For referral duration the goal of the organisations was to refer all patients within 48 hours. Out of all 101 patients indicated as patients with a social indication 81 are referred to a care institute within 48 hours and 7 patients went home within 48 hours. For a total of 88 patients (87 percent) the goal of the hospital was reached. The official Treeknorm[1] for care within a nursing home is 6 weeks (a total of 1008 hours). In comparison to this norm the average of 22.6 hours for the referral duration is substantially lower to the maximum

[1]The Treeknorm is a norm determined by the Ministry of Health Care and describes the acceptable waiting times per form of care in the Netherlands

accepted referral duration. Combining the scores on the goal of the hospital and the Treeknorm the referral process in the hospital can be seen as very effective in performing quick referrals. A small note is that the Treeknorm are determined for patients living at home and requesting care and not for patients within an acute care setting. Norms for a maximum referral duration in acute settings are not present and it is recommended for the Ministry of Health Care to make a more specialized Treeknorm for the acute care setting in the future.

As is said, for the availability of hospital beds and for the referral distance, no norms or targets exist. However, on availability of hospital beds can be said that every extra day a bed is available is extra gain in comparison to the old situation. It is a decrease of unnecessary bed occupancy in the hospital. This number will only increase if more patients will be referred directly or if other patient groups with longer hospital stays will also be directly referred to care institutes. To determine whether this number is effective or not the main point is whether the group of patients referred could be expanded or not. If this is the case, the number could have been higher and increased effectiveness could be reached. Since for this moment the 374 extra available days a bed is available is clean profit the process is an effective way to create extra beds in the hospital. If a hospital wants to increase this number they should focus on the direct referral of extra unnecessary admitted patients.

Already some context was presented when looking at the referral distance. Questions were asked to the Minister of Health Care within the Dutch House of Representatives what has to be seen as an acceptable referral distance. The Dutch Minister answered that it was never researched and that other factors are also important. Which concludes in a severe lack of knowledge on the importance of this factor and the acceptability. To travel a distance of 7 kilometers takes within the urban area of Dordrecht around 8 to 12 minutes. This is seen as a relative short travel distance and therefor to the opinion of the researcher the process is effective in placing patients in a care institute relative close to home. If someone wants to do further research on this topic a survey has to be done where both patients and relatives are included to see if they are happy or not with the travel distance.

Based on the first time the assessment method is applied to a case can be said that the Zorgtransferium-process is effective in referring patients quick, relative close to home and in creating available beds in the hospital. It can not be said whether the process is effective in referring patients to the right goal and intensity of care in a care institute.

5.6. Reflection on the data collection and analysis

Within this part is reflected on both assessment method steps explained within this chapter: The data collection and the data analysis.

5.6.1. Reflection on the data collection

When looking at the collection of data a large data-set is built with data of the patients collected in the hospital. However, the taken perspective of the research is systemic and not institutional. The database only consists of data collected within the hospital. The care institutes, which are also included in the systemic perspective, also own a part of the needed data. Due to privacy regulations it is only possible for the hospital to collect this data, owned by other organisations, when the patient gave formal permission. Since this is not done beforehand and since it is impossible to do this afterward due to the nature of the patients. The collection of data on the fit of goal and intensity of care to a patients' need for care, owned by the care institutes, was impossible within this research. When one does have the permission on this data it is recommended to investigate the percentage of patients referred to a care institute under a specific indication, but referred internally within the care institute to another indication over the total amount of patients referred.

The data collection is done retrospective by searching within patient files. This made it easy to collect larger numbers of data at once, since a large number of patient files were already present. However it also made it impossible to ask the patients for permission for the data outside of the hospital. It is recommended to ask this permission in the future to make further research possible.

5.6.2. Design rules based on the Data Collection

1. The measurement of indicators on a systemic level requires data collection from multiple organisations, which requires special attention to privacy regulations.

2. Retrospective data collection makes it easy to collect large numbers of data at once.

3. Retrospective data collection can lead to problems with privacy regulation if permission is not asked

beforehand, since asking permission afterwards within elder patients is often impossible.

5.6.3. Reflection on the data analysis

The relative simple data analysis leads to usable first results which did not exist before this research was conducted. Out of the collected data the descriptive statistics were relatively easy to construct. The hard part was to give meaning to the numbers generated. There was no comparison possible with similar processes, since the data to compare was not available. Next to that a lack of accepted norms, targets or goals on the indicators made it relative impossible to say whether the process was successful or effective in meeting these norms, targets or goals. The conclusions from the data analysis make it possible for other processes to use this process as a comparable process, since the data on this process is available.

Within this research the researcher concluded that the process was effective in referring patients quick, relative close to home and in creating available beds in the hospital. However, this conclusion is based on very limited context available. As is said, the actual information needed to conclude this, was not available. The conclusion is made by comparing the referral duration with the accepted referral duration when a patient is at home, comparing the referral distance to the communal distance and by concluding that extra available bed day is already better than everything which is known before. It is recommended for future researchers to find better context to make this conclusion. For instance, by comparing their results to the results of this research.

From this research it becomes clear that more processes need to be assessed and when these assessments are compared clear conclusions on effectiveness can be made. By taking the five indicators as a basic set of indicators for all direct referral processes from ED's of hospitals to care institutes and measuring the performance of other hospitals a benchmark will be created to further compare different processes in effectiveness. The responsible organisations (both government and health organisations) need to come with generally accepted norms on direct referral from ED's of hospital to care institute in order to determine when such a process is successful.

The current data analysis is scoped on determining the unknown outcomes of a referral process. It does not conclude anything on which effects lead to successful outcomes. Within the data collection the data needed to come to such conclusions is collected, which makes it possible to determine what leads to a successful process. The data needed for this analysis is presented in Appendix E.

In general the data analysis is a very good basis for further research and gives a notion on the effectiveness of the process, but much more can be researched in the future.

5.6.4. Design rules based on the Data Analysis

1. For conclusions on effectiveness and success of a referral process data analysis is needed.

2. Conclusions on effectiveness can be only be made when context is available for values of the specific indicators, for instance by doing a benchmark or by generally accepted norms.

3. When assessing a referral process one should think and describe before doing the data analysis on which targets the referral process should achieve.

6

Conclusion and Discussion

6.1. Conclusion

The aging population in the Netherlands requires new approaches to make sure that health care in the future stays affordable and accessible. One of these approaches is to prevent unnecessary expensive hospital admissions for elderly with a social indication by referring them directly to care institutes when presented at the ED. This problem and the required solution is not an issue of solely the hospital or only the care institutes, it is a problem caused at system level. Therefor this research has developed a method to investigate the effectiveness of these direct referral processes of elderly by a systemic perspective. This development has lead to a list of design rules which conclude the main findings on assessment of the effectiveness of direct referral processes for patients with a social indication from the ED to care institutes. The Design rules are firstly summarized and afterwards the main research question and the underlying sub-questions are answered.

6.1.1. Design Rules summarized

Within this paragraph the most relevant design rules are mentioned. A more extensive list of all design rules mentioned in this thesis are displayed in Appendix F.

- A visualization of the process is required, in such a way that it can be used to determine whether the understanding of all important stakeholders is the same and to come to a collective agreement of the stakeholders that the described process is the process to assess. (Paragraph 3.5)
- The identification and selection of important stakeholders have to be implemented in such a way that the perspectives of these stakeholders together form a representative perspective on system level. A representative perspective is reached when the stakeholders are spread out over the process in both the phase of the process they are involved in and the kind of role (operational or managerial) they play in this phase. (Paragraph 4.4.1)
- It is required to map and translate the perspectives of the most important stakeholders into measurable indicators in such a way that it is possible to create a construct of indicators which can be quantitatively analyzed. (Paragraph 4.4.3)
- A selection of the most important indicators is needed in order to form the construct space of effectiveness in such a way that the construct represents the most important indicators which data is available on and which do not overlap in the effects they measure. (Paragraph 4.4.5)
- Data collection and data analysis of the indicators in the indicator set is needed in such a way that numbers on the indicators are created which make it possible to conclude the effectiveness of the process on these indicators. (Paragraphs 5.6.1 and 5.6.3)

6.1.2. Research answers

To recap, the main research question defined within Chapter 1 is:

How to describe and assess referral processes for elderly patients with a social indication*?

** elderly patients with need of care from a care institute other than the hospital, presented at the emergency department.*

This main research question is divided into different sub-questions, which will be answered in the following paragraphs.

6.1.3. *How to measure the effectiveness of a referral process from a systemic perspective?*

To assess the effectiveness of referral processes on a system level, different important steps need to be taken:the object of study needs to be described, the important stakeholders need to be identified and selected, these stakeholders' perspectives need to be mapped and translated into indicators, the the important indicators need to be selected to come to a construct space for effectiveness on a system level, data on these indicators needs to be collected and analysed to come to conclusions on these indicators and the effectiveness. For an assessment method on systemic perspective all these steps are necessary.

6.1.4. *How can a referral process be visualized for communicability?*

A process can easily be visualized by the flowchart method. The researcher needs to analyse which activities and decisions are made from the moment a patient arrives at the ED until the moment the patient is referred to another care institute. The visualization of the process by a flowchart is very suitable for the creation of overarching insight in parts of the process where the stakeholders are not involved with on a daily basis. All six interviewed stakeholders understood the process when shown to them. The flowchart representation is easy to understand and therefor can be used for the communicability of the process.

6.1.5. *To what degree do stakeholders agree on a description of a referral process?*

All stakeholders on which the flowchart of the process is shown agreed that the actual referral process was represented correctly by the flowchart. In this case all stakeholders fully agreed on the process. Within this case the process was designed within a pilot project and the stakeholders where involved in this process, which could have helped them understand the process. It is unknown whether stakeholders in less designed and more hands-on referral processes also agree to the same extend as within the case used within this research.

An important notice is that when a researcher wants to validate to what extend a process described on paper is applied into practice, a better approach would be to come up with process indicators. By collecting data on these process indicators a researcher could determine how often specific steps of the process are neglected, performed poorly or not applicable.

6.1.6. *How do stakeholders perceive indicators of effectiveness of a referral process?*

It is not a simple task for stakeholders to translate their own perception to measurable indicators. At first the process description is needed to make the objective of generating indicators less abstract. It makes it possible for the stakeholders to think in their own professional context. The process description also needs to be used to determine which set of stakeholders represents the system perspective.

When the process is described clearly to the stakeholders a goal tree is a very good tool to translate stakeholder perception into indicators. Problems can exist in generating a diverse set of indicators and in fully measurable indicators. The interviewer needs to help the stakeholders with these problems (for example by using themes for creativity and asking further until a measurable indicator is created), but also has to make sure that the stakeholders perspective is not biased by this help. A large list of indicators is generated and out of those is set of important indicators can be chosen based on importance, availability of data and uniqueness. Within the case the importance was not available and therefor this is substituted by the support for the factor. Within the case the final set of important indicators consists of five indicators: 'Availability of hospital beds', 'Fit of the goal of care to the patients' care need', 'Fit of the intensity of care to the patients' care need', 'Referral Distance' and 'Referral Time'.

6.1.7. *What is the current effectiveness of the referral process at the Albert Schweitzer Hospital in Dordrecht?*

The effectiveness is translated to a set of five indicators and per indicator the value of the indicator is determined based on data analysis:

Availability of hospital beds The amount of extra availability of hospital beds is a total of ***374 occupant days/year*** under the assumptions that all patients referred where otherwise admitted to the hospital.

Fit of goal of care ***Inconclusive*** due to privacy regulations.

Fit of intensity of care ***Inconclusive*** due to privacy regulations.

Referral distance The average referral distance is ***6.9 kilometers*** with a minimum of 0 kilometers and a maximum of 19 kilometers.

Referral duration The average referral duration of ***22.6 hours*** with a minimum of 2 hours and a maximum of 78 hours.

At this moment no objective effectiveness can be determined due to the lack of context to the numbers. Since no comparison can be made with similar processes or generally accepted norms are available the meaning to the numbers is given by reasoning of the researcher. On the indicators 'Fit of the goal of care to the patients' care need' and 'Fit of the intensity of care to the patients' care need' the effectiveness is inconclusive. Based on the reasoning of the researcher can be said that the referral process is effective on 'Availability of hospital beds', 'Referral Distance' and 'Referral Time'.

6.2. Contributions

The contributions of this research are twofold: Scientific contributions, which explain the added knowledge of this research and the societal contribution which describe how health care professionals could benefit from this research.

6.2.1. Scientific contribution

As mentioned often within this research, the nature of this research is explorative. This research is the opening of a black box, which was remained close. Therefor the main contribution is the description of processes, that were not described before. The system description given within Chapter 1 in itself is of added value to science. It describes system failure leading to the situation where patients with a social indication do not end up in a place where they do not receive the care they need. The identification and clear description of this group and the effects leading to the failure of care is never described before and is still unknown and/or neglected by many health professionals.

One of the very specific and very useful description of the system is the distinction of care indications presented within Table 5.5 on Basis of Problems, Goal of Care and Intensity. It gives a categorisation of care indications which could be used in further research on care in care institutes in the Netherlands. Since these indications are relative hard to understand and distinct, even for care professionals working with them on a regular basis, this categorisation unravels the mess of care indications into clear understanding of the distinctions between them. This knowledge makes it much easier for further research to use the different indications and investigate more on the appropriateness of these indications for specific patients or patient groups.

An assessment method is presented which deals with the multiple perspectives of different stakeholders and therewith creates a system perspective on the problem and referral processes as potential solution. This is needed since the nature of the system failure lies between different organisations and a perspective on the problem by a single organisation or a single stakeholder would not conclude in the needed improvements on system level. Without this assessment method one would exclude important aspects within the system. Although the assessment method itself is built out of different steps already known and proven within literature, the combination of these steps and application to the assessment of effectiveness of processes within health care is fully new.

Within this research a way to visualize referral processes is described. This visualization method is used to describe the referral process in the Albert Schweitzer Hospital in Dordrecht. This makes it possible for further research to refer to this process or to visualize a similar process in the same way. It creates a basis for the standardization of referral processes in the Netherlands, since researchers could propose other referral processes or changes to the presented referral process in order to come to an improved and general accepted referral process. It also helps for researchers not involved within the organisation of the hospital with the understanding of such processes.

Further research on the assessment of effectiveness of direct referral of patients with a social indications from the ED of the hospital could use the assessment method presented in three different ways, which is further explained in section 6.3.3.

Therewith it helps researchers in assessing the effectiveness and, on longer term, creating a benchmark to determine the effectiveness in comparison to similar processes. The start of this benchmark is set by the values found within this research. Since the assessment method is applied to a case and throughout the research is clearly reflected on, researchers in the future can read within this paper which strengths and pitfalls are associated with the method.

6.2.2. Societal contribution

The recognition of patients with a social indication is lacking in most hospitals. This research explains the characteristics of these patients, the problems which lead to the situations and an alternative for hospitals to deal with these patient. This could lead to a perspective change within the health professionals dealing with these patients. In most hospitals the health professionals only ask themselves whether these patients should be admitted or not, while other alternatives are present. The system description within Chapter 1 could help to create awareness that other care processes are needed for these specific patients.

As the interviewed stakeholders reflected, the visualization of the referral process helped them in the understanding of the whole process instead of the specialized part they were responsible for in their day-to-day work. The visualization of processes helps the health professionals in their communication to and expectations of colleagues. It also helps in communication to patients, since a professional at the ED could explain better what the follow-up process for a patient will be.

Both the visualization of the referral process presented in Figure 3.4 as the categorization of care indications presented in Table 5.5 could be used for new employees to explain the tasks they have to fulfill within the process.

The Causal Relation diagram could help professionals in the understanding the effects of the way they act within their profession. It could help them in understanding why specific factors are important in the system and why they should act in a way to affect these factors positively. It also shows why specific actions perceived good on a short term good have negative effects on the longer term. Shortly it helps them in understanding the broader context of their own work.

In section 6.2.1 is explained how researchers could use the assessment method to do further research on the effectiveness of referral processes. With the same approaches hospital managers could use the method to determine the effectiveness of the referral processes they are responsible for. The visualization of the process could be used to talk with health professionals to determine points of improvement in the process and to discuss where the process needs alterations.

6.3. Discussion

The discussion of this thesis is due to the explorative nature of this thesis and different challenges throughout the execution of this thesis relatively extensive in comparison with other theses. The discussion consists of four parts. First, a general discussion on the executed research which includes the main challenges, a disclaimer on the conclusions and the general value of the research. Second, a summary of the different reflections on the method steps given in Chapters 3,4 and 5. Thirdly, a recommendation on the future use of the assessment method developed in this thesis. And Fourthly, three different recommendations for future research on this topic.

6.3.1. General discussion on the research

From the start of the research the goal of this thesis, to determine the effectiveness of direct referral from the ED of an hospital for patients with a social indication, seemed relative straightforward. However, looking at the final conclusions on the effectiveness these are not fully satisfactory yet.

Since the subject of study, direct referral of patients with a social indication, was not researched before, and a theoretical basis for the assessment of the effectiveness of the referral process was missing in literature, this research took place within unexplored terrain. A new assessment method was applied on a new to research subject, resulting in a double explorative nature. Give this double explorative nature, this study can be described as a pilot-pilot study (a new method applied on a new research subject). Although the goal of the research seemed relative straightforward, reaching this goal within an explorative research was far more challenging than expected. This also leads to a disclaimer on the conclusions within this research. This research is an attempt to determine the effectiveness of referral processes for patients with a social indications, but different attempts are possible. It reflects on the used method and the subject, however it can not be concluded that the effectiveness is objectively determined and it also cannot be determined whether other methods to

assess effectiveness would be more successful in delivering satisfactory conclusions on the effectiveness of these referral processes.

There are a couple of reasons why an easy assessment of the effectiveness was impossible. At first, the lack of easy-to-understand and accepted descriptions of the referral process, led to a situation where it was not certain whether all involved stakeholders had the same understanding and perspective on the process. Without this description a high chance exists that different stakeholders have different views on what the exact process is. As long as this different views exist, can not be spoken about 'the referral process' to assess on system level, since what the referral process is, would be fully dependable of the view of the stakeholder the researcher is talking with at that moment. Eventually it was validated that all stakeholders agreed with the understanding of the process by the researcher.

Secondly, no generally accepted set of indicators was available to base the effectiveness on. The scope of the assessment of the effectiveness was to do this on system level, since the problem is caused at system level, between organizations. Due to this scope the perspectives of multiple stakeholders had to be taken into account. Only looking at the indicators for one organization would not lead to effectiveness on the desired organizational level. Since this was not available it had to be created from the different perspectives of the stakeholders.

Thirdly, the data needed to assess the effectiveness was not available. Especially within a health sector with the goal to make data-driven decisions this one of the most important findings. Both researchers and health care managers can suffer from 'data-optimism'. This is the idea that data to research effects, make decisions on, build models from and validate these models is always available. Within this research relative basic data was not available and to collect this data the needed effort was high or even impossible. To make evidence based management possible in the future the state of the data on system-level has to be improved.

Fourthly, the context needed to conclude whether the process was effective was not available. To determine whether the process was effective the analyzed data needs to be compared to other data or it has to be determined whether specific targets are reached. No targets to reach and no data to compare the process with other processes were available. The only possible way to determine whether the results from the process were effective or not, was based on the opinion of the researcher and the stakeholders. This led to unsatisfactory conclusions on the effectiveness since these conclusions are fully subjective.

But, when satisfactory conclusions on effectiveness cannot be reached, the question arises what the actual value of this research is. This research started untangling a large problem in the current health care sector. To the opinion of the researcher, elderly which should be cared for are not receiving the right care at the moment. They are falling between the two stools of hospital care and safely living at home. This research creates attention for this problem. By identifying the perspectives of the most important health professionals involved with the health care provision of these patients these problems are underlined. It creates awareness on problems with patients with a social indication, which cannot be neglected. Besides that, it shows that very much is still unknown on these patients and on potential solutions for the problems. Even relative basic data, needed to analyze the health care provision for this group of patients, is missing. This thesis has opened a Pandora's box by showing these unknowns and on the same hand this box cannot be closed by neglecting the need to deal with these problems. Within this research, a first attempt to research the current state of referral processes has gathered useful insights, but was not fully successful. Even when this attempt would have been successful, much more steps have to be taken to come to actual solutions for these patients. The general value of this research is that it made first steps in the recognition of the problems for these patients and that it creates first insights in the system and processes affecting these problems. These steps and insight create the needed attitude to, eventually, come to the needed knowledge to create actual solutions for these patients. This research should be seen as the first push, which should set the health care sector in motion to take the steps to deliver the right care for these patients.

6.3.2. Reflection on the assessment method

Throughout the paper is reflected on the different steps of the assessment method. These reflections together give a good overview on how to use and generalize the assessment method for further applications. Within this Section a summary of these limitations is given and together these conclude in an overall reflection on the assessment method, which gives insight in how generalizable this method is for other purposes.

The *visualization of the process* is very suitable for the creation of overarching insight in parts of the process where they are not involved with on a daily basis. The visualization was suitable for face validation by the stakeholders. However, if a researcher wants to validate to what extend a process described on paper is applied into practice, a better approach would be to come up with process indicators. By collecting data on

these process indicators a researcher could determine how often specific steps of the process are neglected, performed poorly or not applicable.

The *stakeholder selection* is relative simple due to the use of the description of the process makes, since it is much easier to determine per process step which stakeholders are involved instead of determining this for the whole process at once. The classification of the stakeholders in both the process step involved and their role within the step, made it easy to determine which selection of stakeholders was a good representation. With a stakeholder group size between five to ten people the research stays within reasonable size. The only reason to make the stakeholder group bigger is when a referral process has more steps or phases and not selecting a stakeholder would leave out an important step of the process.

Within the *indicator collection* the goal tree method is used in interviews to translate the perspective of the stakeholders into clear indicators. The stakeholders reflected that it helped them in getting more insight in their own perspective and to translate it into real measurable indicators. It created a large list of indicators. Within most interviews the themes thought up by the researcher were needed for the stakeholders to come to a more diverse set of indicators. This influence by the researcher is unwanted, since it could bias the interviewees perspective. When all indicators were written down the researchers checked whether all indicators generated were important to make sure that the influence of the interviewer did not lead to unwanted indicators in the goal tree. The researcher needs to be sharp whether the named aspects could be measured or not, since most stakeholders name broader concepts or aspects which are not measurable

Within *indicator selection*, the CRD, gives a first insight in how the different factors influence each other. The overview of the availability on data gives the hospital insight in which data already is available, but also which data could be made available with which effort. The main point of improvement for the indicator selection is the lack of knowledge on the preference or importance of indicators. The stakeholders should have given preferences or a notion of importance to the indicators. The use of the support is a good alternative to use when the importance itself is not available. It also should be noted that the chosen set of indicators could be used by further researchers as a set to determine effectiveness. However, the set is not fully generalizable to all other processes.

The *data collection* is done within the hospital. The data on the process within the hospital is easily available. But, due to privacy regulations it makes it very hard to collect data which is held within other organisations when the patient acceptance is not asked beforehand. This made the collection of data on the fit of goal and intensity of care to a patients' need for care impossible within this research. Retrospective data collection made it easy to collect larger numbers of data at once. However, it also made it impossible to ask the patients for permission for the data outside of the hospital. It is recommended to ask future patients this permission to make further research possible.

The *data analysis* leads to usable first results which did not exist of any kind before this research was conducted. It was hard to give meaning to the numbers generated, since no comparison with similar processes was possible due to lack of available data. Next to that, a lack of accepted goals made it impossible to say whether the process was effective in meeting these. The conclusions from the data analysis make it possible for other processes to use this process as a comparable process. By measuring the values of the five indicators for comparable referral processes a benchmark will be created to determine effectiveness in the future. The responsible organisations (both government and health organisations) need to come with generally accepted norms on direct referral from ED's of hospital to care institute. The current data analysis does not conclude anything on the effects leading to successful outcomes. The data needed for this analysis in the future is presented in Appendix E. In general the data analysis is a very good basis for further research and gives a notion on the effectiveness of the process

Overall can be said that the assessment method steps in itself are not very innovative, since most of them are widely applied to other researches. However, it is the combination and necessity of every method step which makes the assessment of effectiveness from a system perspective possible. The method is a step-by-step approach which covers all the important parts needed to come to the broader systemic approach to deal with the assessment of the effectiveness of referral processes: The description of the object of study, the identification and selection of important stakeholders, the mapping of these stakeholders' perspectives and the translation to indicators, the selection of the important indicators as construct space for effectiveness, the collection of data on these indicators and the data analysis to come to conclusions on these indicators and the effectiveness. This systemic approach is very novel within the health care sector. Due to the shift of the health care sector from care by single organisations to care chains, it is expected that this method becomes even more relevant for the future.

6.3.3. Future use of the assessment method

The assessment method presented in this research could be used in future assessments. When assessing the effectiveness of direct referral of patients with a social indications from the ED of the hospital in the future the assessment method could be used in three different ways. Depending on the degree of similarity between the process assessed within this research and the process to assess in the future research, a researcher has three approaches to assess the effectiveness (displayed in increasing difficulty):

1. Take the set of the five selected indicators in this research and determine the values for the indicators for the process to assess.
2. Take the full list of collected indicators, choose a set of indicators based on the specific context of the process to assess and determine values for these indicators.
3. Visualize the process, select the important stakeholders, collect the indicators which the stakeholders perceive important, select a set of indicators and determine the values for these indicators.

A researcher has to make a decision on which of this three approaches to take for the assessment of the referral process. At first a researcher should determine whether the stakeholder selection used within this research is representative for the process to assess. This could be done based on two factors, the scope of the process and the scope of the perspective. If the process to assess has a different starting point(an acute presentation of an elderly patient at the ED), end point(a referral to a care institute) or context(a hospital setting referring to a care institute), it is recommended for the researcher to include other stakeholders. For example, if a researcher would like to assess a referral process from the moment a patient comes to the GP, instead of the hospital, a researcher should include the GP as a stakeholder and take approach 3. The second factor to look at is the scope of the perspective. In this research the operational and managing stakeholders within the health organisation are included. If a researcher decided to include other perspectives, such as the governmental perspective, the health insurers perspective or, last but not least, the patient perspective a researcher should go with approach 3.

If the scope of the process and the scope of the perspective are relatively similar to this research a researcher is recommended to go with approach 1 or 2, since this simply will spare the researcher a lot of time. The main difference in choosing approach 1 or 2 lies whether the indicator selection within this research is representative for the process to assess. A researcher should ask the stakeholders within the process to assess whether they agree with the chosen indicator set in this research.When this is not the case the researcher should go with approach 2. If they agree, the researcher should determine whether data is or could be made available on the five indicators in the indicator set. When this is not the case a researcher should go with approach 2. If both stakeholders agree and data can be made available the researcher is recommended to go for approach 1.

6.4. Recommendations

Three main recommendations are chosen and explained: More evidence-based management for pilot projects, The creation of a research framework for norm-setting in society and Expansion of the referral process to other patient-groups.

6.4.1. Evidence-based management for pilot projects

Within the hospital it was already decided that the referral process was a success without any data to prove this. The approach used within this paper is data-driven: the wanted outcome is determined and measured and when this outcome meets a specific goal, the process is a success. The approach used in the hospital was: think of a process which should lead to good outcomes and if the process is followed the process is a success. However, the old approach is based on the assumption that the process leads to good outcomes. This assumption can only be made if one with one hundred percent certainty can predict all the effects of the pilot project. With a project on direct referral processes these effects are not only present within the hospital but also affects other care institutes. This makes it very hard to predict all effects, since one should have insight in effects outside of their own organisation. With the used approach within this research, it can be said what the actual outcomes are. Pilot projects should be judged based on actual outcomes and not assumptions or hunches of professionals.

Interesting is that the old approach has lead to a process which turned out to be effective based on this research. So, it is not said that the approach used always leads to unsuccessful pilot projects. One of the

stakeholders mentioned that one of the success-factors of the process was that they: *"Just started it."* without the bureaucratic hassle usually needed for a pilot project. Which could be true, however, not knowing exactly what you are striving for is not a professional approach. Therefor, when starting a pilot project, professionals should at least think of the main goal they want to achieve, translate this into measurable indicators and collect data to see whether the goal is reached based on indicator values.

A well-known term within the hospital is evidence-based medicine, where decision making on which medicine to use should be based on evidence and research. The approach used in this research could be called (with a nod to evidence-based medicine) evidence-based management. One should make organisational decisions within a hospital based on data, evidence and research. The assessment method presented is a practical approach to deal with evidence-based management. The main recommendation would be to implement evidence-based decision making not only within decisions for medicine, but also within decisions for the best care processes (whether implemented via a pilot project or not).

6.4.2. Creation of a research framework for norm-setting in society

This research opened the black box of direct referral of frail elderly from the ED of the hospital and therewith gives a lot of potential for further research. To get more insight in the referral process, different aspects need to be further researched. This research would lead to a large perspective change in the best care for patients with a social indication and should be a basis for accepted norms for these patients.

At first further research should be done to further test the assessment method proposed in this thesis. The indicators on the goal of care and the intensity of care were unable to determine within this thesis. Further research should apply the approaches presented in this paper, to collect data in a way which complies with the privacy regulations. This would make it possible to determine the values for the two indicators on content of care within care institutes.

Another important aspect to research is to apply the assessment method on other referral processes for frail elderly to create context for a benchmark of the indicators. By comparing different referral processes it makes it possible to determine which processes perform better than others and to create nationwide norms on what values for indicators are acceptable.

When it is known what are the indicators and what indicator-values are acceptable, the next step is to research effects which prevent or cause good performance. It could be further researched for which patients a specific referral process works and for which patients barriers exist for good referral. The data-set collected within this research makes this possible and within Appendix E the data is described which could be used to do this research.

Two further specialized researches are mentioned within this thesis. One specialized in the patient and family perspective on referrals. Due to the complex cognitive nature of the patients researched, this is expected to be a very interesting but complex research. Within the causal relation diagram presented in Appendix C some of the potential factors are already mentioned (communication, degree of control of patients, patient satisfaction, patient trust and expectations of the patients), this could be taken as a starting point for further research. The second research is a specialized research on costs. Within this research, it is explained how the prevention of admissions leads to lower healthcare costs throughout the chain. However, it is unknown how large these savings are. The standard for cost research within health care is to measure the Quality-adjusted life years (QALY) to measure how much an extra year in good health of a patient costs. This method is known to be less suited to research the utilization of costs within elderly (Pettitt et al., 2016) and therefor a research on the cost effectiveness of referral processes for frail elderly should deviate from this standard.

Together, this combination of researches should lead to a framework with as main goal the recognition of patients with a social indication and standardization of alternatives to deal with these patients. All named research helps with achieving this goal.

6.4.3. Expansion of the referral process to other patient groups

The third recommendation would be to research the possible expansion of the referral process for other unnecessary admitted patients. One of the main groups known to be suited for the referral process are patients which need to be referred to long-term care. However, since there is a lack of available spots for long-term care, the hospital knows it is almost impossible to refer patients for long-term care within 48 hours. Therefor the decision is mostly made to admit these patients in stead of quick referral. However, all mentioned negative effects of a hospital admission are also present within this group. Therefor it would be interesting to look how the barriers in place could be lifted for these patients.

Another group to look at, are patients which were admitted to the hospital and need follow-up care at home or in an institute. The arrangement of this care takes relatively long, although the needed follow-up care could often be planned beforehand. The data on this group is not available at the moment, since these patients are badly registered in the hospital. However, the expectation is that an improvement in referral of these patients could lead to an even bigger improvement in availability of hospital beds. Next to that, the data on these patients is used to determine the needed capacity in care institutes. Bad registration by the hospital therefor leads to bad information on system level which leads to bad decisions on system capacity. Better registration would therefor potentially lead to more capacity in care institutes. This would not only help the patients admitted with a need for follow-up care, but also the patients with a social indication.

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A

Interview Guide

A.1. Rules of the interview

Introduction	
Intro	At first I want to thank you for your time and cooperation to this interview. I would like to start with some formalities before I ask you the questions of the actual interview.
Topics	Within this interview we will talk about the referral of older patients with a social indication from the hospital to a care institute. Especially the referral directly from the ED to a nursing home, as is the case within the Zorgtransferium. At first we will talk about the effectiveness of referral and secondly we will discuss barriers for effectiveness.
Goal	These interviews are held with different actors. In this way I can map the different perspectives which exist and I expect to identify a wide range of barriers for effectiveness. Important is your perspective on the process. Therefore the main idea of today is that you mostly speak and I mostly listen.
Anonimity	When writing down this interview I will process everything as anonymous as possible. It will be impossible for other to retrieve who said what. I will transcript this interview in Dutch and will send this transcript to you. If there is anything you do not want to be published you can mention this when you have received the transcript.
Duration	If you want to stop during the interview this is always possible. The interview will take around 50 minutes, but stopping is always possible during the interview.
Recording	This interview will be recorded. In that way I can listen to you during this interview and I can write everything down in a later moment. I will keep this recording during my research for possible checking by my thesis supervisors. After my graduation I will delete the recording. At the start of the recording I will ask you for confirmation, so the confirmation is also recorded.

A.2. Start of the interview

Start Recording	
Confirmation	Do you agree to recording this interview?
Warm-up Questions	
Introduction	Can you explain briefly and in general what your working activities are?
Process	Are you familiar with the Zorgtransferium and can you explain in your own words what it is?
Role	What is/was your own role in this process?

Table A.1: Interview questions at the start of the interview

A.3. Validation of the Process Description

Process Validation	
Validation	I have identified the zorgtransferium process and concluded that this process consists of two part. The identification of the patient at the ED and the arrangement of follow-up care for the patient. I would like to ask you if this process, as described by me, is correct. ***Show process and explain to respondent***

Table A.2: Interview questions on the validation of the process desctiption

A.4. Collection of indicators for a good referral process

Indicators for good referral	
Opinion	What do you think of the zorgtransferium?
Satisfaction	Why are you or are you not satisfied with the zorgtransferium?
Succesfulness	When is the zorgtransferium a success for you? What are the factors of success?
Subgoals	When I talk about a good referral process, what does that mean for you? Which sub-goals need to be reached? Which indicators can we think of for this subgoals? When thinking about the following aspects can you think of subgoals of which you think they are important? *The aspects to use, if needed, are: Content of Care, Process Speed, Finance, Logistics, The patient, Knowledge, Communication*
Goal Tree	A goaltree is a way to divide an abstract main goal into different subgoals. Every higher level is an answer to the question: "why do you want this **goal of lower level** ?". Every lower level is an answer to the question: "What is this **higher goal** exactly?". Based on what you already mentioned, I already wrote these goals down. Do you agree? Which goals are missing? **Fill in goals based on what already is mentioned and add other goals.**
Effect over Time	If you look back from now to the moment the zorgtransferium started, is your idea of a good referral changed?

Table A.3: Interview questions on the collection of indicators for a good referral process

A.5. Barriers for a good referral process

Barriers for good referral	
Barriers	Why does good referral fails sometimes? When you look at the mentioned goals, why don't you reach this?
Groups	Can you mention one or multiple groups of patients, where you experience problems when referring from hospital to nursing home, which? Why? How often does it occur?
Differences	Do patients exist which have nearly the same symptoms/need for care, but eventually go to a different place with different indication? Why is this?
Hypotheses on Barriers	
Human Assessment	*A big difference between assessments of patients by care professionals is present and this difference leads to unnecessary admissions to the hospital.* Where is this difference mainly present? In the ED or in nursing homes
Capacity Hospital	*The hospital has too limited capacity.*
Capacity Short term care	*There is too limited capacity for short-term care (GRZ and ELV)*
Capacity Long term care	*There is too limited capacity for long-term care (WLZ)*
Seasonal Influence	*Big seasonal influence is present, due to this influence it is always during the same period in the year that good referral bexomes problematic.*

Table A.4: Interview questions on the barriers for a good referral process

Hypotheses on Barriers (continued)	
WLZ Indication	*Arranging care for a patient with a WLZ-indication takes much more time in comparison to ELV/GRZ-indications.*
WLZ Indication delay	*The process to request a WLZ-indication results in a longer duration before the patient is at the right spot.*
Cherry Picking	*The financing of care in a nursing home is a reason for nursing homes for cherry-picking (only accepting the patients they benefit from the most).*

Table A.5: Interview questions on the barriers for a good referral process (continued)

A.6. Concluding the interview

Concluding question	
Context	If you are the minister of Healthcare and you would have unlimited budget to arrange better care for elderly with a social indication. You can chose one thing to do, what would you do?
Concluding statements	
Ending	Would you like to add something to this interview? Is there anything not yet said, which you think is important to mention? How did you experience the interview?
Continuation	I will write this interview down and will send this to you within a week. Afterwards I will compare the subgoals and barriers mentioned by the different stakeholder. My conclusions will be presented in a meeting in the hospital, where you will invited for. Potentially it is possible to discuss these findings with the other stakeholders.
Thanking	I would like to thank you again for your time. Hopefully you had the feeling that you could have said whatever you want and that I listened carefully to you.
Further Questions	If you have further question or other remarks you can always contact me via mail or phone.

Table A.6: Interview questions at the conclusion of the interview

B

Goal Trees

Within every interview a goal tree is constructed to translate the interviewee's perspective on what a good referral process is into measurable objectives. The goal tree consists of different levels of goals. The highest goal is the most abstract, in this application this is 'a good referral process', while lower goals are operationalized into more concrete goals. When a sub-goal within the tree was not operationalized enough to make the sub-goal measurable, the interviewer asked how to measure the sub-goal. In this way, the lowest level consists of indicators for an effective referral process.

Within this appendix all goal trees are published in order to show the individual perspectives. Which goal tree belongs to which stakeholder is left out due to the privacy of the interviewees and adding this information will not have any added value.

The indicator list presented in Table 4.1 is constructed by adding all the indicators in the lowest level of the six trees to the list. The supportfactor is the number of stakeholder which mentioned that specific indicator within their tree.

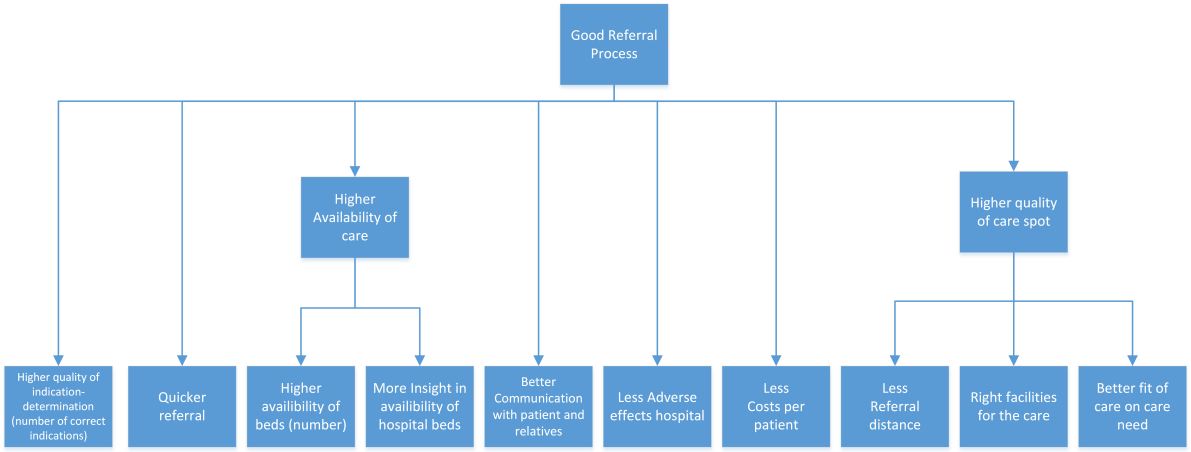

Figure B.1: Goal tree 1

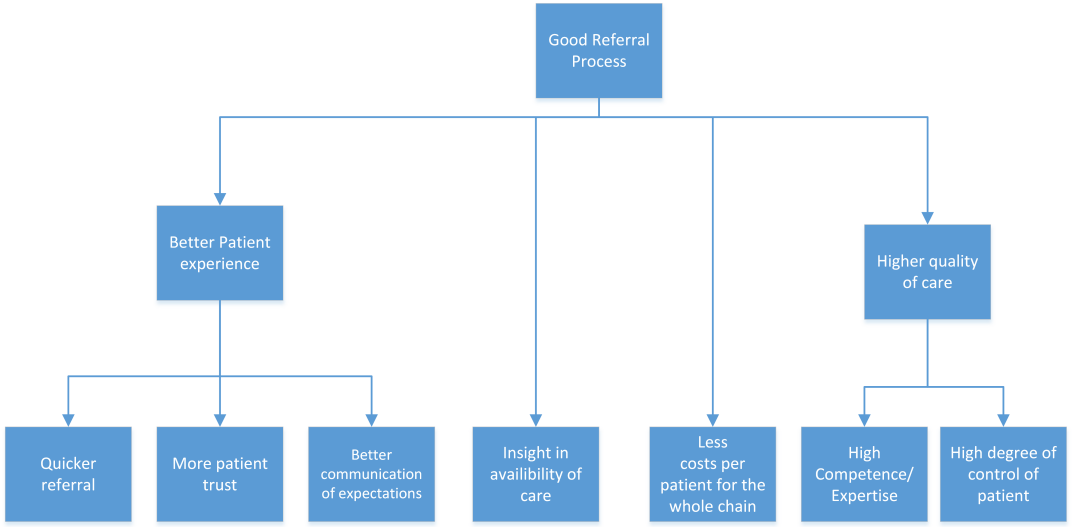

Figure B.2: Goal tree 2

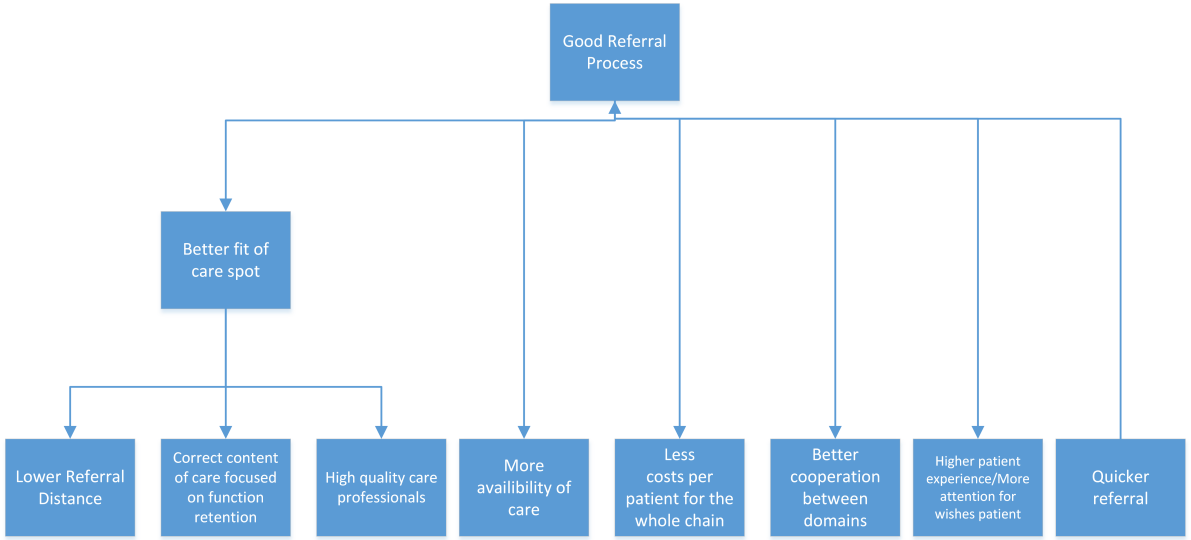

Figure B.3: Goal tree 3

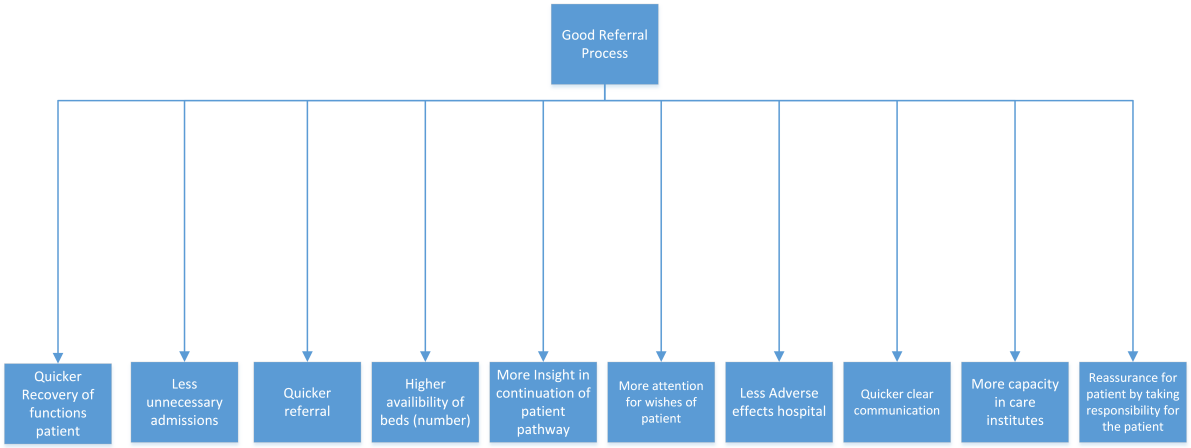

Figure B.4: Goal tree 4

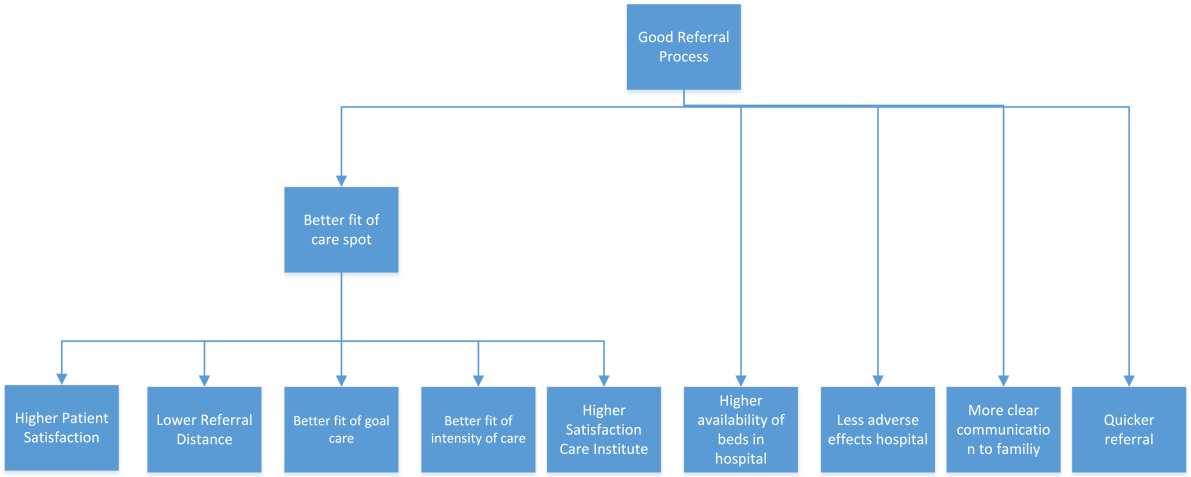

Figure B.5: Goal tree 5

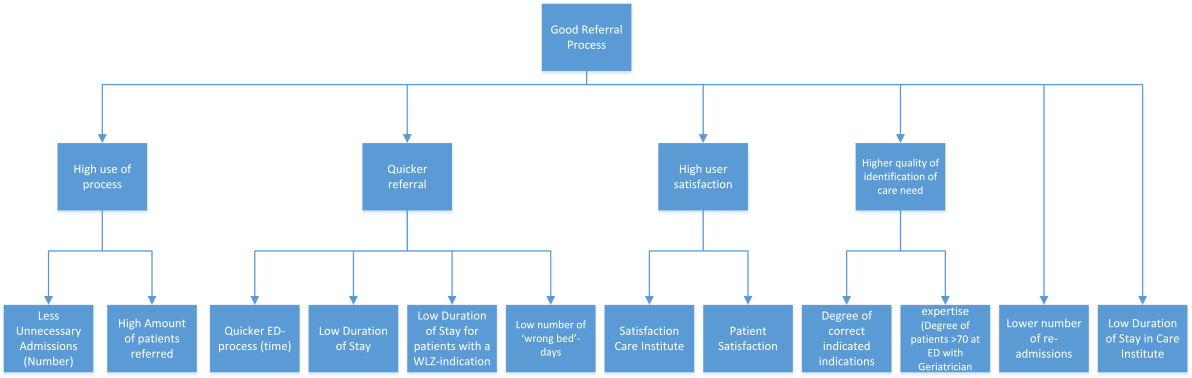

Figure B.6: Goal tree 6

C

Causal Relation Diagram

Within a Causal Relation Diagram different factors and their effect on each other are displayed. This is done by visualizing the factors in ovals and adding an arrow between two factors if these factors influence each other. Next to an arrow a plus- or minus-sign is added to explain what the effect of the factor on the other factor is. A plus-sign represents a positive relation: If factor A influences factor B by a positive relation, this means that if factor A increases, factor B increases and if factor A decreases, factor B decreases. A minus-sign represents a negative relation, when factor A decreases, factor B decreases.

This CRD is a creation by the researcher based on the expected causal relations between the indicators. Because of the novelty of this problem as research topic, most effects are not researched yet and therefor can not be proven based on literature. Therefor this diagram should not be seen as it is a theoretical framework. It is an attempt to show the relations between the different potential indicators based on logic and assumptions.

This is especially true for the patient perspective and patient satisfaction (visualized by the grey cloud). Patient satisfaction can be influenced by a very large number of factors (such as the coffee in the waiting room or the taxi to the hospital not being on time), therefor it is too bold an assumption to see the mentioned relations as the truth or to assume total completeness of this CRD. The assumptions on the effects made by the researcher are explained within this Appendix. This CRD is built upon the mentioned indicators of the stakeholders and it shows the assumed relation between these indicators, it is not a total and complete overview of all factors involved in the referral of elderly with a social indication.

The CRD is created by transforming the indicators mentioned within the different interviews into factors. The indicators have a preferred direction mentioned by the stakeholder, by taking this direction away the indicator becomes the corresponding factor. In grey extra factors are added if indicators are indirectly influencing each other to complete the total picture. After the CRD the individual effects between factors are explained.

C.1. Explanation of effects

In left (light blue) cooperation between domains is displayed. This cooperation has three different effects. At first, cooperation leads to more familiarity with professionals of other domains, this familiarity leads to more cooperation in itself, since new initiatives on cooperation can emerge from the contact between these professionals. Secondly, it leads to more insights in the availability of care within other organisations and domains. For the cooperation it is needed to share information on this availability, which makes this information more widely known. The third effect is that it leads to insight in the patient pathway, by knowing the other professionals it also becomes known what these professionals do in their day-to-day activities, which makes the patient pathway more known throughout the care chain.

The insight it the patient pathway makes clearer and quicker communication possible, since the knowledge and insight in the patient pathway needed to give this communication is sooner and more clearly available. The chance that a professional communicating with a patient or family knows what the expectations for the patient are is higher. Insight in availability of care also leads to clearer communication, since the professional can make a better estimation whether specific forms of care are available or not and within which referral distance.

Clearer and quicker communication both leads to reassurance of the patient. When a patient ends up in

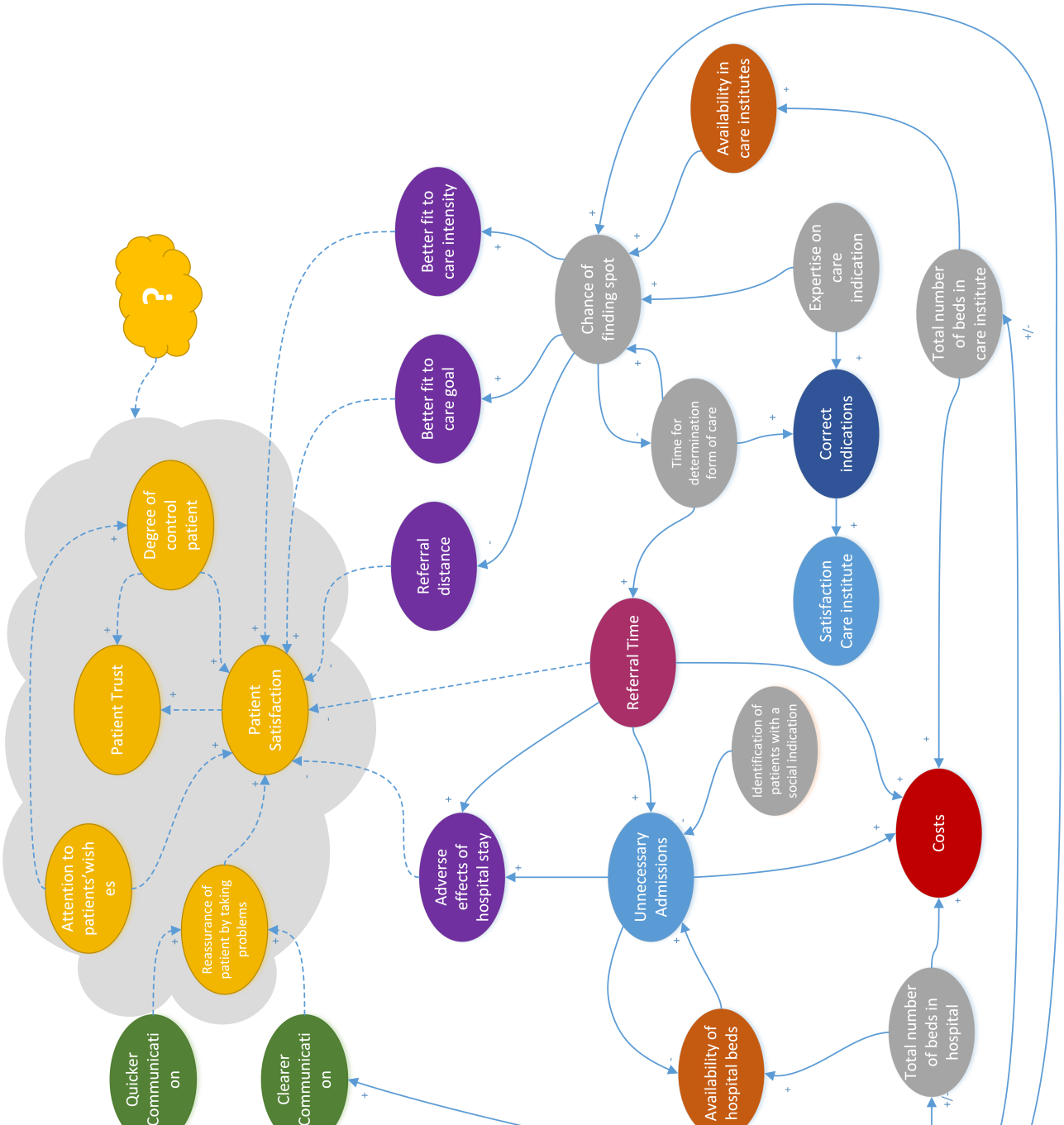

Figure C.1: Causal Relation Diagram

an acute care setting the patient and family are unknown with the situation and do not know what to expect. By communicating clearly and quick to the patient and family what the expectations are, the patient and family becomes reassured that the problem the patient is facing will be handled correctly. This reassurance leads, among other factors, to patient satisfaction, since the stressful unknown situation is handled for.

The patient satisfaction is affected by two other patient perspective factors (in yellow):the attention to the patients' wishes and the degree of control of the patient. More attention for the wishes of a patients leads to more wishes of the patient being fulfilled, which leads to higher patient satisfaction. The degree of control of a patient is a hard factor to grasp, especially within patients which are heavily confused or mentally incompetent. If a patient loses the feeling of control within the choices for care such patients because of the feeling that there is decided on them instead of with them. However, patients with deterioration always lose part of their control and independence. When, due to this loss of independence, specific care is needed but unwanted by the patient, a difficult situation arises. The best care from perspective of family and professionals differs from the perspective of the patient. Although the quality of care will be increased, the patient satisfaction will decrease. A hard dilemma for health care professionals. This degree of control also affects together with the patient satisfaction the patient trust. When a patient has the feeling he or she is in control, she will trust the professionals more. Also when a patient is satisfied the patient will trust that the professional does the right thing in the future.

The earlier mentioned Insight in availability of care in the lower right corner (in dark blue) affects, besides the clearer communication, also the total number of beds in a hospital, the total number of beds in care institutes and the chance of finding a spot for a patient. When more insight on the available spots is present it is easier to find a spot on short term. Especially when the amounts of spots is limited finding the right spot needs a lot of insight in availability. On longer term the insight can show whether more or less spots in both the hospital and the care institutes is needed. This insight will help to act to shortage in capacity.

The total number of beds both in hospitals and in care institutes leads to more availability in the associated care organisation, however more beds also leads to more costs, since a bed and the associated resources have operational and investment costs. Costs is also affected by unnecessary admissions and the referral time. Every admission costs money, unnecessary and necessary admissions, since the patient need to be cared for and the extra resources used to do this causes costs. The longer a patient needs this care, measured in the referral time, the longer the patients' care causes this costs.

Unnecessary admissions is also affected by the availability of hospital beds. When scarcity within hospital beds exists health professionals are less willing to admit patients with a low need for care. This, since they have to decide who will receive the spot in the hospital and rather choose a patient with a high need for care. The other way around, an unnecessary admission occupies a bed in the hospital, which leads to less availability. Unnecessary admissions could be used to fill the hospital beds in order to get money for these beds. However, this is not proven in literature. Besides the availability, unnecessary admissions are also affected by the identification of patients with a social indication and the referral time. When patients with a social indication are recognised, these could be referred and not admitted, which prevents unnecessary admissions. If the referral time becomes to long a patient automatically will be admitted to the hospital, leading to an unnecessary admission. The unnecessary admission itself causes adverse effects of the hospital stay, since within every admission there is a chance of these effects to happen.

More availability in care institutes (in orange on the right) increases the chance of finding a spot for a patient. Expertise on care indications also affects the chance of finding such a spot. Care indications are, as explained in this thesis, a relative complex to understand. When someone has expertise on the indications one increases the chance of finding a spot, since the person knows what he or she is looking for. This increased expertise also increases the number of correct indications on the need of the patient, which increases the satisfaction of care institutes. If an indication is incorrect a care institute has to refer this patient to another indication internally, which is a lot of unwanted work from the care institute perspective. The chance of finding a spot is also affected by the time for the determination of the form of care needed. When more time is used, a longer time frame exists to find the right spot for a patient. The other way around when the chance of finding a spot is bigger, less time is needed to find such a spot. Time for the determination of care is also a part of the total referral time. Since the referral time has to be short to prevent unnecessary admissions, the time for the determination of care also needs to be short. If more time is needed the patient first has to be admitted, which is often the case with long-term care patients.

When the chance of finding a spot is increased this also entails that a person can go to the right spot, which consists of a spot with the right goal of care, the right intensity of care and a spot close to home (with a low referral distance). When this chance decreases it happens that a person can go to a spot with the good

goal of care, but not close to home. Or close to home, but with the wrong intensity. A dilemma which exists within the transfer unit of the hospital.

Patient satisfaction is also affected, besides the earlier mentioned patient perspective factors, by some quality of care factors (in purple). These are Adverse effects, Referral Time, Referral Distance, Better fit to goal care and Better fit to intensity of care. These all have negative effects since to the patients' perspective it is not wanted to stay very long at the wrong spot, to live in a care institute far away from home, to experience adverse effects in the hospital or to go to a spot with the wrong care goal or intensity.

D

Dataset Overview

Attribute	Number of patients	Percentage
Gender	**101**	
Male	26	26%
Female	75	74%
Age	**101**	
<70	3	3%
70-79	17	17%
80-89	46	46%
90-99	33	33%
>99	2	2%
Living Situation	**101**	
Independent Living	85	84%
Single	*65*	*76%*
Together	*20*	*24%*
Sheltered Living	12	12%
Elderly Home	4	4%
Use of Home Care	**100**	
Yes	64	64%
Times per day		
1	*17*	*27%*
2	*21*	*33%*
3	*10*	*16%*
4	*12*	*19%*
>4	*1*	*2%*
Missing	*3*	*5%*
No	36	36%
Walking Device	**98**	
With Walking Device	76	78%
Without Walking Device	22	22%

Table D.1: Overview 1 of the total dataset collected for this research

Dementia	**101**	
With Dementia	24	24%
Without Dementia	77	76%

Indication at Presentation	**100**	
No Care Indication	91	91%
WLZ	5	5%
Applied for WLZ	2	2%
GRZ	2	2%

First-line Specialty	**101**	
Geriatrics	54	53%
Surgery	32	32%
Neurology	7	7%
Cardiology	2	2%
ED	2	2%
Internal Medicine	1	1%
Pulmonology	1	1%
Gastroenterology	1	1%
Orthopedics	1	1%

Way of Presentation	**100**	
General Practitioner	58	57%
Emergency number	22	22%
General Practice Center	13	13%
Outpatient clinic	6	6%
Self-referral	2	2%

Reason of Presentation	**101**	
Fallen	56	55%
Confused	11	11%
Infection	11	11%
Fallen and Confused	11	11%
Other	13	13%

Outcome	**101**	
Care Institute	84	83%
Hospital Admission	10	10%
Home with Home Care	6	6%
Home without Home Care	1	1%

Outcome Indication	**100**	
GRZ	51	51%
ELV	29	29%
ELV PG Obs	5	5%
WLZ	5	5%
Applied to WLZ	1	1%
None	8	8%

Referral Distance	**84**	
0-5 km	30	36%
5-10 km	33	40%
10-15 km	16	9%
15-20 km	5	4%

Table D.2: Overview 2 of the total dataset collected for this research

Referral Duration	**84**	
0-12 hours	17	20%
12-24 hours	33	39%
24-36 hours	25	30%
36-48 hours	6	7%
>48 hours	3	4%

Representation within 30 days	**101**	
No	94	93%
Yes	7	7%

Re-admission within 30 days	**101**	
No	95	94%
Yes	6	6%

Table D.3: Overview 3 of the total dataset collected for this research

E

Secondary Attributes

The data collected from the patient files was broader than only the selected indicators. This with the aim to make broader research in the future on the effects of other factors on the success of a referral process possible. Within this appendix these factors are described.

E.1. Description of patients living situation

Three categories of living situation are identified. These differ in amount of life support and degree to which it is adjusted to living for elderly. These three categories are independent living, a sheltered home and an elderly home. Independent living can be seen as the average house, it is possible that some adjustments are made to the house, such as a stair lift, and that the patient receives home care. But in general such a home is not specifically designed for the elderly living there and there is no standard system of care within these places, which is a difference with the other living situations. If care is needed at home this needs to be requested by the municipality or home care organisation. Within this category a distinction is made between elderly living single and elderly living together (with a partner and/or one or multiple children).

The second category are sheltered homes (in Dutch: aanleunwoningen). Sheltered homes are located directly next to nursing homes or elderly homes. No direct care is given, but the elderly can request some care at the nursing home or elderly home if needed, in most cases they can also join activities organised by the elderly or nursing home nearby. Most houses have a button, which an inhabitant can press in case of an emergency. These homes are designed for elderly, which means that they consist of one floor and are designed in such a way that it prevents the elderly from falling.

The third category is an elderly home (in Dutch: bejaardenhuis or verzorgingshuis). In 2015 the ministry of Health Care decided that these elderly homes will be phased out. But elderly still live there if they already start living there before 2015. Within an elderly home inhabitants have a room inside the home. Eating is done together with the other inhabitants and most of the elderly homes organize activities for the patients. Basic care is given and people need to have the most the lowest indication for long term care (WLZ4) to live here. The care which is given consists of sanitary care, help with clothing and basic medication.

Living situation	Number	Percentage
Independent Living	85	84%
Single	*65*	*76%*
Together	*20*	*24%*
Sheltered Living	12	12%
Elderly Home	4	4%
Total	**101**	**100%**

Table E.1: Living situation within patients with a social indication

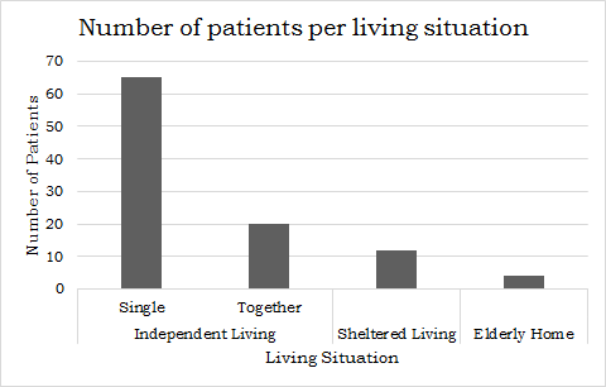

Figure E.1: Histogram of living situations within patients with a social indication

Looking at the distribution most elderly patient live single independent. While only a very small portion lives in an elderly home. de Klerk et al. (2019) researched that in the Netherlands 8 percent of the 75+-population live within a care institute. The elderly home is the only care institute found in the living situation of patients with a social indication. This category accounts for four percent of the elderly patients in the data-set, which is lower than the eight percent in literature. However this is easily explained due to the fact that patients which originate from an elderly home or a nursing home have more possibilities for care when they return to their origin in comparison to people living in a sheltered home or live independent. Therefore these patients have a higher chance to return to their origin and therefore less often are patients with a social indication.

Out of the 75+-population living independent in the Netherlands 44 percent lives alone (de Klerk et al., 2019). Within the patients in the Zorgtransferium process this percentage is 76 percent (65 single living elderly out of 85 independent living elderly). Within elderly patients it is known that single living elderly get more care than elderly living together (de Klerk et al., 2019). People living together can receive basic care from the other people in their household, explaining this difference. Plaisier and de Klerk (2004) found that the average single independent living adult in the Netherlands has a 3.6 times higher chance to use care in comparison to a adult living together with other people. This 3.6 times higher chance for the average single living adult to use care and the 44 percent of the 75+-population living single gives an expected value of 74 percent of the independent living patients using ED-care to be single in this data-set. Based on this expected value of 74 percent and the 76 percent found in the data from the ED can be concluded that this is a normal distribution for the Netherlands.

Use of Home care (Times per day)	Number of patients	Percentage
Yes	64	64%
1	*17*	*27%*
2	*21*	*33%*
3	*10*	*16%*
4	*12*	*19%*
>4	*1*	*2%*
Missing	*3*	*5%*
No	36	36%
Total	**100**	**100%**

Table E.2: Use of home care within patients with a social indication

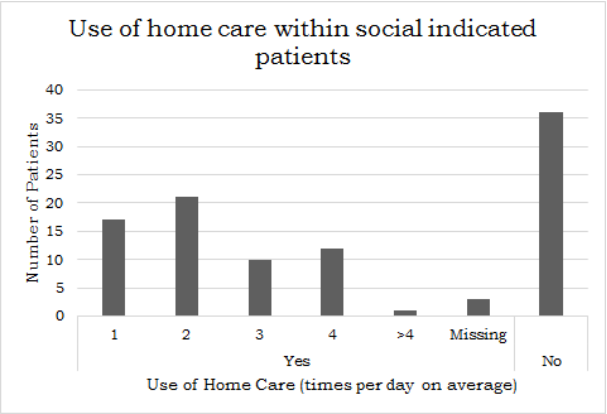

Figure E.2: Histogram of use of home care within patients with a social indication

Another important factor on the living condition of elderly is the use of home care. On one of the patients it was not possible to retrieve if the patient used home care or not. 63 Out of 100 patients used home care before they were presented at the ED, 37 did not use home care. Within the 63 patients who made use of

home care a distinction can be made based on the average number of times per day they get home care. Some elderly only use home care for giving more advanced medicine a limited number of times a week, while other elderly get help with going in and out of bed, sanitary help and help with their nutrition. The number of times home care is used is a good measure for determining the dependency of the elderly on care. For three patients it was known that they receive home care, but it was not recorded how many times a day they received it and one patient received 24-hour home care, which is recorded as more than four times a day.

Of the total 75+-population living at home 28 percent uses home care(de Klerk et al., 2019). The 63 percent found in this research is much higher than the 28 percent over the total elderly population, concluding that this patient group had already a higher dependency of care in comparison to the average elderly living at home.

Use of walking device	**Number of patients**	**Percentage**
With walking device	76	78%
Without walking device	22	22%
Total	**98**	**100%**

Table E.3: Use of walking devices within patients with a social indication

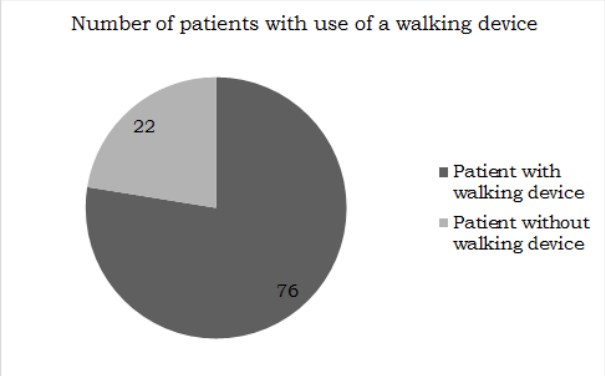

Figure E.3: Pie chart of use of walking devices within patients with a social indication

One of the main reasons a patient can not return home is that the patient can not transfer safely from bed to toilet. In this case a patient has such high care need that this can not be dealt with by home care. To give an insight on the degree of mobility a patient had before it is presented at the ED the amount of patients which used a rollator or other walking device is documented. 76 Patients used a rollator, 22 were independent of walking device and for 5 patients it is unknown if they used a walking device or not. Of the total 80+-population 15 percent walks with a rollator. Compared to the 78 percent found within this research can be concluded that the number of patients which already had decreased mobility before presented at the ED is a much higher number in comparison to the amount of 80+-people with decreased mobility in the total community.

Dementia	**Number**	**Percentage**
With dementia	24	24%
Without dementia	77	76%
Total	**101**	**100%**

Table E.4: Diagnosed dementia within patients with a social indication

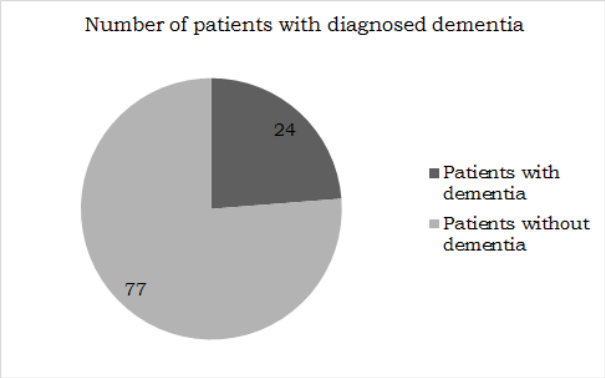

Figure E.4: Pie chart of diagnosed dementia within patients with a social indication

At 24 patients out of 101 patients dementia was diagnosed in a moment before the presentation at the ED which led to the social indication. The 77 other patients had no diagnosis for dementia, but within these patient undiagnosed dementia can exist. Within the Netherlands 8 percent of the 65+-population has dementia, as people get older more people suffer from dementia as for the 80+-population 25 percent has dementia and

this percentage is even rising to 40 percent for the 90+-population(Alzheimer Nederland, 2019). The percentage of 24 percent found in this study seems quite representative for the population. Not all of these patients were confused when they were presented at the ED. Dementia can be a slow process, which already can be diagnosed at patients which do not yet face big cognitive problems. So having the diagnosis dementia does not mean that you immediately have problems with your cognitive functionality. However it is known that the risk of falling is bigger within people with dementia due to cognitive dysfunction or impairment(Rubenstein, 2006).

Indication at presentation	**Number of patients**	**Percentage**
No Care Indication	91	91%
WLZ	5	5%
Applied for WLZ	2	2%
GRZ	2	2%
Total	**100**	**100%**

Table E.5: Care indications at the moment of presentation at the ED within patients with a social indication

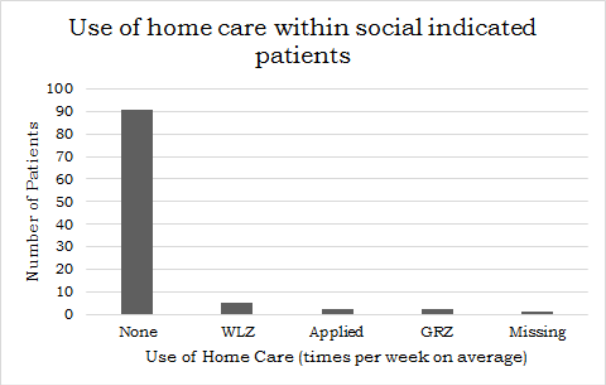

Figure E.5: Histogram of care indications at the moment of presentation at the ED within patients with a social indication

Some of the patients presented at the ED already had an indication for care in a nursing home before they were presented to the ED. However, the biggest group, 90 patients, did not yet had a indication for this care. 5 Patients already had a long-term care indication, a WLZ4-indication, which is an indication for protected living in an institution without medical care. With this indication patients can still choose to live at home, but it gives the person the possibility to be on a waiting list for a nursing home. With this indication it is also still possible to go to short-term care and return home afterwards. With other WLZ indications this is not possible anymore, since you are indicated as someone who cannot live at home anymore. 2 Patients applied for a WLZ-indication, but the CIZ, which gives the indications for WLZ, was not yet available to do the screening. 2 Patients still had a GRZ-indication and 1 patient has a ELV-indication at ED-presentation. Once GRZ- or ELV-care is delivered within an institute, the institute gets a budget to deliver rehabilitation care for the patient. Since this care does not consist of one treatment, but consists of care over a longer period is spoken of a care-trajectory. The care institute gets a fixed amount of money for the whole trajectory, not for the individual treatments or activities within the trajectory. At the moment the GRZ- or ELV-indication is given to the patient the care-trajectory for that patient will be opened at the care institute. Regulation dictates that the trajectory closes 42 days after the last activity on the trajectory, such as a physiotherapist session. These three patients with a GRZ- or ELV-indication at ED-presentation left a care institute for GRZ- or ELV-care less than 42 days ago. A care institute cannot open a trajectory for GRZ-care if the patient still has an open GRZ-trajectory at another care institute and the same counts for ELV-care. The main implication for arranging follow-up care for these patients is that they, if they need the same care, have to go to the nursing home which opened the trajectory, but this nursing home probably already has filled the spot which came free when the patient left with a new patient. Instead of the five possible cooperating nursing homes in the zorgtransferium-project, only follow-up care that specific nursing home is available. This leads to a lower chance to find a free spot for the patient. For 1 patient it is unknown if the patient had an indication at presentation, since this is undocumented.

E.2. Description of the patients presentation at the ED

In the Netherlands every person has a dedicated General Practitioner. This GP can be chosen by the person itself. Looking at the 101 patients in the database they have 68 different dedicated general practitioners. The number of patients per general practitioner varies from 1 to 5 and has an average of 1.5 patients. The role of GP's on patients with a social indication presented at the ED is debatable. One of the opinions on this role is that better knowledge of GP's on frail elderly could create direct referrals to the nursing home instead of the indirect referral via the ED, which would be better for the patient and would give less costs. Another opinion

is that the GP does the best they can for the patient by sending the patient to the ED. Sending a patient to the ED gives certainty about exclusion of underlying somatic issues, such as fractures and infections. Only when these underlying issues are excluded a patient can go safely to a nursing home. Raising the knowledge of all the GP's would ask time of the GP's. Given the low number of patients per GP a question arises if this effort is worth the potential improvement, since the average potential per GP is to prevent a referral to the ED of 1.5 patients.

Within the patients in the referral process the distinction can be made between five groups of patients, based on the reasons for presentation at the ED. The three main groups are patients with mobility problems due to a fall, patients with mobility problems due to an infection and patients with cognitive problems. However combination of these problems can exist. In practice all of the reasons mentioned above can be combined. However, in the data-set only the patients with a combination between cognitive problems and mobility problems due to a fall are found. A combination seen a lot in practice, is an infection combined with confusion, since a urine tract infection can cause a delirium to happen. However the treatment of this combination of problems is a reason for a hospital to admit a patient under a hospital indication and therefore do not conclude in patients with a social indication. Besides the four groups mentioned, a group is added with patients having other reasons for presentation, which could not be included in the other four groups. Within this group patients can be found with decreased strength due to other reasons than mentioned before. Examples are individual weakened patients due to severe pain in the lower back, smoke inhalation, dysphnoea or distorted blood pressure. As can be seen in the examples this is a group with very diverse causes of overall weakness.

Patients have mobility problems when they can not transfer from bed to toilet in a safe way. Older patients have a higher risk of fractures when falling and this can lead to severe problems on the dependency of these elderly people on family or other caregivers. Some fractures need treatment within the hospital, for instance when a hip needs to be replaced by a prosthesis via a surgery, and therefor lead to an admission to the hospital under a hospital indication. However some falls lead to fractures or contusions which do not benefit from hospital treatment, for instance a fracture of the pelvis needs a high degree of physiotherapy, which can be given in other care institutes. This group therefore has no reason to be admitted to the hospital, but also cannot go home due to their mobility problems. Therefore these patients are patients with a social indication. In general can be concluded that only patients with a fracture which needs surgery have to be admitted to the hospital.

It is not always the case that it is a fall which leads to mobility problems. Within some cases the patients are weakened by an infection. This can lead to a state where the patient temporarily does not have the power to stand or walk. Infections which are often seen are: urinary tract infections, lung infections and influenza. The degree of the illness determines if the patient has to be admitted to the hospital or not. How ill someone becomes depends on the kind of infection the patient is affected by and the immune system of the patient. If the treatment of the illness requires intravenous access or the patient is hemodynamically unstable[1], the patient should be admitted to the hospital. When this is not the case, but the patient does have a mobility problem, a patient needs to get the care to strengthen within another care institute.

When patients have cognitive problems other issues result in an unsafe return home. Patients can do unexpected things when they are confused and they have the risk of forgetting day-to-day things. Some of the issues with patients with cognitive problems are wandering on the street and getting lost, leaving the gas open, using chemical cleaning products wrong and burning due to hot water from the tap. The main question with these patients when they present themselves at the ED is if the confusion is temporarily, caused by a delirium, or definitely, caused by a form of dementia. A delirium is a reason to treat a person with intravenous medication, while dementia is unable to treat and therefore such a patient should go to long-term care. However within short-term care a special indication exists, the 'ELV PsychoGeriatric Observation'-indication (ELV PG Obs), which falls under the ELV High Complex care. The main goal of this spot is to observe if the confusion is temporarily or definite. So in case the conclusion of the screening at the ED is that the patient is severe enough confused to make safe living at home impossible, the patient is not severe enough confused to be treated at the hospital and there is doubt if the confusion is temporarily or definite, the hospital will try to arrange an ELV PG Obs-spot for the patient.

The group with combined cognitive issues and mobility issues due to a fall can consist of three kind of patients. For one group of patients the fall has lead to a severe head injury or concussion, a second group suffers from a delirium, caused by the change of situation, while the third group already had cognitive issues

[1] Hemodynamical instability can be defined as perfusion failure, represented by clinical features of circulatory shock and advanced heart failure (Weil, 2005)

before the fall due to dementia and now both come together. The first group first needs rest before they can start rehabilitation, the second group needs treatment in the hospital and the third group needs special attention while rehabilitating. It also has effect on the intensity of rehabilitation a patient can endure, for a patient with nausea due to a severe concussion, rehabilitation can be to much at all and they first need to recover from the concussion, before the treatment with the physiotherapist can start. For the group with severe cognitive problems due to dementia, rehabilitation can be impossible at all since they are not trainable any more. Due to the dementia they are not capable of fulfilling tasks given to them by the physiotherapist. In such a case rehabilitation in a care institute becomes impossible and such a patient should go to long-term care. These groups are not further split into these smaller groups, since this would lead into such small groups that any form of statistical analysis does not make sense anymore. But it is important to know that this group consists of this three heterogeneous patient-groups to understand the difference motivations to send these patients to different spots in a care institute.

Reason of Presentation	**Number of patients**	**Percentage**
Fall	56	55%
Infection	11	11%
Confused	10	10%
Fall and Confused	11	11%
Other	13	13%
Total	**101**	**100%**

Table E.6: Reasons patients with a social indication are presented for at the ED

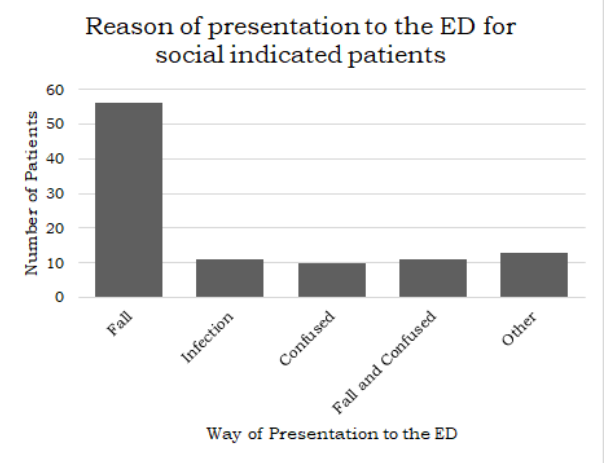

Figure E.6: Histogram of reasons patients with a social indication are presented for at the ED

Looking at the reasons for indication 56 patients are presented due to a fall, 11 due to an infection, 10 due to a confusion, 11 due to a combination of a fall with confusion and 13 patients have other reasons for decreased strength. More than half of the patients have a suffered a fall before going to the ED. From this can be concluded that the zorgtransferium is very suited in identifying patients within this group. Next to that, the group is very diverse, since the three other divided categories are all around 10 percent of patients and more than 10 percent of patients have other reasons for decreased strength than the formulated reasons.

First-line Specialty	Number of patients	Percentage
Geriatrics	54	53%
Surgery	32	32%
Neurology	7	7%
Cardiology	2	2%
ED	2	2%
Internal Medicine	1	1%
Pulmonology	1	1%
Gastroenterology & Liver disorders	1	1%
Orthopedics	1	1%
Total	**101**	**100%**

Table E.7: First-line specialties patients with a social indication are presented for at the ED

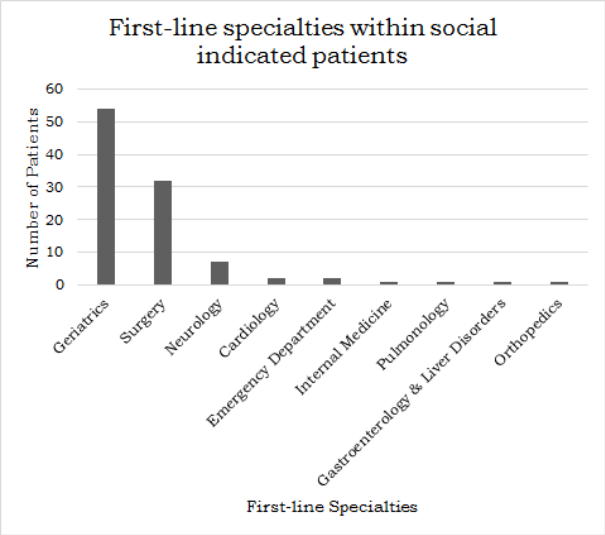

Figure E.7: Histogram of first-line specialties patients with a social indication are presented for at the ED

When a patient is presented at the ED the patient is specifically referred to one of the first-line specialty[2]. When looking at the distribution of first-line specialties the patients are referred to, insight can be created on which specialties and affiliated doctors are most affected by the patients with a social indication. 54 out of 101 patients are primarily referred to the geriatrics department and 32 of the patients are referred to surgery, causing that these two specialties are the main influenced specialties. 7 Patients were referred to neurology, 2 to cardiology and 2 to the the ED (the ED is used as specialty when it is unclear on what specialty to refer to) and 1 patient is send to Internal Medicine, 1 to Pulmonology, 1 to Gastroenterology & Liver Disorders and 1 to Orthopedics.

Way of presentation	Number of patients	Percentage
General practitioner	58	57%
Emergency number	22	22%
General practice center	13	13%
Outpatient clinic	6	6%
Self-referral	2	2%
Total	**101**	**100%**

Table E.8: Way of presentation to the ED for social indicated patients

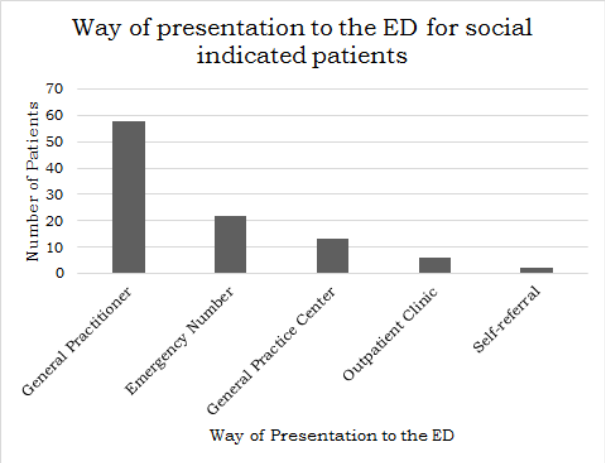

Figure E.8: Histogram of way of presentation to the ED for social indicated patients

Patients can be presented to the ED via different ways. A patient can be referred by a GP, a ambulance can pick the patient up after the emergency number is called, a patient can first come to the general practice center of the hospital, a patient can be referred from the outpatient clinic or in rare cases the patient can come to the ED by himself without any interference of medical professionals, called self-referral. As mentioned before in some cases the presentation of patients with a social indication to the ED can be prevented. By looking at the way these patient are presented the possible areas to prevent such a presentation can be researched. 59 Out of 101 patients where presented via the GP, 21 via the emergency number, 13 via the general

[2]Within Dutch law a distinction is made between first-line specialties and supportive specialties within the medical specialties. The first-line specialty is the specialty where a patient is primarily referred to for hospital care.(Regeling medisch-specialistische zorg, 2019)

practice center, 5 via an outpatient clinic, 2 via self-referral and 1 via the nursing home doctor. Important to know is that within the general practice center different regional GP's have shifts during evening, night and weekend-hours to perform the GP-function for the region within these hours. So 72 (direct GP or General practice center) out of 101 are referred to the ED via a GP, which is a big fraction of the total. However as mentioned before there is a really large number of GP's active in the region (68 on the total of 101 patients), making improvement within this group hard. 21 Patients are referred via the emergency number, which is a much easier entry point to control. So this a potential area with a substantial fraction of the patients with a social indication for preventing these patients from being presented to the ED. The patients being referred from an outpatient clinic are interesting, since these patients are already visiting a medical specialist at the hospital. The only reason to send a patient to the ED via the outpatient clinic is to make a quick referral via the zorgtransferium-process possible, since the hospital made the choice to make this only possible for ED-patients. The questions to answer at the ED (hospital admission necessary? and is return to origin possible?) are already answered in the outpatient clinic. Although it is a small fraction of the total this can lead to unwanted stays in beds at the observatory.

Outcome	Number	Percentage
Care Institute	84	83%
Hospital Admission	10	10%
Home with Home care	6	6%
Home without Home care	1	1%
Total	**101**	**100%**

Table E.9: Outcome of the referral process for patients with a social indication

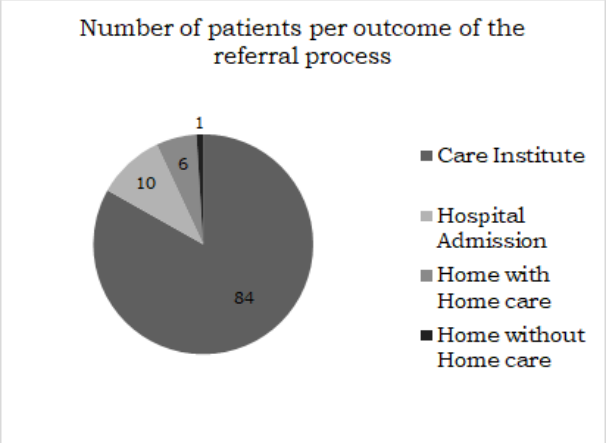

Figure E.9: Pie chart of the outcome of the referral process for patients with a social indication

Four different outcomes of the zorgtransferium-process are identified: Referred to another care institute, admitted to the hospital, send home with extra home care and send home without extra home care. Only patients which are referred directly from the observatory within 48 hours are seen as referred to another care institute. When patients are referred within 48 hours, but this is done from a ward within the hospital, this is not registered as a direct referral, since the patient went into the hospital. 84 Patients are referred directly to a care institute, 10 patients are admitted to the hospital, 6 went home with extra care and 1 went home without extra care. Different reasons exist to admit someone to the hospital: The two beds of the observatory dedicated for these patients are full, no free spots are available in the care institutes, the patient needs long-term care in the care institute.

One of the aims of quick referral to a care institute is to prevent revisits to the ED or re-admission to the hospital. A revisit is defined as an unscheduled presentation to the ED within the 30 days after the original presentation, if a patient is admitted to the hospital based on this revisit is spoken of a re-admission. For every patient is registered whether a revisit or a re-admission had taken place within 30 days after the presentation at the ED. 7 Patients had a revisit within 30 days and 6 patients were admitted to the hospital based on this revisit. Within global literature a revisit percentage from 14 up to 22 is reported(Arendts et al., 2013; Caplan et al., 2004; Costa et al., 2014; Lowthian et al., 2016; McCusker et al., 2007; Mion et al., 2003). A comparable study in the Netherlands reported a revisit percentage of 10,4 (de Gelder et al., 2018).

E.3. Referral distance

As example the effects on the referral distance are investigated to give an idea of how further research could look like.

E.3.1. Referral Distance

One of the indicated important indicators for an effective referral is the referral distance. The referral distance is an important factor of the referral, it is the route-distance between the origin (the home) of the patient and the referral location. This distance is based on the calculation of the route-planner of Google Maps. The postal code of the home address is taken as starting point and the postal code of the care institute the patient is referred to as destination. On purpose is chosen for the route distance instead of the direct distance. Within the region of the Albert Schweitzer Hospital a lot of rivers are located. Since it is not possible to cross the river at every point, two locations on each side of the river can be closely nearby, although the route from one point to the other could be relatively long. Since the main reason to include the referral distance is that a referral location further away is harder to visit for friends and family, the route is a better indicator.

Referral Distance	Number	Percentage
0-5 Kilometers	30	36%
5-10 Kilometers	33	40%
10-15 Kilometers	16	9%
15-20 Kilometers	5	4%
Total	**83**	**100%**

Table E.10: Referral distance for patients with a social indication referred to a care institute

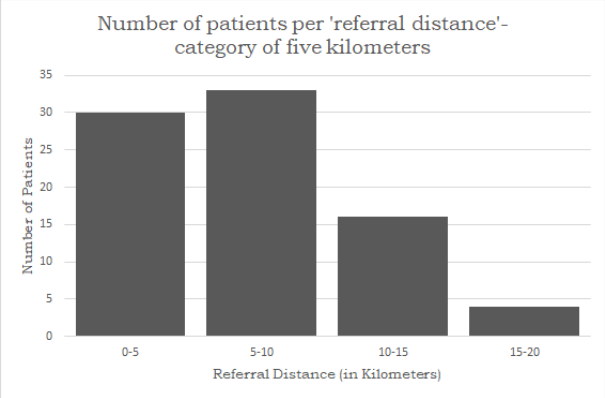

Figure E.10: Bar chart of the referral distance for patients with a social indication referred to a care institute

Out of the 84 patients directly referred to a care institute, 1 patient is indicated as an outlier, since this patient is referred to a care institute 162 kilometers from home on request of the family. This referral location was very close to relatives living further away and made easy visit of family possible. Out of the remaining 83 patients, 30 patients are referred to a location less than 5 kilometers away from home, 33 patients have a referral distance between 5 and 10 kilometers, 16 patients have a referral distance from 10 to 15 kilometers and 5 patients are referred between the 15 and 20 kilometers away from home (visualized in figure 5.4. No patient were referred further than 19 kilometers from home. The average referral distance is 6.88 kilometers.

To have an idea whether this distance is acceptable for inhabitants or not, context is needed. Since the Netherlands is densely populated, people are used to short distances. For example, the average commuting distance for the municipality of Dordrecht is 21.3 kilometers, which gives an idea what acceptable distances are within the region. No prior research is available to place the referral distance found into context. However, since the longest referral distance is shorter than the average commuting distance, the referral distances concluded from the referral process are assumed to be good.

E.3.2. Effect of Living situation on Referral Distance

When looking at factors affecting the referral distance, one of the first factors is the living situation of a patient. As is mentioned, patients already living in a sheltered living or an elderly home make use of facilities of nearby care institutes. To make this possible sheltered homes and elderly homes are located close to care institutes, therefor it is expected that these patients have a shorter referral distance. In the following table and graph, the average referral distance per living situation is presented.

Living Situation	Average Referral Distance (km)	Number of patients
Independent Living	9.64	71
Single	*10.08*	*55*
Together	*8.15*	*16*
Sheltered Living	3.38	9
Elderly Home	4.49	4
Total	**8.73**	**84**

Table E.11: Average referral distance per living situation of patients with a social indication presented at the ED

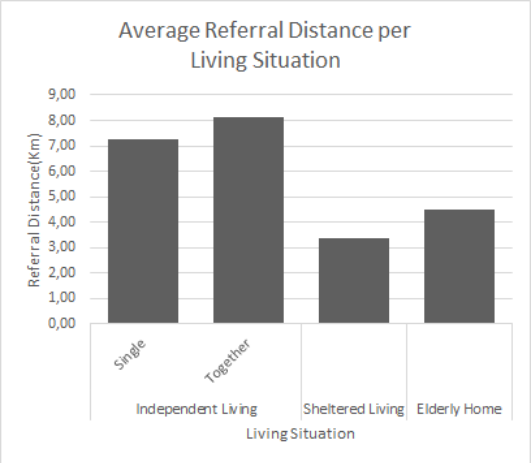

Figure E.11: Histogram of the average referral distance per living situation of patients with a social indication presented at the ED

Looking at the data the referral distance for patients within sheltered living and elderly homes is lower to patients which live independent. To make this conclusion statistically valid all groups should at least consist of 20 patients and more data needs to be collected to come to statistically valid conclusions. Based on this first impression the living situation is expected to have significant effect on the referral distance.

E.3.3. Geographical location

Another important factor could be the geographical location a patient is coming from. Firstly is shown where the patients with a social indication are coming from by showing the number of patients per postal code area.

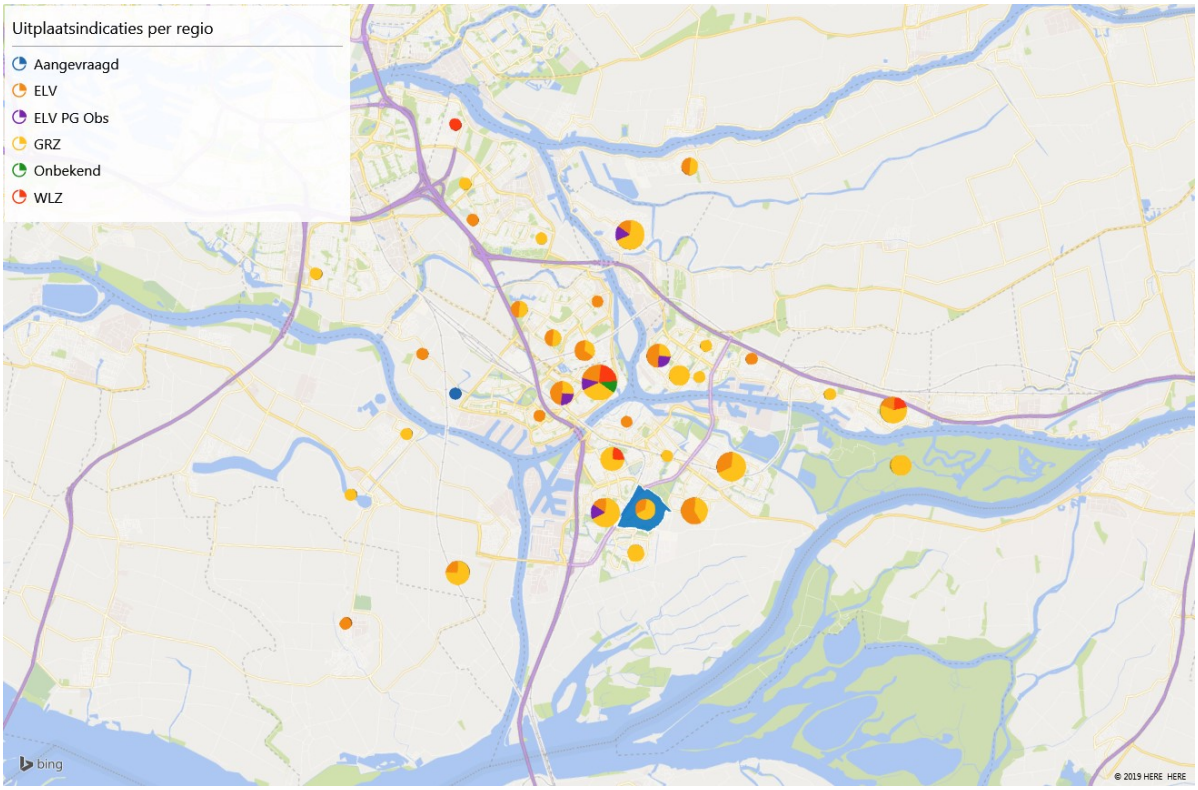

Figure E.12: The number of patients with a social indications per postal code categorized per care indication at referral

In this figure the spread of origin of the patients with a social indication is given based on the four numbers

of their postal code. The postal code of the hospital itself is visualized in blue. The highest number of patients with a social indication in one region is nine. Per region the patients with a social indication are categorized based on the care indication they received when the patient is referred from the hospital to the care institute.

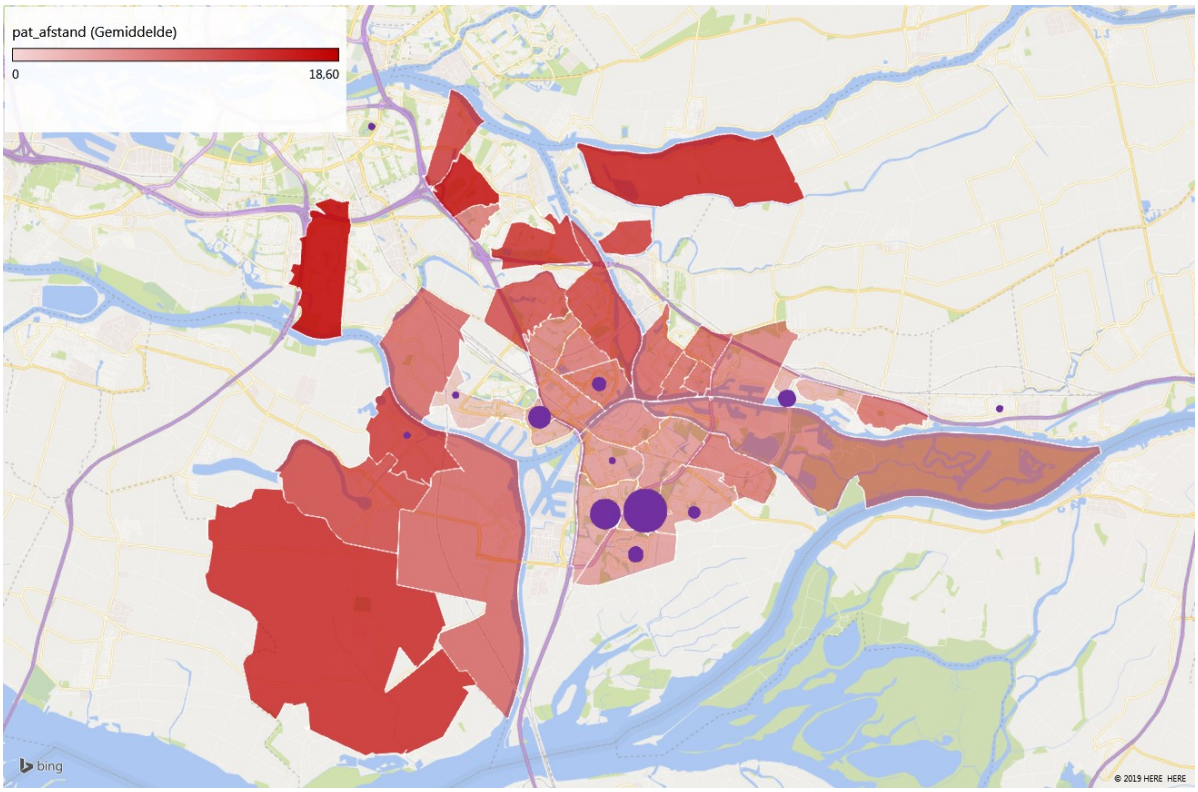

Figure E.13: The average referral distance per postal code (in red) and the amount of referrals per referral destinations (in purple) in the region of the Albert Schweitzer Hospital

Within this picture the different postal codes are coloured based on the average referral distance for a patient originated from that region. A darker red area represents a larger Referral Distance in comparison to light red areas. A purple bubble represents the amount of patients referred to one of the care institutes within the region with that postal code. From this picture can be concluded patients are mostly referred to care institutes close to the hospital. This also entails that patients living further away from the hospital have a higher referral distance, when being referred to such a location. From this small analysis can be concluded that it is expected that the geographical location is patient is coming from have a significant effect on the referral distance and more specific, that the distance between the location of origin and the hospital has a significant effect on the referral distance. This can be researched by a linear regression analysis between the distance between home and the hospital and the referral distance. This is not done within the scope of this research. If a hospital wants to decrease the referral distance for patients living further away from the hospital a potential solution is to cooperate with a wider spread of referral locations in order to have a bigger chance of finding a location close to the patients' origin.

E.3.4. Indication

Another interesting factor to look at can be the Outcome Indication (the indication someone receives when being referred from the hospital to the care institute. Since often is claimed that referral for WLZ-patients is much harder in comparison to short-term care. The average referral distance per outcome indication is presented.

Outcome Indication	Average Referral Distance (km)	Number of patients
ELV	7.29	26
ELV PG Obs	5.68	4
GRZ	6.79	50
Applied	0	1
WLZ	12.51	1
Unknown	6.55	1
Total	**6.88**	**83**

Table E.12: Average referral distance per outcome indication of patients with a social indication presented at the ED

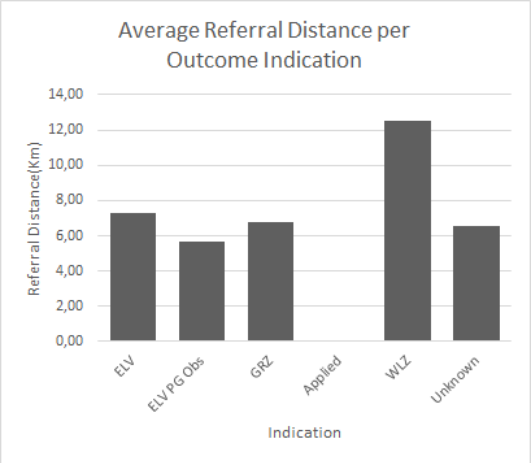

Figure E.14: Histogram of the average referral distance per outcome indication of patients with a social indication presented at the ED

Looking at the different outcome indication the referral distance WLZ is much larger in comparison to ELV, ELV PG Obs and GRZ. However, only 1 patient is directly referred to WLZ care, therefor more research is needed on this topic. No statistical conclusions van be made on effect of the outcome indication on the referral distance at this moment of the research.

F

Design Rules

Within this Appendix all formulated Design Rules throughout the thesis are listed. Only the most relevant are displayed within the conclusion of this thesis.

1. A visualization of the process is required in such a way that it can be used to determine whether the understanding of all important stakeholders is the same and to come to a collective agreement of the stakeholders that the described process is the process to assess. (Paragraph 3.5)

   (a) A process visualization needs to be implemented for face validation by stakeholders to determine whether an assessor and the stakeholders have the same understanding of a process and to make a collective agreement possible by the stakeholders on what the process to assess is.

   (b) When a researcher wants to validate to what extend a process is applied into practice face validation is not enough, in that case process indicators should be collected.

2. The identification and selection of important stakeholders have to be implemented in such a way that the perspectives of these stakeholders together form a representative perspective on system level. A representative perspective is reached when the stakeholders are spread out over the process in both the phase of the process they are involved in and the kind of role (operational or managerial) they play in this phase. (Paragraph 4.4.1)

   (a) In order to identify the stakeholders which influence the process a process visualization is useful. This can be used by determining per activity which stakeholders are influencing that activity. Only those activities which have direct effect on the final place of care someone is referred to (for example by generating important information on the patient within a diagnoses or by making decisions on the patients) are important to take into account.

   (b) A process visualization is helpful in selecting a representative set of important stakeholders, by choosing a set of stakeholders which are equally spread over the different phases in a process and which are representing all different perspectives (such as operational or managerial) on the process.

   (c) A set of stakeholders should be of such a size that at least all different steps of a referral process and all perspectives included in the research are represented. To determine whether this is the case a researcher should check whether all steps determined within the process visualization have at least one stakeholder representing that step and each determined perspective (such as operational and managerial in this thesis, but potential governmental or from the patient perspective) have at least one stakeholder representing that perspective.

3. It is required to map and translate the perspectives of the most important stakeholders into measurable indicators in such a way that it is possible to create a construct of indicators which can be quantitatively analyzed. (Paragraph 4.4.3)

   (a) A process visualization is useful in helping stakeholders to map their perspective and generate indicators, since it makes the indicators easy to associate with activities in practice instead of an abstract exercise.

(b) A tool, such as the, proven to be useful, goal tree, should be used to translate the perspective of stakeholders into measurable indicators. These indicators should always be measurable factors and the unit of measure needs to be determined in order to make it possible for the indicators to be quantitatively analyzed.

(c) Brainstorming tools (such as general associative themes on which the stakeholders can associate indicators with) should be used to help the stakeholders to generate a diverse set of indicators.

4. A selection of the most important indicators is needed in order to form the construct space of effectiveness in such a way that the construct represents the most important indicators which data is available on and which do not overlap in the effects they measure. (Paragraph 4.4.5)

   (a) An indicator set should represent the perspectives of all stakeholders in the stakeholder set together, since in that case the set represents the systemic perspective on the referral process. In order to make sure that it really represents this systemic perspective each indicator in the indicator set should always be supported by multiple stakeholders of the referral process to assess in that specific assessment.

   (b) On the indicators in the indicator set data should be available or the effort to make it available should be reasonable otherwise measurement is impossible.

   (c) Indicators in the indicator set should be unique in such a way that two indicators do not measure the same aspect of the system, which is the case if on of two indicators have a direct causal effect on the other indicator. Otherwise the concluded effectiveness will over-represent this aspect of the system, which can lead to the wrong conclusions on effectiveness.

   (d) Within two assessment methods where the referral processes have the same scope of the process and the same scope of the perspectives the same set of indicators can be used, under condition of design rule 4a and 4b. More explanation on how to determine whether two processes have the same scope of process and perspectives is explained in paragraph 6.3.3.

   (e) For the selection of the indicators it is best to present a list of all collected indicators combined with the effort needed to make the data available and the causality between the indicators to the stakeholder set and to let them reason on which indicators to include to the indicator set.

   (f) The combination of the process visualization and the indicator set could be used to identify which activities affect the performance of the referral process on a specific indicator, which makes alterations to the process to improve the process' performance possible. (For instance when a lot of patients with a need for long-term care end up in short-term care, a manager can investigate within the process visualization which exact activities have effect on the decision which care a patient is referred to. From that the manager can research whether those specific activities have the desired outcome and where barriers exist for those patients to end up in the right form of care. So it can be answered whether these patients are indicated wrongly or whether no spot is available in long-term care leading to wrongly indicated patients on purpose.) (Paragraph 4.4.7)

5. Data collection and data analysis of the indicators in the indicator set is needed in such a way that numbers on the indicators are created which make it possible to conclude the effectiveness of the process on these indicators. (Paragraphs 5.6.1 and 5.6.3)

   (a) The measurement of indicators on a systemic level requires data collection from multiple organisations, which requires special attention to privacy regulations.

   (b) For conclusions on effectiveness and success of a referral process data analysis is needed to come to numbers for the specific indicators.

   (c) Conclusions on effectiveness can be only be made when context is available for values of the specific indicators, for instance by doing a benchmark or by generally accepted norms.

   (d) When assessing a referral process one should think and describe before doing the data analysis on which targets the referral process should achieve.

G

Scientific Article