Overview of Care Coordination Within Specialized Home Care in Stockholm County

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Översikt av vårdkoordination inom specialiserad hemsjukvård i Stockholms län

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Abstract

The ageing population of Sweden is expected to increase throughout the future decades. Changing life-style trends and smaller families in the modern society has decreased the population’s access to informal care. This is expected to entail an increase in the services provided by specialized home care. This thesis studies the work performed by nurses within the department of specialized home care (ASIH) in Stockholm County. The nurses represent the majority of all professions active at ASIH in Stockholm County, which puts their work in particular interest for this thesis. The thesis focuses on the ways the nurses’ work procedures may influence continuity of care and patient safety. Continuity of care is an essential component in qualitative care and is characterized by well-executed coordination and minimization of broken patient appointments. A high level of continuity of care consequently entails a high level of patient safety. Descriptions of continuity of care at ASIH in Stockholm County can therefore provide indications on current care quality and areas of improvement.

The thesis consists of two parts – a literature review containing international research on continuity within home care and an empirical study containing a retrospective analysis based on the Functional Resonance Analysis Method (FRAM). The empirical study creates an overview of work tasks related to nursing performed at three units of ASIH in Stockholm County. The interdependencies between work tasks are identified and important chain reactions are analyzed.

The findings from this thesis indicate that extended training programs for nurses in the initial phase of employment is likely to decrease the number of disruptions in the nurses’ work. Furthermore, well-developed routines could facilitate work task procedures which would decrease the number of delays and disruptions in the nurses’ work. It was found that these findings together with information continuity between all parties involved represent significant factors for attaining continuity of care and patient safety at ASIH in Stockholm County.

**Key words:** Functional resonance analysis, home care, palliative care, care coordination, continuity of care, patient safety
Sammanfattning


Resultaten i denna rapport påvisar att utökad undervisning för sjuksköterskor i anställningens inledande skede kan troligen minska antalet störningar i sjuksköterskornas dagliga arbete. Dessutom påvisar resultaten att fler tydliga rutiner skulle kunna underlätta sjuksköterskornas arbetsprocesser, vilket skulle kunna minska antal förseningar och störningar i deras dagliga arbete ytterligare. Dessa fynd i kombination med välfungerande kommunikationer mellan alla berörda parter utgör de huvudsakliga åtgärderna för att erhålla vårdkontinuitet och patientsäkerhet hos ASIH i Stockholms län.

Nyckelord: Functional resonance analysis, hemsjukvård, palliativ vård, vårdkoordination, vårdkontinuitet, patientsäkerhet
Preface

This master’s thesis was conducted at the School of Technology and Health at KTH Royal Institute of Technology in Stockholm, Sweden. The idea for this thesis was presented by the thesis supervisor Mirjam Ekstedt during our first meeting. Our research questions were thereafter formulated together with Mirjam. The initial focus of the thesis was aimed at the medication management at the department of specialized home care (ASIH) in Stockholm County. As the project proceeded, the focus seemed too narrow for the intended project scope. We therefore chose to adjust the focus to cover management and coordination of all work tasks concerning nurses instead. The report is intended to provide an overview of the nurses’ current work tasks at ASIH for healthcare professionals and researchers who are interested in the subject area. We hope to provide a basis that future researchers can build upon.

We would like to express our gratitude to our thesis supervisor Mirjam, who untiringly provided us with useful comments and insightful remarks throughout the project. We are moreover thankful for the access to the transcribed data from three ASIH-units in Stockholm County which have been invaluable for compiling the results of this thesis. Many thanks also to Marlene Lindblad for sharing her thoughts on the report with us. A special thanks goes to our friends and families who have provided us with support and motivation.

We hope you enjoy your reading.

Yi-Qin Bu & Jieyu Wang

Stockholm, November 3, 2015
## List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
<th>Swedish denomination</th>
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<tr>
<td>ALS</td>
<td>Amyotrophic Lateral Sclerosis</td>
<td>Amyotrofisk lateralskleros (ALS)</td>
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<tr>
<td>ASIH</td>
<td>Advanced home care in Sweden</td>
<td>Avancerad sjukvård i hemmet (ASIH)</td>
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<tr>
<td>COPD</td>
<td>Chronic Obstructive Pulmonary Disease</td>
<td>Kroniskt obstruktiv lungsjukdom (KOL)</td>
</tr>
<tr>
<td>FRAM</td>
<td>Functional Resonance Analysis Method</td>
<td>FRAM</td>
</tr>
<tr>
<td>FMV</td>
<td>FRAM Model Visualiser</td>
<td>FMV</td>
</tr>
<tr>
<td>HIT</td>
<td>Health information technology</td>
<td>Informationsteknologi inom vården</td>
</tr>
<tr>
<td>HSCI*</td>
<td>Health and Social Care Inspectorate</td>
<td>Inspektionen för vård och omsorg (IVO)</td>
</tr>
<tr>
<td>MS</td>
<td>Multiple Sclerosis</td>
<td>Multipelskleros (MS)</td>
</tr>
<tr>
<td>NBHW*</td>
<td>National Board of Health and Welfare</td>
<td>Socialstyrelsen</td>
</tr>
<tr>
<td>OECD</td>
<td>Organization for Economic Co-operation and Development</td>
<td>OECD</td>
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* Abbreviations that are not generally recognized
# List of Definitions

This section contains a list of definitions that is arranged in alphabetical order, which may assist the reader in comprehending the remainder of this study. All definitions are retrieved from the Swedish National Board of Health and Welfare (NBHW, Swedish: Socialstyrelsen) unless stated otherwise (Socialstyrelsen, 2001; Socialstyrelsen, 2013; Socialstyrelsen, 2015). Available Swedish denominations of the listed organizations and services are provided for clarity.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
<th>Swedish denomination</th>
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<tbody>
<tr>
<td>Assisted living services</td>
<td>Provides practical services and care at home to individuals (often elderly) with impairments that may impede safety and/or adequate life quality. Common practices include running postal and banking errands, distributing and preparing meals, and assisting in grooming, dressing and matters of personal hygiene.</td>
<td>Hemtjänst</td>
</tr>
<tr>
<td>Basic home care</td>
<td>Provides home care for patients with disabilities that require minimum two visits per week over more than 14 days. Common treatments include medication, blood pressure monitoring and sampling (Stockholms läns landsting, 2008).</td>
<td>Basal hemsjukvård</td>
</tr>
<tr>
<td>Multi-dose drug dispensing</td>
<td>A service provided by the Swedish pharmaceutical corporation Apoteket. A patient’s regular medical prescriptions are packaged into a band of disposable dose unit bags which contains all medications required for one dose occasion. Medication content, patient data and date and time for intake are labelled on the bags. These are delivered to the patient at regular time intervals (every 1 or 2 weeks) (Apoteket, 2015; Läkemedelsverket, 2013)</td>
<td>ApoDos</td>
</tr>
<tr>
<td>Multi-professional team</td>
<td>A team of caregiving personnel within different professions/qualifications who collaborate in their work for an individual patient.</td>
<td>Multi-professionellt team</td>
</tr>
<tr>
<td>Palliative care</td>
<td>Care provided to patients at end of life, mainly to relieve pain from progressive and incurable diseases or damage and to enhance the life quality with respect to patients’ physical, psychological, social and existential needs.</td>
<td>Palliativ vård</td>
</tr>
<tr>
<td>Senior housing</td>
<td>Types of lodging which offer around the clock care for elderly in need of special aid. Includes group homes, retirement homes, residential homes, nursing homes and service buildings.</td>
<td>Särskilt boende för äldre, gruppboende/ servicehus/ äldreboende</td>
</tr>
<tr>
<td>TakeCare</td>
<td>Electronic patient journal system used by healthcare providers across entire Stockholm county since 2008 (CompuGroup Medical, 2015).</td>
<td>TakeCare</td>
</tr>
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</table>
# Table of Contents

1. Introduction .................................................................................................................. 1

2. Research Objective .................................................................................................... 3
   2.1 Delimitations .......................................................................................................... 3

3. Background .................................................................................................................. 5
   3.1 Specialized Home Care in Stockholm County ....................................................... 5
   3.2 Target Patients ....................................................................................................... 5
   3.3 Working Structures of a Unit .................................................................................. 6
   3.4 Laws and Regulations ............................................................................................ 6
   3.5 Healthcare Choice Program ................................................................................... 7

4. Theoretical Perspective ............................................................................................... 9
   4.1 Resilience Engineering ............................................................................................ 9
   4.2 FRAM-Principles ................................................................................................... 9
   4.3 FRAM Functions .................................................................................................... 10

5. Part I – Literature Review .......................................................................................... 13
   5.1 Data Collection ...................................................................................................... 13
   5.2 Influential Factors in the Work of Home Care Nurses .......................................... 14
   5.3 Care at Home ......................................................................................................... 15
   5.4 Continuity of Care ................................................................................................ 16
      5.4.1 Coordination of Care ...................................................................................... 16
   5.7 Summary of Literature Review ............................................................................. 17

6. Part II – Empirical Study ............................................................................................. 19
   6.1 Methodology .......................................................................................................... 19
      6.1.1 Settings and Participants ................................................................................ 19
      6.1.2 Method ........................................................................................................... 19
      6.1.3 Analysis Method – FRAM ............................................................................. 20

7. Results ......................................................................................................................... 23
   7.1 Overview of Functions .......................................................................................... 23
   7.2 Function Variability .............................................................................................. 23
   7.3 Functions of Significance ....................................................................................... 27
      7.3.1 Employ, Train and Educate Staff .................................................................... 27
7.3.2 Establish Work Routines ................................................................................. 28
7.3.3 Arrange Work Plan .......................................................................................... 30
7.3.4 Manage Patient Data ....................................................................................... 33
7.3.5 Respond to Call or Message ............................................................................ 34
7.3.6 Deliver Care ..................................................................................................... 35

8. Discussion ............................................................................................................... 37

8.1 Results .................................................................................................................. 37
  8.1.1 Primary Findings ............................................................................................. 37
  8.1.2 Secondary Findings ........................................................................................ 39
  8.1.3 Findings Excluded from Results .................................................................... 41
  8.1.4 Future Research ............................................................................................. 42

8.2 Methodology ......................................................................................................... 43
  8.2.1 Literature Review .......................................................................................... 43
  8.2.2 Empirical Study ............................................................................................ 44

9. Conclusions ............................................................................................................ 47

References .................................................................................................................. 49
List of Illustrations .................................................................................................... 55

List of Figures

Figure 1. A FRAM-function and its six aspects (Hollnagel, et al, 2014) ......................... 10
Figure 2. The user interface of FRAM Model Visualiser ............................................. 22
Figure 3. A finished foreground function awaiting to be coupled to other functions .... 22
Figure 4. Model of FRAM-functions generated through FRAM Model Visualiser (function names in Table 1) ................................................................. 24

List of Tables

Table 1. FRAM-functions and their associated variability ............................................ 25
Table 2. Schedule depicting a standard work day for nurses ...................................... 30
Table 3. Factors that may cause delays in a work day ............................................... 32

Appendix
1. Introduction

Specialized home care is a relatively new service in the Swedish healthcare establishment. It has successively gained the public’s awareness over the recent years, during which it was well received in general (Stockholms läns landsting, 2014 (a)). This form of care is of topical interest at the time of writing, since many of those who benefit from the care are elderly people suffering from severe chronic diseases. According to data from the Stockholm County Council, the fraction of inhabitants over 70 years of age is expected to increase from 10% in 2013 to approximately 12% in 2020 (Stockholms läns landsting, 2014 (b)). Furthermore, research has shown that changing life-style trends and smaller families in the modern society have decreased the population’s access to informal care (Genet, et al., 2011). The services of specialized home care are therefore expected to be well needed.

The concept of specialized home care is regarded as a cost-effective alternative to maintain the independence of patients, in a way the patients prefer (Genet, et al., 2011). The multi-professional teams consisting of physicians, nurses, counselors, physiotherapists, occupational therapists and dieticians work together within specialized home care to provide comprehensive care to each patient (Bäcklund, et al., 2013). According to the World Health Organization, “home is a place of emotional and physical associations, memories and comfort” (Tarricone & Tsouros, 2008). Providing specialized care at home can therefore be beneficial from the patients’ perspective.

The department of specialized home care in Stockholm County – locally referred to as Avancerad sjukvård i hemmet (ASIH) – has rapidly increased in size over the recent years (Hälso- och sjukvårdnsnämnden, 2015). The increase in size has entailed a number of challenges for nurses and other caregivers at the department, including increased workload and difficulties in transportation (Stajduhar, et al., 2011). This thesis seeks to observe how these challenges may impact the continuity of care and the patient safety at ASIH in Stockholm County.

The research is performed in two parts; through a literature review and through an empirical study. The literature review seeks to examine the concept of home care in order to create an understanding of its benefits and its areas of improvement. The empirical study uses transcribed interviews and observational data retrieved from field studies at ASIH in Stockholm County to create an analysis using the Functional Resonance Analysis Method (FRAM). The findings from this thesis will serve as a basis for future research within this topic area.
2. Research Objective

The main objective of this thesis is to create a map of care-related work procedures performed by nurses at ASIH in Stockholm County. The specific aims of this thesis are:

- To describe how nurses coordinate patient care together with other members of the multi-professional team at ASIH-units in Stockholm County
- To describe aspects of care coordination that may cause patient neglect and/or impede patient safety and continuity of care

The results of this thesis are meant to provide a broader understanding of the current workflow of nurses at ASIH Stockholm and to create a foundation for future research within this topic. The workflow of other professions at ASIH is not addressed in this thesis as it would exceed the intended thesis scope.

2.1 Delimitations

The literature study seeks to illustrate how care coordination is commonly arranged in home care settings and to describe the characteristics of continuity of care. Care coordination and continuity of care are described primarily from nurses’ perspectives. This seems appropriate as nurses constitute the predominant proportion of all professions at ASIH, and the work tasks of nurses cover a wider range than any other profession at ASIH. Research-based measures for improving nurses’ care coordination and increasing continuity within home care are described as well; as are common difficulties related to these areas. Work-related difficulties faced by nurses that are not relevant to care coordination or continuity of care are not described in this thesis. Any work-related difficulty faced exclusively by physicians, counselors, physiotherapists, occupational therapists, dieticians or any other profession active within home care is excluded from this report in order to not exceed the thesis scope.

The empirical study seeks to create an overview of work tasks performed by nurses at ASIH Stockholm. The interdependencies between work tasks are identified. Most of the work tasks are only described briefly. Some of the more prominent work tasks are described in greater detail. The importance of work tasks are assessed through their relevance to care coordination and continuity of care. The resulting overview of work tasks is not representative of any ASIH-unit located outside of Stockholm County.
3. Background

A brief background on specialized home care in Stockholm County is presented in this section, which includes descriptions of its organizational structure and its target patients. The laws and regulations concerning specialized home care are also described along with the political reform that enabled it, in order to introduce the reader to the societal context of this thesis.

3.1 Specialized Home Care in Stockholm County

The department of specialized home care in Stockholm County is locally referred to as ASIH and currently holds 15 different units within the county (see Appendix A). Each unit is responsible for patients within a certain geographical area determined by the Stockholm County Council (Hälso- och sjukvårdsförvaltningen, 2014). The units are currently distributed over eight regions.

An average ASIH unit is responsible for approximately 30-200 patients (Bäcklund, et al., 2013; Nationella rådet för palliativ vård, 2014). Multi-professional teams at each unit provide care that covers all aspects of the patients’ needs. A multi-professional team consists of physicians, nurses, counselors, physiotherapists, occupational therapists and dieticians. Nurses represent a clear majority in the teams.

ASIH collaborates with several other branches of local healthcare providers in order to facilitate care (Hälso- och sjukvårdsnämnden, 2011 (a)). The collaborations involve inpatient departments of hospitals, primary care and local municipalities (i.e. assisted living services) among others.

3.2 Target Patients

The objective of ASIH is to provide advanced palliative care and advanced medical care for eligible patients (Bäcklund, et al., 2013). The care provided by ASIH has been available for cancer patients situated in Stockholm County since the 1980s. The Healthcare Choice Program (Swedish: Vårdvalsreformen) established in Stockholm County in 2013 has, however, broadened the spectrum of target patients. This has provided more patients the opportunity to receive care from ASIH. The care is provided in patients’ homes through visits that are available around the clock.

The around the clock visits may substitute for inpatient care at hospitals to a large extent (Bäcklund, et al., 2013). The patient is required to be 18 years of age or older and fulfil a certain patient criteria in order to be considered eligible for receiving care from ASIH. The eligible patient then has the option to select ASIH as his/her main healthcare provider (Stockholms Sjukhem, 2015). In such case, the hospital physician will write a referral for the patient to an ASIH unit. The patient usually remains in contact with a specialist physician at a hospital during his/her time with ASIH.

A large portion of ASIH’s patients are in need of advanced palliative care (Regionala cancercentrum i samverkan, n.d.). Cancer is the cause of approximately 90 percent of all registered deaths at ASIH units that offer advanced palliative care. Aside from cancer, patients may also suffer
from Chronic Obstructive Pulmonary Disease (COPD), heart failure, end stage liver failure, end stage renal failure, aids and neurological diseases such as Parkinson’s disease, Multiple Sclerosis (MS) or Amyotrophic Lateral Sclerosis (ALS) (Socialstyrelsen, 2013).

3.3 Working Structures of a Unit

The information provided in this subsection is retrieved from transcribed interviews and observational data from field studies (see section 6.1 Methodology).

The organization of ASIH is complex in the sense that it contains a variety of processes that need to be executed in parallel or in a predefined order. Each ASIH-unit in Stockholm County is staffed with a unit manager and minimum one multi-professional team. The unit manager has the overarching responsibility for the workforce and for the caregivers’ schedules.

The multi-professional teams work in three daily shifts; the day shift, the evening shift and the night shift. Between each shift, patient information is documented and transferred from the preceding team to the subsequent team. The team working night shift is the smallest. Physicians work on-call from their homes throughout the nights. Except for nurses, caregivers of all other professions at ASIH only work day shifts.

During day shifts on weekdays, one to two nurses remain at the unit office to perform administrative tasks. The office-based nurse(s) also attend to visiting patients at the unit’s treatment room for temporary treatments, such as blood transfusion. The rest of the team diverges to visit a number of patients in their homes.

Each unit has access to a limited set of cars, which are shared among the caregivers. Occasionally, the caregivers may use the public transport or walk. At the patient’s home, the caregivers perform predefined tasks which occasionally involves cooperation with other caregivers from e.g. the basic home care.

3.4 Laws and Regulations

Several laws and regulations issued by the Swedish Parliament and the National Board of Health and Welfare (NBHW, Swedish: Socialstyrelsen) concern the work of ASIH. These are presented in this section.

The Health and Medical Services Act (1982:763) sets certain standards for the quality of care in Sweden (Riksdagen, 2014 (a)). The act states that satisfactory care should be easily accessible for patients, respect the patient’s autonomy and promote continuous communications between caregivers and their patients. It is essential to withhold a sufficient level of continuity throughout a treatment. The County Council and the unit managers of ASIH are responsible for ensuring that these requirements are met.
The *Social Services Act* (2001:453) provides the foundation for guidelines concerning social services in Sweden (Riksdagen, 2015). Each municipality needs to guarantee that all residents of the municipality receive the support and assistance that they need. It is the responsibility of the County Council and the municipality to provide this support. NBHW has issued a regulation in connection to this act, denominated as *Management System for Systematic Quality Work* (SOSFS 2011:9) (Socialstyrelsen, 2011), which provides advice on how to conduct quality work in organizations. These advice specify the necessity of collaborations between social services and the healthcare establishment.

The *Patient Safety Act* (2010:659) ensures an increased awareness of patient safety in Swedish healthcare (Riksdagen, 2014 (b)). Patient safety is defined as protection against healthcare-related injuries. The act specifies healthcare providers’ obligations for conducting work that promotes patient safety on a continuous basis. It is the healthcare providers’ responsibility to report detected safety deficiencies and events that have caused – or may potentially cause – injuries, to the Health and Social Care Inspectorate (HSCI, Swedish: Inspektionen för vård och omsorg). Possible measures are issued by the Medical Responsibility Board (Swedish: Hälso- och sjukvårdens ansvarsnämnd).

The *Patient Act* (2014:821) intends to highlight and accentuate the patient’s position and his/her integrity in connection to healthcare (Riksdagen, 2014 (c)). The act aims to improve the patient’s autonomy and increase his/her participation in treatment plans. This means that the patient is enabled to select among providers of specialized outpatient care within all counties in Sweden (Vårdgivarguiden, 2015). The act states furthermore that care providers need to reinforce their duty of informing patients of their treatments. The content of information shall be adapted to the patient’s personal maturity, experience, age and linguistic background among other considerations.

### 3.5 Healthcare Choice Program

The Healthcare Choice Program of Stockholm County enables the patients living in Stockholm County to select among healthcare providers within the County according to their own preferences (Hälso- och sjukvårdensnämnden, 2011 (b)). The purpose of the Healthcare Choice Program is to gain focus on patients; to meet their needs of continuity of care and to increase the availability of appropriate care. The program increases patients’ ability to influence their care plans, which strengthens the patients’ autonomy.

However, the services of specialized home care is of topical interest to the Swedish healthcare not only for gaining the patient’s autonomy. According to a study by the Organization for Economic Co-operation and Development (OECD) in 2012, Swedish healthcare holds the least amount of hospital beds compared to 26 other EU-member countries (Appendix B) (OECD, 2012). The Healthcare Choice Program presents an opportunity to rectify this number by allocating hospital beds into patients’ homes, which can be realized through specialized home care. It is, however, important to emphasize that home care settings also entail potential risks for patient safety. Such risks will be further discussed in the sections 5. *Literature Review* and 7. *Results*.
4. Theoretical Perspective

The theoretical perspective used for conducting the empirical study of this thesis is presented in this section. The theoretical perspective is based on the concepts of resilience engineering and the Functional Resonance Analysis Method (FRAM) (Hollnagel, 2012).

4.1 Resilience Engineering

Traditionally, the methods of safety management have focused on detecting unwanted outcomes such as accidents, injuries and other adverse events (Hollnagel, et al., 2011). Resilience engineering has a different approach to safety management in the sense that safety is defined as the ability to overcome conditions that vary, i.e. conditions that have the potential to result in both wanted and unwanted outcomes. It is therefore important to understand the nature of both wanted and unwanted elements in a given context. By shifting focus to increasing the number of wanted outcomes from reducing the number of unwanted outcomes, it is believed that the attainment of environmental safety can be facilitated and made more efficient. The idea behind resilience engineering has led to the development of methods for analyzing complex environments, among them the FRAM (Hollnagel, 2012).

FRAM is a non-linear systematic analysis method for modelling complex socio-technical systems (Hollnagel, 2012). Central to FRAM is the concept of functional resonance, which is defined as the signal that consequently arises from the variability and unintended interaction within a larger quantity of other signals. This concept is used to explain how small variations in a system, which easily could be disregarded as unimportant, in fact can give rise to large effects in the system outcome.

4.2 FRAM-Principles

The concept of FRAM is derived from resilience engineering to a large extent (Hollnagel, et al., 2011). The basic principles of FRAM are described below (Hollnagel, 2012).

The Principle of Equivalence
The principle of equivalence alludes to the fact that success and failure actually share the same nature. Both success and failure can be caused by the same processes. Different outcomes of a process do not necessarily mean that the underlying causes are any different from each other.

The Principle of Approximate Adjustments
People commonly adjust their performance to adapt to certain situations when performing a work task in order to manage a complex system. The adjustment is approximate and can occur on an individual, group, or organizational level. Each adjustment gives rise to new variability, which may result in both positive and negative outcomes.
The Principle of Emergence
Variability caused by everyday adjustments may not have a crucial impact on the subsequent outcomes. The variability of one function is rarely large enough to directly cause failure or accident. Nevertheless, the combined variability of multiple functions may coincide and affect each other in unexpected ways, which creates instability, which may lead to positive or negative outcomes.

The Principle of Resonance
The variability of a given number of functions could be activated simultaneously and thereby increase the overall variability in the system. The increased variability could then resonate through surrounding function couplings and amplify the variability of all connected functions. The normal limits of variability for those functions are exceeded, which could lead to either positive or negative outcomes.

4.3 FRAM Functions

FRAM-functions can describe performance on an individual, organizational or technical level (Hollnagel, 2012). A function is defined as the following:

“A set of actions that a system performs or is used for, which are valuable for the achievement of a set of goals” (Woltjer, 2009; Herrera & Woltjer, 2010).

Each function is described in terms of six aspects. The function is shaped as a hexagon and each corner is attached to a certain aspect, which is illustrated by Figure 1 (Hollnagel, et al, 2014). If one aspect of a certain function is identically formulated as another aspect on another function, these two functions will be coupled to each other through their identical aspects. There is however an exception when it comes to the aspect named precondition; this aspect can only be directly linked to another function’s output.

There are two types of functions as well – the foreground function and the background function. The foreground functions are the fundamental functions. As many aspects as possible should be identified on these functions. The background functions serve instead as supportive functions to the foreground functions; for purposes of clarification. A sequence of FRAM-functions requires both foreground and
background functions. What defines a background function is the lack of identified aspects; only the output is identified and coupled to other functions.
5. Part I – Literature Review

A collection of relevant findings from previous international research within home care is presented in this section. The information conceived is believed to provide insights to continuity of care and the management and coordination of ASIH in Stockholm County. The literature review provides indications of how the ASIH-units could improve its operations and also which areas may represent potential hazards.

5.1 Data Collection

A literature review was conducted in the initial phase of the study in order to create an understanding for the current situation within the research area (Cronin, et al., 2008).

Several aspects within the context of specialized home care were chosen to be focused on. The ideas for these aspects emerged through discussions with the supervisor of this thesis. These aspects will be presented in the remainder of this section. Their appropriateness and relevancy have been confirmed and approved by the supervisor.

The literature review was conducted by collecting the following:

- Articles from online databases and journals
- Data from Swedish government agencies

Relevant articles and electronic books were mainly retrieved from the online databases KTH Primo, Cochrane Library, PubMed, and ScienceDirect. Some of the articles retrieved online provided access to additional relevant articles through their reference lists. All used articles have been published in various medical journals, all but one were published within 15 years from present time. The content of the single older article used in this thesis remains valid in present time. The research topic of all used articles and electronic books concerns home care, specialized home care, palliative care or FRAM-analysis. As it became evident that an inadequate amount of research has been conducted on the topics in Sweden thus far, research from other countries – mainly the U.S. and Canada, were taken into account as well. A table of search data is presented in Appendix C.

Data from the Swedish government were collected to create an understanding of the regulatory aspects surrounding ASIH. The data consists of reports and online documents from Swedish government agencies, including the NBHW, the Stockholm County Council, the Confederation of Regional Cancer Centers in Sweden and the Swedish Association of Local Authorities and Regions. The data used in this thesis is enlisted in References.
5.2 Influential Factors in the Work of Home Care Nurses

The home care nurses represent the majority of all professions within home care (Woodward, et al., 2004). Although all professions contribute to the care quality of home care, it is believed that the working methods of nurses may hold particular value for home care. A study in Canada identified *adequate competence* and *skills* as important characteristics of nurses that increase the continuity in home care. Nurses who were trained to have special skills – such as the ability to handle specialized equipment – experience a lesser amount of disruptions when overtaking other nurses’ patient cases.

In Canada, home care nurses’ perceptions of a patient’s capabilities are influenced by their previous experience and knowledge as well as their personal intuition (Stajduhar, et al., 2011). The methods they use for assessing a patient’s capabilities include listening, observation, casual conversations, asking questions, reading charts and consulting fellow colleagues. The patients that they prioritize based on the assessments are the ones with low capacity and high needs. The assessment of a patient’s capabilities contributes to a personal connection between the patient and the home care nurse which could facilitate the establishment of trust between them. Trust could induce a positive attitude towards future interactions and increase the patient’s likelihood to follow suggestions.

It was found that caregiver discontinuity may pose a barrier that could hinder the growth of personal connection (Stajduhar, et al., 2011). This could be caused by the caregiver’s time and workload constraints. Each time a new home care nurse is introduced to a patient, the personal connection needs to be rebuilt. It was observed in a study that patients often prefer continuous service from the same caregiver (Byrne, et al., 2011; Woodward, et al., 2004).

A study in the United States (US) indicates that work related stress is the main reason for home care nurses’ decision to change career paths (Samia, et al., 2012), which is an important cause of caregiver discontinuity. Home care settings encompass unpredictable elements that could contribute to a stressful work environment. Common sources of stress for home care nurses are lack of autonomy, work overload and role conflict.

Another barrier identified is information discontinuity (Stajduhar, et al., 2011). When receiving unsatisfying amount of information or conflicting information from caregivers, the patient’s trust in the caregiver could be counteracted. Frequent communication between patient and caregiver is identified as crucial for following through with care plans, attaining satisfactory care and avoiding misunderstandings (Woodward, et al., 2004).

It is however necessary to bear in mind that the quality of communication is heavily dependent on the patient’s and the caregiver’s individual characteristics (MacDonald, et al., 2013; Michaels & Meek, 2004; Myers, et al., 2006; Sauvé, et al., 2009; Scherr, et al., 2009). Differences in cultural background and language fluency may also influence the efficiency of communication (Evangelista, et al., 2009; MacDonald, et al., 2013).

The influential factors of home care nurses’ work thus depend on both the nurses’ personal abilities and the environment they work in. The nurses’ personal abilities can be taught to a certain extent but they also depend on their personal experiences and judgment. Their personal abilities can
however be overshadowed by barriers in their working environment. These barriers include caregiver discontinuity, work related stress and information discontinuity. These barriers carry the potential to cause patient neglect and impede patient safety.

5.3 Care at Home

Home care settings rely to a certain extent on patients’ next-of-kin – who often is a family member – to provide both emotional and physical support to the patient (Milberg, et al., 2003; Naylor, et al., 2008; Stajduhar, et al., 2011). He or she therefore carries a certain responsibility to comprehend information provided by home care staff and to provide care of sufficient standards, which makes them factors that influence patient safety and continuity of care. Since the next-of-kin is not formally trained for this purpose in most cases, it is important that the caregivers are able to communicate instructions that are sufficiently clear for a layman’s comprehension. Studies have shown that individualized home interventions that target patients as well as next-of-kin can reduce the caregiver burden, increase the caregiver’s skills and knowledge as well as enhance the caregiver satisfaction.

The opinions of next-of-kin are valuable for developing a better home care (Milberg, et al., 2003). A study in Sweden discovered several factors that the next-of-kin considered important in the context of specialized palliative home care. These factors concern the caregivers’ service, the level of comfort and the ability to participate in care. It was found that the next-of-kin appreciated caregivers with pleasant attitude, satisfactory communication skills and adequate competency; i.e. the ability to provide continuity of care.

A study in Canada indicates that an increased level of care provided by next-of-kin may in turn result in a decreased level of care provided by home care professionals (Stajduhar, et al., 2011). The study showed that home care nurses perceived next-of-kin as a part of the care-providing unit, which means that the participation of next-of-kin was regarded as a source for workload relief. The next-of-kin’s contributions to home care include initiatives to contact home care nurses, basic patient care, compliance to following care plans and management of patient’s medication administrations. It has been indicated that patients living alone are more likely to disrupt regular administration of prescribed medications and overstep dietary restrictions (Brännström, et al., 2006; Davidson, et al., 2005; MacDonald, et al., 2013; Sauvé, et al., 2009).

The next-of-kin can be regarded as a unique asset to caregivers in home care settings. Given the right circumstances, the next-of-kin could relieve the workload for home care nurses which promotes the continuity of care and contribute to the development of a better home care. It would therefore be beneficial for home care managers to pay attention to how to create the right circumstances for next-of-kin.
5.4 Continuity of Care

In home care settings where the patient might receive care from multiple healthcare providers, there is a particular need for continuity of care (Parry, et al., 2008; Samia, et al., 2012). The concept of continuity within a healthcare environment can be defined by the following quote (Shortell, 1976):

“/…/ the extent to which services are received as part of a coordinated and uninterrupted succession of events consistent with the medical care needs of patients.”

Continuity of care is mainly characterized by consistency of caregiver and minimization of broken patient appointments (Shortell, 1976; Woodward, et al., 2004). The nurse-patient relationship is believed to be difficult to establish and maintain if continuity of the visiting nurse’s identity is disrupted from time to time (Parry, et al., 2008). Broken continuity therefore results in fragmented care which could entail among other things:

- Duplication or loss of services
- Conflicting recommendations
- Inappropriate recommendations
- Errors in medication
- Confusion between the patient and caregiver
- Patient and caregiver distress

Errors in medication is likely caused by patients’ confusion regarding their medication and the proper method of administration (MacDonald, et al., 2013; Morgan, et al., 2006; Polzien, 2007; Roberts, et al., 2008; Smith, 2010; VanderSchaaf, et al., 2010), physical difficulties such as patients’ lack of ability to open medication bottles (Freydberg, et al., 2010; Horne & Payne, 2004; MacDonald, et al., 2013; Smith, 2010) or obstacles in the healthcare system such as difficulties in contacting healthcare providers or medication shortages (Clark, et al., 2007; Davidson, et al., 2005; Lundman, et al., 2009; MacDonald, et al., 2013; Upadaya, et al., 2004; VanderSchaaf, et al., 2010).

The continuity of care is of significant value for the quality of care and as a fundamental component in nurses’ and other home care staff’s relationships with patients (Barnett, 2005; Boyd, et al., 2009; British Thoracic Guideline Development Group, 2004; Davidson, et al., 2005; MacDonald, et al., 2013; Samia, et al., 2012; Woodward, et al., 2004). Continuity can be increased through careful planning and coordination; to set clear goals when providing care and to monitor care plan developments on a continuous basis (Woodward, et al., 2004). It has been observed that fragmented care occurs frequently in the care providing process due to poor management. Continuity of care is thus closely related to coordination of care (Parry, et al., 2008).

5.4.1 Coordination of Care

Coordination of the nurses’ work tasks is essential for continuity in home care settings. This is especially important in the context of heavy workload, which entails an increased work pace and increased risk for errors (Stajduhar, et al., 2011). Examples of consequences entailed by a high
workload include shorter patient visits, prioritization of patients with urgent needs before routine visits and delegation of care to next-of-kin.

Heavy workload could result from several factors (Stajduhar, et al., 2011). It could result from resource barriers such as staff limitations; an insufficient amount of staff entails an increased number of patient cases for each staff. It is also affected by the travel distance to patient homes, the means of transportation, language barriers, the methods for scheduling and the user-friendliness of administrative software tools. Furthermore, it has been shown that high workload may influence home care nurses’ decision-making process. When facing high workload, some nurses would prioritize among the scheduled patient visits for the day and visit only the patients deemed to have most urgent needs. Other nurses would try other means to ensure that as many patient visits as possible are finished during the day, including working overtime, skipping over breaks and transferring visits to other available nurses.

In Canada, the appointed time for each patient visit in schedule is estimated by the home care nurse who last visited the patient or by an office-bound nurse (Stajduhar, et al., 2011). However, the home care patients often carry unpredictable needs that complicates an accurate scheduling. When the time for a patient visit proves to differ from the appointed time, the nurse either adjusts the time in his or her schedule in order to rearrange the upcoming visits, or the nurse continues with the preplanned schedule and hopes that the time for patient visits evens out during the course of the day.

The findings on continuity of care suggest that continuity is characterized by consistent and uninterrupted medical care. Consistent care is represented by consistency of caregivers and minimization of broken patient appointments. Broken patient appointments is a potential source for patient neglect and impairment of patient safety, which is often caused by heavy workload. Continuity of care is believed to be increased through efforts of coordination.

5.7 Summary of Literature Review

The reviewed literature indicates that an adequate level of competence and skills is essential for a nurse’s daily work in home care settings. Adequate competence and skills could increase the nurses’ work efficiency and decrease the number of broken patient appointments. The desired competence and skills are acquired through qualitative training and education. Certain useful abilities depend on the nurse’s personal characteristics and cannot be taught, but can be improved through working experience. Certain barriers have been found that could obstruct the nurses’ performance. These barriers include caregiver discontinuity, work related stress and information discontinuity.

The studies further emphasized the importance of building and maintaining patient relationships, as healthy relationships between caregivers and patients can improve communications and increase patients’ compliance to treatments. The establishment of patient relationship can be facilitated through the participation of next-of-kin. The next-of-kin could furthermore relieve the workload for caregivers to a certain extent. Patients living alone are allegedly more inclined to deviate from
care plans. The next-of-kin are therefore indirectly important for maintaining qualitative care for patients. They therefore need to be properly instructed and comprehensively informed on treatment requirements by nurses.

A central concept within home care is the *continuity of care*. Continuity is characterized by consistent and uninterrupted medical care, which is believed to be attained through consistency of caregivers and minimization of broken patient appointments. Discontinuity in care is often caused by heavy workload, which can be resolved by care coordination. Properly coordinated care could involve setting clear goals in work tasks and monitoring care plans as they proceed.

The findings from the literature review are believed to serve two main purposes in this thesis. One of its purposes is to aid the reader in comprehending the context of nurses’ work in home care settings, i.e. its general benefits and its common difficulties. Another purpose is to create reference points to the empirical study of this thesis. The reference points serve the purpose of validating and supplementing the findings from the empirical study.
6. Part II – Empirical Study

An overview of the empirical study is presented in this part of thesis. The procedures for collecting relevant data and analyzing data content are also described in this section. A compilation of results from the data analysis is shown in the subsequent section.

6.1 Methodology

The methods for collecting and analyzing relevant data for the empirical study are described in this section. The empirical study had an ethnographical approach using qualitative observation methods.

6.1.1 Settings and Participants

Three ASIH units in Stockholm County were selected for the observational study. The units will be referred to as Unit A, Unit B and Unit C in the remainder of this thesis due to confidentiality. The three units were selected due to their distinctive settings and internal routines.

Participants of this study consisted of the multi-professional teams, the unit managers and other staff who were working at the three observed ASIH-units at the time of the observation study. The interviews were mainly conducted with office-based nurses, field nurses, unit managers and representatives of Stockholm County Council.

6.1.2 Method

Research data was retrieved from a field study in a larger project, a literature review and from Swedish government agencies. The previous field study on ASIH was conducted by a research group at KTH during the years 2012 to 2014. Data used in the present study was collected using observational methods (Arman, et al., 2009) including general participant observations in everyday clinical work, using a semi-structured protocol, field notes, audio recordings and photographs. Observations included formal morning meetings, handover situations, and during phone calls and chitchat throughout the day where team members prepared for home care encounters, shared information and updated their knowledge during the shift. Short interviews with key-players (including patients and family caregivers) were also performed to clarify and deepen the observations. All data were digitally recorded and transcribed verbatim. The transcripts were used for analyses in this thesis with focus on the working structure at ASIH followed by areas within the organization that are in particular need of organization. The description intends to provide a more complete basic understanding for how the ASIH works.
6.1.3 Analysis Method – FRAM

Scientific articles on FRAM-modelling browsed through the databases KTH Primo, ScienceDirect and Scopus were reviewed prior to developing the FRAM-model of this study. Two books written by Hollnagel; the inventor of the model, provided thorough descriptions of the purpose of FRAM and the necessary steps of application when creating a model (2011, 2012).

Areas of Application
The variability of normal everyday performance within ASIH-units, when viewing the units as socio-technical systems, are identified through the FRAM-model. The variability covers all types of possible outcomes, or consequences, of certain events which results in a broader understanding of the situation than strictly viewing the event in terms of cause and failure as is common by traditional means (Felici & Sujan, 2012; Hollnagel, 2012). Both successful and failing components are incorporated into an organization’s everyday performance according to FRAM. The everyday performance is thus arranged into FRAM-functions.

The FRAM-analysis can be used either retrospectively or prospectively (Hollnagel, 2012). In retrospective analyses, i.e. event analyses, FRAM aims to describe how a number of actual micro-events may have affected a main event in its whole nature. In prospective analyses, i.e. risk assessment, FRAM is used to estimate how potential risks may emerge in given circumstances. A retrospective FRAM-analysis is applied in this thesis.

Steps of Application
The FRAM-model was created in the following three steps (Hollnagel, 2012):

1. Identify and describe the relevant functions of the system examined.
2. Identify and describe the actual or the potential variability of the functions.
3. Identify how the variability may affect other functions and how its effects may spread through couplings to other functions.

Step one was an iterative process which was repeated for each observational data and interview used for analysis. When identifying a function, the purpose was to extract the ASIH work tasks that could be considered as cornerstones for each unit’s performance. Through this method, a set of functions could be identified. The functions and their aspects were assigned appropriate names according to instructions and specifications provided in the book on FRAM-analysis (Hollnagel, 2012).

The result of step one was thereafter gathered in a software program designed for creating models of FRAM-analyses, named the FRAM Model Visualizer (FMV) (see section FRAM Model Visualizer). The identified functions were shown to the thesis supervisor for feedback and discussion.

The process of step two involved carefully looking through the identified foreground and background functions one by one and determine the ways in which they may vary. Variability was identified with respect to the time and duration required by each function and the factors that could
influence the precision of each function’s performance. *Time* refers to the time of day the function is performed and *duration* refers to the length of time during which the function is performed. Factors that could influence the precision of a function are of organizational or technical nature. Step two is only applicable to foreground functions, as background functions are assumed to be constant due to their structural simplicity.

As described in section 4. *Theoretical Perspective*, background functions can be assumed as constant which means that such functions, unlike foreground functions, in themselves lack variability. However, it was found that the execution of background functions could be influenced in the time domain by surrounding factors. The execution of background functions could also depend on the applied technology, as technical difficulties could prevent these functions’ performances. Consequently, variability is specified for background functions as well as foreground functions.

Several factors were taken into consideration when assessing the impact of identified variability, e.g. the quality of work performance, the level of care continuity, the level of satisfaction of concerned parties and the accuracy of work tasks.

The significance of six specific functions was highlighted along with their impact on other functions through couplings, since they turned out to be highly influential and carried great significance for patient safety and continuity of care.

By analyzing each *output* of these six functions and reviewing the observational data, the potential and actual influence of these functions on other functions were identified. The findings are presented in section 7. *Results*.

**FRAM Model Visualizer**

FRAM Model Visualiser (FMV) is a software program which enables the user to create visual models of FRAM-functions (Hollnagel, 2015). Each FRAM-function is represented by a hexagonal figure, as directed by the book on FRAM-concepts (Hollnagel, 2012). *Figure 2* illustrates the graphical user interface of FMV. To the left hand side is the *function pane*, where the specific data of each function is entered. To the right hand side is the *visualizer pane*; it is in this window that the graphical structures of the desired FRAM-model will eventually appear. When two aspects – *not* the two corresponding aspects – of two functions are identical, they will be coupled automatically by the program.
A finished foreground function is illustrated by Figure 3. The red color surrounding the aspects of the function indicate that the aspects are yet uncoupled to other functions; they are thus indications of an unfinished foreground function. As more functions are successively added to the sheet in the visualizer pane, the redness should successively decrease in number. No redness should be present in the finished sheet of functions.
7. Results

This section presents the results from the empirical study. The findings from transcribed interviews and observational data are represented by a FRAM-model. The model visualizes the main work tasks at ASIH Stockholm and their correlation to each other, which provides an understanding of the complexity in providing a coordinated and safe care at home, and enables the detection of potential gaps in care coordination.

7.1 Overview of Functions

The resulting FRAM-model (see Figure 4) presents 19 functions, where each function represents a work task at an ASIH-unit in Stockholm. Each function may influence the performance of other functions through the coupling of one or more of their aspects. All functions in the model are interconnected in this manner which means that the performance of a few functions could ultimately impact the performance of the entire ASIH-unit.

As the FRAM-model in Figure 4 may be difficult to read off and interpret for the reader, a table of all functions can be found in the next subsection (see Table 1). Descriptions of these functions and their contributions to the performance of an ASIH-unit can be found in Appendix D.

7.2 Function Variability

The functions discovered in the FRAM-analysis were thereafter analyzed in order to specify their properties of variation. Most functions listed in Table 1 carry certain inherent variability; i.e. each varying function has the possibility to differ from its correct purpose/intentions due to the following:

- Time and duration of the function
- Precision of the function

Furthermore, each varying function is likely to influence a set of other functions in a distinctive way which could provoke unwanted chain reactions. These types of variability are specified for the majority of FRAM-functions in Table 1. The function left out from Table 1 is assessed as not being a carrier of any inherent variability.
Figure 4. Model of FRAM-functions generated through FRAM Model Visualiser (function names in Table 1)
<table>
<thead>
<tr>
<th>Function name</th>
<th>Variability in work process</th>
<th>Variability in outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish healthcare information technology</td>
<td>Time to implement and integrate electronic systems.</td>
<td>Duration of work tasks using electronic systems.</td>
</tr>
<tr>
<td>Purchase office supplies and electronic equipment</td>
<td>Time to obtain office supplies and electronic equipment</td>
<td>Duration of work tasks using office supplies and electronic equipment</td>
</tr>
<tr>
<td>Employ, train and educate staff</td>
<td>Time to recruit personnel. Frequency and duration of internal education.</td>
<td>Quality of care and work performance. Degree of staff and patient/next-of-kin satisfaction.</td>
</tr>
<tr>
<td>Establish work routines</td>
<td>Time to implement and review routines.</td>
<td>Degree of staff's readiness for work and staff satisfaction. Level of standardized work performance.</td>
</tr>
<tr>
<td>Arrange work plan</td>
<td>Duration of work plan arrangement.</td>
<td>Actual time for care delivery and degree of staff satisfaction regarding work plans. Degree of patient satisfaction regarding continuity of care.</td>
</tr>
<tr>
<td>Order medication, equipment or material</td>
<td>Time of day when order is placed. Frequency and duration of order placements.</td>
<td>Quantity and accuracy of stored medication, equipment or material.</td>
</tr>
<tr>
<td>Store medication, equipment or material</td>
<td>Frequency of orders.</td>
<td>Availability of medication, equipment or material. Degree of patient/next-of-kin satisfaction.</td>
</tr>
<tr>
<td>Prepare medication, equipment or material</td>
<td>Time of day when preparation of medical supply is needed. Frequency and duration of preparation.</td>
<td>Quality of care. Degree of patient/next-of-kin satisfaction.</td>
</tr>
<tr>
<td>Receive referral</td>
<td>Time of day when referral is received. Frequency of received referrals.</td>
<td>Duration of patient admission.</td>
</tr>
<tr>
<td>Admit patient</td>
<td>Time of day when patient is admitted. Frequency of patient admission.</td>
<td>Accuracy of work plan arrangement. Quality of upcoming patient data management.</td>
</tr>
</tbody>
</table>

*Table 1. FRAM-functions and their associated variability*
<table>
<thead>
<tr>
<th>Task</th>
<th>Time of day</th>
<th>Outcome Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand over work</td>
<td>Time of day when shift changeover occurs. Duration of handing over work.</td>
<td>Accuracy of transferred patient data. Usability of system for documentation. Continuity of care. Accuracy of patient data documentation. Degree of staff’s readiness for work and staff satisfaction.</td>
</tr>
<tr>
<td>Receive alert notification</td>
<td>Time of day when alert is received. Frequency of receiving alerts.</td>
<td>Quality of alarm system. Availability of staff. Quality of care. Degree of patient/next-of-kin satisfaction.</td>
</tr>
<tr>
<td>Respond to call or message</td>
<td>Time of day when response is needed. Frequency and duration of response.</td>
<td>Situational context when response is needed. Accuracy of transferred information. Quality of care. Accuracy of patient data management as well as work plan arrangement.</td>
</tr>
<tr>
<td>Make phone call</td>
<td>Time of day when call is made. Frequency and duration of phone call.</td>
<td>Relevancy of phone call. Accuracy of transferred information. Quality and accuracy of patient data management and work plan arrangement.</td>
</tr>
</tbody>
</table>
7.3 Functions of Significance

Through reviewing the collected field data from ASIH Stockholm as well as the data from Table 1, it was found that six of the FRAM-functions hold significant values in affecting the overall performance of ASIH Stockholm. These functions will be thoroughly presented one by one in this section. Their current advantages and disadvantages will also be presented, along with more detailed descriptions of their variability and their relations to other functions.

7.3.1 Employ, Train and Educate Staff

This function is performed on the management level of each ASIH-unit and enables the performance of all other functions in the FRAM-model (see Figure 4).

**Employ Staff**

The basic requirements of the applicants involve a completed education on College or University level in order to ensure their qualifications for work. No special education is required of the applicants prior to application. Previous experience of home care or specialized home care is regarded as a qualifying advantage. The ability to work independently and a valid driver’s license are other advantages that are regarded as important in fieldwork.

The number of assistant nurses and unit coordinators may vary in the different units according to their needs. The role of the assistant nurses is to relieve the workload for nurses, which includes responding to office phone calls and visiting patients to deliver basic care.

Many of the units have expanded throughout the previous couple of years. The number of staff, mostly nurses, has increased in order to keep a proportional ratio to the increased number of admitted patients. The appropriate number of staff could be difficult to determine for the unit manager in charge of the unit’s employment. The ability to foresee the appropriate number of staff at each unit is an important quality of the unit managers.

Not many staff members of ASIH have resigned from their work duties due to high workload thus far. On the contrary, some of the new staff expressed their satisfaction of working at ASIH due to the encouraging and including environment. More experienced staff requested higher employment requirements or more extensive training for new staff, as their initial insecurities at work could be time-consuming. The suggested areas for training include work routines, work safety and patient safety.

**Education and training**

The staff needs both theoretical and practical training to perform their work tasks efficiently at their ASIH-unit. Their competencies need to be maintained and up-to-date. Training is therefore prioritized in the occasions when training coincides with other work tasks.
**Internal Education**

ASIH units provide internal education and activities to their staff on a continuous basis with the purpose of team-building and work proficiency. Newly employed staff receive training in their initial phase of employment by assisting more experienced staff. They may additionally participate in training courses within palliative care provided by the management of each unit. Some units use clinical programs where staff can be mentored by supervisors. Training sessions can also be provided by external healthcare organizations or companies. Such sessions are commonly instructional for presenting the usage of a certain medical product. The current level of training can seem insufficient in some circumstances. The nurses do not seem to share the same level of skills and competencies in all work tasks.

**Variability**

In the time domain, the performance of this function may vary due to the time of employment procedures and due to the frequency and duration of internal educations. The time of employment procedures may vary due to factors such as the amount of applicants at the time. The longer the time of employment procedures, the weaker the function performance. The frequency and duration of internal educations may vary due to work routines and work plan arrangements. The more frequently the education is given, and the shorter duration of each educational session, the stronger the function performance.

The performance of this function is furthermore influenced by the quality of employment procedures and the internal education. The better the quality, the more precise is the function performance. The patient safety can also be ensured by this to some extent.

This function’s variability in time and its precision can influence a set of other functions through different parameters. These parameters involve the quality of care and work performance, and the degree of staff and patient/next-of-kin satisfaction of received care. The output of this function is staff competence. Competence is the resource for almost all other foreground functions (see Table 1) and can therefore influence the overall performance at one unit and the unit’s quality of care.

### 7.3.2 Establish Work Routines

Each ASIH-unit in Stockholm County operates according to a set of external and internal work routines, which all staff at ASIH receive training in. The purpose of establishing work routines include to provide directions and guidance for staff to facilitate their daily work, to ensure that work procedures are performed according to unvarying instructions and to ensure an adequate level of work standard. The applied external and internal work routines are described in the following subsections.

**External Work Routines**

Much of the existing work routines for nurses at ASIH Stockholm are provided by the Swedish government; i.e. through their guidelines and recommendations. These guidelines and
recommendations may come in the form of decision support tools, instruction manuals or regulatory documents.

An example of a decision support tool commonly used by the nurses of ASIH-units is the online website portal Viss provided by the Stockholm County Council, where professional advices and recommendations on various medical conditions and treatments are collected (Stockholms läns landsting, 2015). Instruction manuals may be of use during the management of medications or medical appliances, as it is of importance that these are correctly prepared when they arrive at the patient (see section 7.3.6 Deliver Care). Many of these instruction manuals are collected on Viss. It is common that such instruction manuals are designed to target medical professionals across the entire country, and they are thus carefully designed to be concise and comprehensible which makes them generally appreciated among the staff. Instruction manuals can also be used for documentation procedures using the electronic patient journal system TakeCare (see section 7.3.4 Manage Patient Data). Regulatory documents specify the professional requirements of staff within palliative care and the associated duties of each profession in the multi-professional team. The unit manager has the responsibility to ensure that the staff can receive adequate education within these areas.

**Internal Work Routines**

Each ASIH-unit is responsible for establishing internal work routines in addition to the guidelines and recommendations that are valid for the entire ASIH establishment in Stockholm County.

Internal work routines specific for each ASIH-unit concern regular staff meetings, delegation of work duties and methods for managing patient data, scheduling patient visits and transporting field staff to patients. It is the responsibility of each unit’s operational manager to establish and oversee the implementation of these work routines.

In the three ASIH-units observed in this study, it was found that work routines can be rather difficult to implement in a structured manner. Although some of the work routines, such as scheduling weekly staff meetings, are easier to implement than others, the routine itself can still carry uncertainties that could impair its effect.

The analysis of transcribed data shows that the staff meetings present an opportunity for available staff at the unit to share their thoughts on patient cases and provide status reports which could create a brief overview of impending work tasks. The meetings also provide opportunities to ask questions regarding any unclear matter on the weekly agenda. It turned out that misunderstandings in communication could potentially result in improper treatments. Also, meeting agendas are not always followed. Meeting protocols are routinely kept and e-mailed to the staff concerned after the meeting.

Transportation of field staff to patient homes is another example. The staff have access to vehicles for such transportation. While on the road, it is difficult for staff to foresee the exact travel time required. Through experience they can acquire a better sense for estimating the approximate travel time required for certain travel routes. This knowledge allows them to estimate a time compensation that can be used when they are planning the day. If an unexpected incident such as
engine stop occurs on the road, it is solved by the field staff themselves. In urgent circumstances they may call an office-based nurse for assistance (see section 7.3.5 Respond to Call or Message).

It was also found that nurses are the ones responsible for maintaining work vehicles, which has raised some dissatisfaction among them. The nurses would rather use the maintenance time to provide care to patients instead.

Work routines surrounding transportation issues rely heavily on staff experience, which is also consistent with many of the other internal work routines. For example, it requires experience to foresee what medical supply to bring to patients and when to replenish the supply. Missing supplies on the field can be replenished by field staff nearby, staff sent by office-based nurse or by returning to office. All options are time consuming and could cause delays in patient visits.

Variability
In the time domain, the performance of this function may vary due to the time required to implement necessary work routines (see Table I). The longer the time of implementation takes, the weaker the function performance. The implementation process may also be active on a continuous basis, since new work routines can be introduced as the existing work routines are being reviewed and as the ASIH-unit develops.

The performance of this function is also influenced by the applicability of implemented work routines, i.e. how well each work routine serves its purpose in reality. The higher the applicability of a work routine, the more precise it is in fulfilling its purpose.

The function’s variability in time and its precision will in turn give rise to a set of parameters that can influence other functions. These parameters involve the staff’s readiness for work, staff satisfaction and the level of standardized work performance. All other functions listed in Table I are influenced by the performance of this function.

### 7.3.3 Arrange Work Plan

It is necessary for all ASIH-units to use a functioning strategy for arranging the staff’s work plans. The main purpose of a properly arranged work plan is to provide a foundation for high performance work. A standard work day for a nurse working in one unit is described in Table 2, some deviations may occur.

<table>
<thead>
<tr>
<th>Time of day</th>
<th>Work task</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>07.00</td>
<td>• Receive status report</td>
<td>The first tasks of any work day are listed in the left hand column. The status report is provided orally from night shift staff and covers care provided during the previous night shift. The personal to-do-list is accessed through TakeCare.</td>
</tr>
<tr>
<td></td>
<td>• Go through personal to-do-list</td>
<td></td>
</tr>
<tr>
<td>07.45</td>
<td>• Make plans and prepare for work day</td>
<td>The entire multi-professional team is gathered to plan the remainder of the work day. A quick overview of admitted patients and their conditions is usually available on a whiteboard. Travel distances,</td>
</tr>
</tbody>
</table>
type of care required and the patient’s preferences are factors considered during the planning process.

After the planning session, each nurse going on the field continues by preparing medications to be delivered during the day. The necessary preparations involve planning, sorting and double checking. Finally, the nurses need to prepare which medical supply to bring in their personal backpack.

| 08.00-09.00 | • Starting fieldwork  
| • Starting office work | The nurses go on field by driving to first patient visit.

One or two nurses are chosen to stay in unit office during weekday day shifts to perform administrative tasks, including responding to calls or messages on the office telephone and the emergency cell phone (see section 7.3.5 Respond to Call or Message).

The office-based nurses are also obliged to attend to visiting patients, who most commonly are visiting the unit office to provide blood samples.

| 12.00 | • Lunch at office  
| • File status report and documentations | The field nurses return to unit office during lunchtime, as it marks the end of the day shift. Due to various time-consuming events, their lunchtime may be delayed for up to two hours.

Lunchtime is also used to file status reports on patients visited in the previous work shift and to perform other necessary documentations.

| 13.30 | • Starting fieldwork  
| • Starting office work | The evening shift starts and the field nurses make necessary preparations for upcoming patient visits.

The office-based nurses resume their administrative work.

| 21.30 | • Provide status report  
| • File status report and documentation  
| • Round up for the day | Night shift workers receive status reports orally from field nurses. Field nurses should return to the unit office in reasonable time to provide status reports and manage documentations before the end of shift.

Sudden shortages of staff can be resolved by assigning office-based nurses to the field. Staff shortages can also be resolved by transferring staff from evening shift to day shift, if it is known that the evening shift is more heavily staffed than the day shift, and vice versa.

The fieldwork is in some of the units arranged according to a rotating schedule. In such scheduling arrangements, the staff are divided into several smaller teams. Each team is responsible for a certain part of the geographical area covered by the unit. The geographical areas of responsibility are thereafter switched after a predetermined time period. The rotating schedule is generally appreciated by the staff. According to sources at one unit, some patients seem to hold an indifferent attitude towards the rotating schedules while others might find it difficult that the nurse that they have grown used to is not available anymore. It turned out that these patients usually accept the situation after they receive explanation from staff.

A number of factors may cause delays in a work day. The occurrence of one such delay may cause a chain reaction of delays throughout the remainder of the day. Such delays represent the main
source of disturbances in daily arranged schedules. The factors observed in this study are presented in Table 3.

Table 3. Factors that may cause delays in a work day

<table>
<thead>
<tr>
<th>Cause of delays</th>
<th>Situational context</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative tasks</td>
<td>Time for managing patient data could require longer time than expected due to complicated procedures and technical difficulties (see section 7.3.4 Manage Patient Data).</td>
</tr>
<tr>
<td>Emergency events</td>
<td>It is difficult to estimate or foresee the time required by an emergency event on the field. As emergency events are prioritized before scheduled events, the occurrence of an emergency event would most likely cause delays in schedule. Delays occur frequently in connection with alert notifications.</td>
</tr>
<tr>
<td>Inaccurate time plan</td>
<td>The ability to estimate the required time for different types of patient visits in an accurate manner can be difficult without proper training or experience (see section 7.3.1 Employ, Train and Educate Staff). Insufficient time reserved for a visit results in delays while excessive time reserved for a visit instead results in time inefficiency. Other scheduling errors that may cause delays include excessive patient visits and duplicated patient visits.</td>
</tr>
<tr>
<td>Transportation</td>
<td>Traffic jam is a frequent cause of delay during field staff’s transportation to patients. Difficult traffic routes, unexpected roadworks and construction sites are other common causes of delay during transportation.</td>
</tr>
<tr>
<td>Language barrier</td>
<td>Some geographical areas inhabit a larger number of foreign-born citizens. Field staff visiting these areas might sometimes face communication problems with patients, as it is not possible to summon a professional interpreter each time such problems occur. It is difficult to estimate and foresee the time required for such visits, which is why they may cause delays.</td>
</tr>
<tr>
<td>Patient demand</td>
<td>Occasionally there are patients who demand additional care from the field staff. As such additional care may often be unplanned by field staff, they often form the cause of delays.</td>
</tr>
<tr>
<td>Miscellaneous unforeseen events</td>
<td>Unforeseen events includes many different kinds of events. One example of such event occurred in connection to a patient visit; the field nurse visiting was unable to enter the patient home. This was due to a misunderstanding by the staff of Assisted living services who had visited the patient earlier in the day and closed the front door despite being instructed not to, since the door had an automatic lock system.</td>
</tr>
</tbody>
</table>

Variability
The performance of this function may vary in the time domain due to the time required to arrange the individual work plans (see Table 1). The shorter the time of arrangement takes, the longer is the time reserved for performing work tasks which enhances this function’s efficiency and thereby its performance.

The precision of this function is influenced by how well organized the planning procedure is, the level of staff experience in caregiving and the staff’s ability to estimate the time required for different types of patient visits. Due to the inevitable nature of unexpected events, the precision of this function is highly susceptible to disturbances (see Table 3).

The outcome of this function directly influences the time aspect of the Deliver care function, as it provides the temporal framework for care delivery. This function also influences the time aspect of function Prepare medication, equipment or material by determining the time of day the
preparations are to be performed. The time dedicated for these preparations could in turn affect the quality of medical supplies that eventually reach patients.

Furthermore, the arrangement of work plans affect the degree of staff satisfaction due to the fact that the more precise the arrangement, the less work delays occur. Well-structured work plans can in addition influence the degree of patient satisfaction.

7.3.4 Manage Patient Data

Administrative work tasks concerning patient data management represent a significant portion of the nurses’ daily work at ASIH Stockholm. The administrative work is performed according to established work routines (see section 7.3.2 Establish Work Routines). The work routines concerning administrative tasks have changed over the past two years in all units of ASIH Stockholm due to a mandatory upgrade of working method. The former approach of keeping patient journals and other documentations in paper format was successively transitioned into its electronic counterparts. The purpose of transition was to facilitate the administrative work and to streamline the organizing of patient data.

Patient data management can be performed throughout the entire work day for an office-based nurse, while a field nurse needs to reserve time for it; either during shift changeovers or when there is time (see Table 2).

Electronic Information System

The main part of administrative tasks are performed in the electronic patient journal system TakeCare, which can be integrated with many other electronic functions applicable to home care work; e.g. application for ordering medications and tools for care planning. TakeCare is applied in hospitals across entire Stockholm County and the system allows all its users to access certain shared patient data, which clarifies patients’ care plans for all involved parties and reduces the possibility of discontinuous or duplicated treatments. TakeCare furthermore enables communication between all of the involved parties although they might be located at different healthcare facilities.

Some features of TakeCare have nevertheless caused dissatisfaction among staff. The steps of managing the patient journal system are reportedly complicated and therefore time-consuming and difficult to comprehend. Some functions are considered to be not sufficiently user friendly. A similar difficulty is encountered when the staff do not use a unified language when managing patient data in TakeCare. There is an overall perception at the ASIH-units observed that TakeCare is not sufficiently simplified and its user interface is not adequately adapted to its target users.

The aforementioned factors tend to discourage staff from using TakeCare. This reluctance could result in the fact that certain information is not registered in the system, which eventually could complicate work procedures for the staff and increase patients’ level of dissatisfaction.

The main work tasks for nurses that require patient data management are often entirely or partially performed through TakeCare. These work tasks include admitting patients, referring patients, transferring patients, discharging patients and incident reporting.
Variability
The factors that may influence this function in the time domain and the precision domain include the functions *employ, train and educate staff, establish work routines* and *establish healthcare information technology*. Any of these influencing functions is capable of reducing the efficiency of this function by not being properly designed and organized. This function is therefore controlled by these three influencing functions. The outcome of this function influences the quality of care through the accuracy of documented patient data.

This function furthermore provides data that can be used when arranging work plans, delivering care or preparing and ordering medications to patients. This function could be activated through patient data acquired from delivering care and responding to calls or messages.

7.3.5 Respond to Call or Message

One or two office-based nurses are responsible for responding to calls or messages at the unit. They are chosen on a daily basis and normally work from Monday through Friday in daytime. They can be assigned to fieldwork during temporary staff shortages. In times when office-based nurses are unavailable, it is common that the unit manager and other staff at the office would in those cases take over the duty of responding to phone calls.

Common Phone Call Purposes

The office-based nurses respond to phone calls on office phones and emergency phones. The received phone calls at the unit can come from patients or next-of-kin, field staff or healthcare staff from external healthcare facilities. The emergency phone is reserved for receiving patient alerts. In times when office-based nurses are unavailable, the emergency phones are distributed among the field staff. Each field staff additionally carry a cell phone to communicate with field staff nearby, office-based nurses or patients and next-of-kin.

When patients and next-of-kin call an ASIH-unit, the purpose is commonly to ask for information or instructions regarding their treatments and medications or to inform ASIH of personal requests, care details, possible deviations in schedule or emergency situations.

When field staff call a unit, the purpose is commonly to ask for assistance or to inform of patient status and traffic/vehicle-related issues. Field staff can receive care details, patient information, requests for assistance and requests for re-scheduling through calls from the unit. Field staff can also receive calls from other field staff nearby who need assistance.

Difficulties for Office-Based Nurses

Office-based nurses have additional work tasks to perform aside from responding to phone calls or messages. These work tasks include basic treatments for patients in the unit’s care room among others, and may distract the nurses from responding to phone calls. Furthermore, the duration of phone conversations may vary from very short (1-2 min.) to relatively long (over 10 min.). A long
phone conversation can be caused by difficulties in retrieving patient data or language barriers when communicating with patient and next-of-kin among other factors and can obstruct the nurse from performing efficiently. Another issue is that field staff are not always available to answer phone calls during patient visits. The effort of trying to reach them can therefore be time-consuming and cause delays in delivering valuable information. This issue affects all potential callers, including office-based nurses and nearby field staff.

**Variability**
In the time domain, the performance of this function may vary due to the time of day when response is needed and also due to the frequency and duration of responses. The function performance is believed to strengthen by the following combinations:

- High frequency and short duration
- Low frequency and short duration
- Low frequency and long duration

The function performance is believed to be weakened by high frequency and long duration. Situational contexts of phone calls and the quality of communication may furthermore influence the precision of the function.

This function’s variability in time and its precision is partially influenced by the functions establish healthcare information technology; purchase office supplies and electronic material; employ, train and educate staff; establish work routines and arrange work plans. This function will in turn influence other functions through a set of parameters. The parameters mainly concern quality of care and accuracy of patient data management. Other functions activated by this function include arrange work plan; manage patient data; order medication, equipment or material; refer patient; discharge patient; manage patient data; make phone calls and deliver care.

### 7.3.6 Deliver Care

Staff of ASIH interacts closely with the patient, including providing care instructions, deliver medications, installing medical equipment or taking samples. The function covers two parts; internal and external care delivery. Internal care delivery refers to the occasions when patients come to visit ASIH. These occasions mostly concern providing blood samples. The patients are assisted by office-based nurses who simultaneously are in charge of responding to phone calls and assisting field staff through administrative tasks. External care refers to the occasions when field staff visit patients at their homes. The visits can be of planned or unplanned nature. When field staff travel to patients and perform planned visits, they use a personal “to-do-list” in order to remind themselves of their duties. It turned out that incorrect or incomplete patient information in patient journal or the “to-do-list” can lead to care issues. According to the transcribed data, most of the problems within care delivery may appear when staff visits patients’ homes.

Medication, equipment or material that are required when visiting patients need to be prepared before the visits. Office-based nurses need to portion patients’ medication in pill organizers. During
this process, there is a risk for some distractions which may lead to mistakes. Examples of such distractions include sudden patient visits to ASIH or phone calls. Fortunately, the services of multi-dose drug dispensing have managed to reduce workload for office-based nurses. Nevertheless, staff of ASIH need to be careful when they distribute pill organizers or multi-dose drug dispensers in order to ensure that patients receive correct medications. In some cases, responsible nurses can choose to portion medication and organize pills for patients manually. These work tasks are considered time consuming but necessary, as they promote patient safety.

Language barrier frequently occur in connection to patient visits. At times, field staff and the patients need to communicate with body languages with each other. This is a source of misunderstanding regarding medications and other care related matters, which could lead to severe consequences. Another barrier is regarding the staff’s communication with the staff of assisted living services. According to transcribed data, the extent and quality of communication between external staff and the staff of ASIH may carry much variation. One reason is believed to be due to the fact that the large number of companies that provide assisted living services may vary in quality. Communications with staff from assisted living services frequently occur through notes in binders or notebooks at patients’ homes. The communication concerns medication dosages and delivered care. It is also common that patients themselves serve as the channel of communication between staff of ASIH and staff of assisted living services. These methods of communications carry much variability that may intrude on patient safety.

Variability

In the time domain, the performance of this function may vary due to the time of day when care is delivered, the duration of each care delivery and the frequency of care delivery. The optimal time for care delivery is during daytime and evenings, as the staff is not at maximum capacity during night shifts. The duration of care delivery should be as close to the scheduled arrangement as possible in order to minimize delays in patient visits. It turned out to be crucial that nurses can work in a pace that does not endanger patient safety. A low frequency of care delivery could result in neglected patient visits which could lead to unwanted consequences. A high frequency of care delivery is desired, but it is important that it does not occur by any coercive means.

Factors that may influence the precision of this function include the accuracy of patient data, the accuracy of arranged work plan, the quality of medical supplies and the quality of nurses’ work performance.

This function’s performance is influenced by several other functions through different inputs. Two of these functions are interdependent on this function, namely arrange work plan and manage patient data. Furthermore, the variability of this function could affect the performance of other functions, e.g. order medication, equipment or material and refer patient.
8. Discussion
The findings from the results of the empirical study and the methods for conducting this thesis are discussed in this section.

8.1 Results

The functions visualized in the FRAM-model are connected through intricate couplings that enable the propagation of unwanted variability amongst them (Hollnagel, 2012). The main results from the empirical study show that the unwanted variability can likely be decreased through management and coordination of some fundamental functions which have the ability to influence a large number of other functions.

Three out of the six significant functions that were identified through the FRAM-analysis are believed to possess this quality, namely employ, train and educate staff; establish work routines and arrange work plan. The potential benefits of managing and coordinating these functions would be the following:

- Provide a comprehensive internal education that can enhance staff’s skillfulness and competencies in their work
- Provide clear and applicable work routines that can facilitate work task procedures and increase efficiency at work
- Provide properly arranged work plans that can decrease delays and disturbances that may obstruct staff’s work performance

The management and coordination of these functions would furthermore increase the level of continuity of care (Dale & Hvalvik, 2013; Woodward, et al., 2004).

8.1.1 Primary Findings

The need to provide more extensive training for newly employed staff was observed in the transcribed data, as experienced nurses voiced their dissatisfaction over the limited skillfulness and inefficiency of newly employed nurses. The differences in skillfulness were particularly evident in scenarios involving newly employed nurses overtaking patient cases from other nurses. Research shows that such scenarios can be resolved through training and education (Woodward, et al., 2004). It is therefore beneficial for ASIH if the initial training programs for newly employed staff include clinical training for common procedures in home care to ensure a consistent level of competency among the newly employed staff.

Aside from the clinical training, the staff could also benefit from learning how to establish healthy relationships with patients. Such knowledge could be reassuring for newly employed staff and reinforce their confidence already during their first patient visit. As stated in the literature review, healthy patient relationships increase patients’ willingness to comply with their care plans (Stajduhar, et al., 2011) and enhances continuity of care (Gjevjon, et al., 2014; Samia, et al., 2012).
The newly employed staff would furthermore need a more extensively coordinated introduction to the work routines of the unit and instructions for how these are implemented in different contexts (Coleman, et al., 2007; Dale & Hvalvik, 2013). Proper knowledge of how to apply routines in work procedures can decrease the level of self-doubt and insecurity that newly employed staff may experience in a new working environment. The reinforced confidence can facilitate and increase efficiency in their work performance. Examples of work tasks heavily dependent on work routines include data management in TakeCare, patient admission/referral/transferal/discharge procedures and procedures surrounding patient visits.

Data management in TakeCare is commonly experienced as time-consuming and complicated by the staff. Training sessions and instruction manuals for newly employed staff could improve their ability to manage patient data (Dale & Hvalvik, 2013; Ruggiano, et al., 2013; Sockolow, et al., 2014). Issues with TakeCare that can be resolved by each unit should be taken into consideration by the units. According to the transcribed data, such issues include the use of inconsistent language among staff in TakeCare. A suggestion that may help avoiding misunderstandings that can impede patient safety is that each unit could provide a list of accepted abbreviations in TakeCare to establish a unified language among users.

The procedures for patient admission/referral/transferal/discharge seem consistent and well-functioning according to the transcribed data. However, procedures concerning patient visits seemed to contain more variability that need to be overseen. There are currently no instructions for nurses on what work-related items to bring to patient visits. Newly employed nurses need to learn this from observing experienced nurses. Although this method of learning may have been successful thus far, it lacks the benefits of a structured training (Berland, et al., 2012; Shick & Balinsky, 2005). It contains variables that have the potential to impede patient safety and continuity of care. Such variables include the knowledge of the experienced nurses; if they themselves never received any instructions on what items to bring, there is no assuring measure to confirm that they would pass on sufficient knowledge. Instructions could ensure that all newly employed nurses receive the same information and can begin their work on same grounds.

It is furthermore difficult to estimate an accurate transportation time in connection with patient visits. Traffic jam and unforeseen building sites can delay transportation and affect the staff’s work performance through increased level of stressfulness (Holm & Angelsen, 2014). As the reserved time for patient visits are shortened, the staff would need to perform work tasks faster than intended in their work plans. This could disturb staff’s decision-making process (Stajduhar, et al., 2011) and increase the risk for care discontinuity. Routines for how to properly arrange a work plan can be useful in this context, as routines can provide guidance on the reasonable number of patient visits for a work shift and how to reserve time-margins for work tasks in different circumstances. A study shows that a restricted amount of patient visits during a working day can decrease the unwanted effects of high workload (Samia, et al., 2012).

The work plan is important for bringing structure and coordination to a staff’s work day (Parry, et al., 2008). The rotating schedule implemented in some ASIH-units additionally offers a regular change of scenery for the staff. The staff are then able to take turns on travelling the longest distances and being responsible for particularly heavy patient cases, which according to the
transcribed data increases staff satisfaction. The staff also obtain a better overview of colleagues working nearby, which can be useful when seeking quick assistance.

However, an accurate work plan can be difficult to obtain despite the efforts of improving staff training and establishing new work routines. The difficulties arise from the unpredictable nature of certain events, such as language barriers (Brämberg & Sandman, 2012; de Graaff & Francke, 2003) or patient demands (Carello & Lanzarone, 2014; Samia, et al., 2012) and emergency events according to transcribed data. Patient demands and emergency visits do not occur according to a pattern, but language barriers can be detected and registered in TakeCare. Nevertheless, language barriers cannot be easily resolved as it is not feasible to hire an in-person interpreter during all home visits with some kind of language barrier, due to the large quantity of such home visits. One possible measure is to request the participation of a next-of-kin, who knows the language in question, prior to a patient visit. However, this measure has its limits, as studies have shown that next-of-kin cannot always fulfil the requirements of remaining impartial and neutral in their interpretations (Brämberg & Sandman, 2012; Fatahi, et al., 2005; Rosenberg, et al., 2007). Also, they often lack a sufficient knowledge of medical terms, which could complicate the interpretations.

Another possible measure is to offer language courses as part of internal training programs for newly employed staff who already have knowledge of foreign languages. The purpose of the language courses would be to understand how to use a foreign language in a home care context. The staff with special language skills can then apply these skills on the patients concerned and resolve the language barrier issue to a certain extent. A third possible measure is to use healthcare information technology to translate the communication between patient and caregiver. No adequate technology for this purpose is available to the authors’ knowledge at the time of writing. It is however believed that such technology can be developed in the future.

As emphasized in the literature review, continuity of care can be attained through careful planning and coordination, which involves setting clear goals and monitor care plan developments on a continuous basis (Carello & Lanzarone, 2014; Woodward, et al., 2004). The planning and coordination can in turn minimize the unwanted variability found in the functions of significance; through routines for training staff, fieldwork and how to arrange work plans. These adjustments, which mainly concern the management level of ASIH, are believed to entail an overall improvement in the quality of care for ASIH-units.

8.1.2 Secondary Findings

The findings addressed in the previous section are considered the most significant for the performance of ASIH. A few additional findings that address the difficulties faced by ASIH are presented below.

Patient visits is a complex work task that carry many uncertainties (Carello & Lanzarone, 2014; De Vliegher, et al., 2010). Aside from the uncertainties described in the previous section, there are uncertainties that can be found in connection to medication management. If certain medication is
ordered, prepared and delivered in a correct manner, it increases the continuity of care for patients (Dale & Hvalvik, 2013; Holm & Angelsen, 2014). If the medication management is performed in an incorrect manner, i.e. if the wrong medication dosage is ordered, if an insufficient amount of medication is brought to the patient or if the wrong instructions for administration are provided, the continuity of care can be disrupted. The quality of these function performances can presumably be enhanced by training and educating the staff of ASIH.

There are however another set of uncertainties in connection to medication management that concerns the patient’s or next-of-kin’s compliance to care (Sauvé, et al., 2009; MacDonald, et al., 2013). If correct and continuous medicinal care has been provided to the patient, it is important that the patient and next-of-kin follow the provided instructions for administering medications. If errors in medication occur independently from the care provided to the patient, it becomes difficult for ASIH to prevent such errors. A possible solution is the technology of tele-monitoring (Fraile, et al., 2014; Ruggiano, et al., 2013), as patients can show the office-based staff how they administer medications through a monitoring screen in real time.

Special circumstances observed in the transcribed data may have contributed to an additional dose of variability to ASIH’s performance than the usual case. Such circumstances include a significant increase of patient admissions throughout ASIH’s establishment in Stockholm in 2013 to present time. This has entailed larger workloads than previously encountered in the units, which may have affected the establishment of internal work routines and the arrangement of work plans (Benzarti, et al., 2013). These effects of increased workload are expected to continue if no active measures are taken by the unit management (Samia, et al., 2012; Stajduhar, et al., 2011).

It was found that the employment of additional staff could be a source for relieving workload for the existing staff. The nurses of one observed unit believed that the employment of an assistant nurse would relieve their workload significantly, as the assistant nurse could perform some of the routine work tasks with less training than a regular nurse (Nickel, et al., 2012). A janitor who could be responsible for matters such as vehicle maintenance, as the care-providing staff state that vehicle maintenance is out of their working scope and may obstruct more relevant work tasks.

Data further indicate that the working situation for office-based nurses who need to perform administrative tasks (Samia, et al., 2012; Stajduhar, et al., 2011) as well as attend to visiting patients in the unit’s treatment room needs to be overseen. It would be beneficial to ensure that two office-based nurses can be present all weekdays. If one of the nurses is in charge of the administrative tasks and the other nurse attends to patients in the treatment room, a lesser amount of important phone calls would be missed out and the patient does not risk being neglected. Most importantly, the office-based nurses are exposed to fewer distractions which in turn could enhance their work performances.
8.1.3 Findings Excluded from Results

Some relevant findings neither addressed by the literature review nor the FRAM-analysis have been discovered retrospectively. These findings are presented in this section in order to complement this study.

Studies have shown that an adequate ability to reflect over events can in fact lead to best practice for nurses (Berland, et al., 2012; Jasper, 2003). When nurses take time to reflect over certain situations, they can visualize all alternatives at their hands and predict the possible outcomes and consequences based on previous experience. The habit of reflecting can contribute to the understanding of moral responsibility and the development of an inner compass (Berland, et al., 2012; Lindh, et al., 2007). The performance of ASIH could therefore benefit from introducing training in self-reflection to their staff.

Another study examined the correlation between home care nurses’ decisions and contextual influences (Stajduhar, et al., 2011). It was found that the home care nurses’ personal characteristics may influence the decision they make; e.g. their ability to identify cues and to apply previous knowledge or cognitive strategies to certain situations. The nurses furthermore described how their decision-making process are based on different factors of considerations, which includes the assessment of patient needs and capacities, their relationship with the patient, their workload around that time and their personal experiences.

It was found shows that home care patients may perceive care differently from staff (Woodward, et al., 2004). Most patients seem to value either consistent timing in care, or trusting patient-to-staff relationships or consistent skills and knowledge over other attributes included in care management. The patients’ view on continuity is thus believed to be strongly influenced by their own direct experience of care. This finding is consistent with information from the transcribed data.

The nurses’ working methods may be influenced by each home care units’ organizational culture (Samia, et al., 2012). Various norms and unofficial expectations at each unit could therefore influence home care nurses’ decision-making processes. If a home care unit harbors an indifferent attitude towards certain guidelines and decision-making tools, the frequency for using the guidelines and decision-making tools among its staff would most likely be fairly low. The home care unit’s indifference could thus decrease the efficiency of the unit by not keeping up to date with the available tools. The organizational culture is therefore of importance to the home care unit’s performance.

A study in the US shows that organizational support together with visible and responsive leadership are key factors to well-managed home care (Samia, et al., 2012). These factors influence the quality of care and patient outcomes. The nurses’ perception of organizational support is partly based on the type of supervision and the amount of supervision they receive from the management. They prefer a manager who is readily accessible in person or through phone calls and who has sufficient knowledge in regulations as well as nursing practice. The ways of communication need to be carefully designed since home care nurses are often engaged in patient visits and are not available for appointed meetings at their office. The ability to voice an opinion to a responsive leader is highly valued by the nurses.
Routine quality assessments can be used to survey the level of continuity of care in home care establishments (Gjevjon, et al., 2014). The unit managers of ASIH could introduce such routine quality assessments to their units to observe the level of continuity of care over time. These assessments are believed to provide an indication of areas of improvement. Such routine assessments can additionally be used for surveying the level of job satisfaction among the staff, which is known to have an influence over continuity of care (Ellenbecker & Cushman, 2012). The level of job satisfaction can be measured through the staff’s personal opinions on matters such as workload, peer relationships and autonomy.

### 8.1.4 Future Research

The empirical study performed in this thesis has the intention to create a platform for future research on care coordination by nurses within ASIH in Stockholm County. The functions brought forward by the FRAM-analysis could individually or in groups serve as topics for deeper analysis. The function variabilities can then be studied in greater detail, which is believed to increase the likelihood of finding suitable measures that can be applied in home care settings.

It would also be of interest to research care coordination performed by other professions of the multi-professional team at ASIH in Stockholm County. In this way, the overview of care coordination at ASIH would become more complete and the close interactions between the professions could be better understood.

When discussing the future of home care, the healthcare information technology (HIT) inevitably emerges as a highly relevant source of suitable measures. There are several arguments for investing in HIT in home care. Well-developed HIT enables quick and effortless methods of communication between the providers that could save working hours for the personnel as well as increase their efficiency at work (Institute of Medicine, 2012; Lundberg, 2007; Lyngstad, et al., 2014; Ruggiano, et al., 2013).

Studies have shown that compromised communications between different healthcare providers responsible for the same patient could result in duplication or omission of care tasks (Aldred, et al., 2005; Corsello & Tinkelman, 2008; Hansson, et al., 2008; MacDonald, et al., 2013), which is consistent with information retrieved from the transcribed data. Studies have shown that the frequency of such communications can be improved through electronic messaging (Lyngstad, et al., 2014). Another benefit that electronic messaging entails is the fact that it documents and stores all previous communication, which can be accessed by healthcare staff for later use. However, the study also shows that electronic methods of communication are better suited as a supplement to rather than a replacement of non-electronic methods. This is believed to be due to the difficulty of ceasing already established communication methods and that it often is easier to add working methods than to replace them (Tsang & Zahra, 2008), which is also supported by the transcribed data. The high-pace working environment is believed to complicate the staff’s learning process of new technology due to stress-related factors.

Many new possibilities of increasing care quality is presented by tele-healthcare. According to studies, elderly tend to hold a positive attitude towards such technology (Lundberg, 2007;
They regard them as tools for promoting their physical independency. At present time, such potential tools may utilize the technology of video surveillance, sensors, monitoring systems, fall detectors and bed alarms (Lundberg, 2007). Due to safety restrictions, telemedical applications are not used in emergency situations as of today (Duursma, et al., 2011), although such applications have the potential of becoming great assets to emergency care in the future.

8.2 Methodology

The chosen methods of performing the literature review and the empirical study are discussed in this section to envision the research process in this thesis and to highlight strengths and limitations of the work performed.

8.2.1 Literature Review

Many key words were used for browsing articles on home care in the chosen online databases (see section 5.1 Data Collection). The key words which generated relevant results were documented. A large quantity of articles was generated through the database browsing. However, the browsing results did not provide as many relevant articles as expected. Some of the articles seemed to have relevant abstracts but did not contain more relevant information after thorough reading. Many of these articles could therefore not be selected as references in this thesis. Meanwhile, some of the articles appeared repeatedly in several databases which made the search process seem somewhat repetitive. Most of the articles used in the literature review originate from other countries, and in some cases other continents as well. Due to the structural and regulatory differences between home care establishments in different countries, not all of the information found regarding home care in other countries can be applied to the operations of ASIH Stockholm. It is however presumed that there is information regarding home care that is common for all countries; i.e. some difficulties that all home care units and their staff need to face and some needs that are universal for all home care patients. It was therefore important to decide which information that was of interest and which was not prior to commencing the literature review. The information found in articles were considered thoroughly before being selected as relevant for this thesis. The selection criteria for relevancy narrowed the amount of relevant articles significantly. Fortunately, quite a few articles with rather high relevancy were found through browsing the databases. Nevertheless, the literature review was a rather time-consuming process mainly because the content of the thesis was successively altered throughout the search process. The focus of the thesis was initially aimed at medication management at ASIH. As research proceeded, it was evident that the research area of medication management would be too narrow for the scope of this thesis. The research area was thereafter expanded to cover all work tasks of ASIH.
8.2.2 Empirical Study

FRAM is a rather newly developed method for variability identification. This analysis method has been used, for example, for functional analyses of hospital discharge processes in Norway according to one article (Laugaland, et al., 2014). FRAM has also been used in other scientific areas such as risk assessment in sustainable construction (Villarinho Rosa, et al., 2015) or analyses for understanding characteristics of system resilience in connection to air traffic management (Rodrigues de Carvalho, 2011). It is important to emphasize that the application of FRAM was self-studied by the authors and was based on a book (Hollnagel, 2012) and a website (Hollnagel, 2015) on FRAM. The authors applied the steps which were explained in the book and the website by the founder of this analysis method. The focus was to identify functions that represent care-related work tasks of nurses at ASIH and to analyze the variability of these functions. The variability of functions were analyzed in order to deepen the understanding of work processes at ASIH.

Concerning the modelling of the coupled functions, the authors used FMV instead of drawing by hand for achieving better visual effects and improving the quality of the analyses. The supporting functions in this software program helped to remind the authors of incomplete couplings between functions (see section FRAM Model Visualizer).

Analyzing variability was the challenging part of the analyses. The analyses focused on variability in work processes with respect to time/duration and precision, and variability in the outcome of work processes. The authors chose to not apply the built-in function for identifying variability in FMV. The authors instead chose to describe the variability by words. One limitation of the analyses is that the authors did not identify if a process occurs too early/too late or its level of precision in connection to specific scenarios because that type of description would be too detailed for this thesis. The analyses of variability instead lay emphasis on general scenarios of work processes and aim to reveal variability during common daily work tasks. The authors attempted to cover as many concerns as possible within the scope of a master thesis.

Another limitation is that only the core work tasks presented in the transcribed data were analyzed in this thesis. The results of this thesis are therefore built on the premise that the data acquisition has captured all relevant information available. There might however be unexplored areas not included in the transcribed data provided that the authors have been unable to describe. Furthermore, the transcribed data was acquired from three ASIH-units in Stockholm. Data acquired from these units may not be representative for the entire ASIH Stockholm in all instances. It is therefore important to recognize information that can be applied to ASIH in general. The data was moreover acquired from 2012 to 2014, during which the observed units underwent organizational and technological transformations. Some of the issues that the staff faced during that period may therefore not be as relevant today.

Yet another factor that may influence the quality of results from the empirical study is linked to the FRAM-model. Although it is a well-grounded method for analyzing complex socio-technical systems, there can be circumstances that are difficult to illustrate by a FRAM-model. One example is that the FRAM-model in this thesis is entirely modelled from ASIH-nurses’ perspective. The
perspectives of patients, other professions within the multi-professional team and external healthcare providers that may also be important for the results of this thesis are thus not included in the model. However, some aspects of these additional perspectives are described in connection to the results.

The resulting FRAM-model is thus a highly general model which creates an overview of the most common work tasks for nurses in ASIH. The model can thus communicate a basic level understanding of nurses’ situation at ASIH. It is believed that parts of this model can be studied in greater detail in a future study to gain more precise knowledge on the underlying mechanisms of these parts.
9. Conclusions

The findings from this thesis emphasize the importance of sufficient management and coordination within ASIH in Stockholm County. Extended and well-planned training sessions for nurses within clinical work and routine work in the initial employment phase is likely to result in desired level of competence and skills among nurses. Such competence and skills involve building healthy patient relationships, understanding what to anticipate on patient visits, having knowledge of clinical treatments and how to manage provided technology. The training sessions would ensure that nurses begin their employment at ASIH on the same grounds. It was found that adequate competence and skills of nurses represent significant factors for attaining patient safety and decreasing disruptions in their work.

Well-developed routines could facilitate work task procedures for all professions at ASIH such as arranging work plans. Skillfully arranged work plans could ease the effects of heavy workload and minimize delays in connection to patient visits. However, work plans always risk being disrupted by unforeseen events such as language barriers, patient demands or emergency events. Another area that could improve its standard from routine-work is medication management. Medication management is an important component in continuity of care, as any disruption in the managing procedure could result in unwanted consequences that could potentially endanger patient safety. Medications thus require meticulous management which could benefit from clear routines.

Clear methods of communication between first line manager and multi-professional teams, and among nurses, are important for efficient work and minimization of broken patient appointments. Furthermore, it is important that no information discontinuity occurs between nurses and patients. This is believed to be facilitated through well-developed routines and appropriate technology. The technology applied today is commonly considered as time-consuming and not sufficiently user-friendly.

Although it was believed that staff discontinuity would be a significant factor for disrupting continuity of care, the patients of ASIH in Stockholm County seem to have a different perspective on continuity of care. According to them, continuity is attained through consistent timing in care, trusting relationships to caregivers and adequate skills and competencies. These preferences could potentially facilitate care planning for the ASIH-units, as it is believed that a regular change of scenery could benefit the nurses’ personal well-being.

Many possibilities for increasing quality of care in ASIH in the future seem to be related to technological innovations. Through time, the technological progress might present opportunities to utilize technologies such as video surveillance, sensors, monitoring systems, detectors and alarms that could assist the nurses and the other caregivers in their work for attaining continuity of care and patient safety at ASIH.
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**List of Illustrations**

Figure 1. Hollnagel, E., Hounsgaard, J. & Colligan, L., 2014. [Digital illustration]
Available at: www.centerforkvalitet.dk/framhandbook  [Accessed 02 07 2015]
Appendix
Appendix

Appendix A. Operational Borders for ASIH Stockholm................................................................. ii
Appendix B. Availability of Hospital Beds in 35 European Countries......................................... iv
Appendix C. Search Data for Literature Review.............................................................................. vi
Appendix D. FRAM-Functions: Descriptions and Contributions...................................................... viii
References to Appendix .................................................................................................................... xiv
Appendix A. Operational Borders for ASIH Stockholm

Figure 1. Operational borders for 8 geographical regions of ASIH Stockholm (Hälso- och sjukvårdsförvaltningen, 2015)
Figure 2. Hospital beds per 1000 population in 2010 (left) and changes from 2000 to 2010 (right) (OECD, 2012)
## Appendix C. Search Data for Literature Review

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Appendix D. FRAM-Functions: Descriptions and Contributions

Table 2. Descriptions of the 18 most significant FRAM-functions and their contributions to system performance

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<th>Description</th>
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<td>Establish healthcare information technology</td>
<td>The healthcare information technology is established in all ASIH-units according to national regulations and guidelines. The technology enables the staff to use several different systems to assist their daily work. Parts of the computer based systems used at ASIH are integrated with systems used by external healthcare providers to increase work transparency and patient safety.</td>
<td>Ensures patient data safety and patient data share between healthcare providers. Activates function Manage patient data.</td>
</tr>
<tr>
<td>Employ, train and educate staff</td>
<td>ASIH employ staff who have received professional education at university or college to obtain adequate qualifications. ASIH staff further undergo internal education and participate in activities organized by each unit in order to acquire desired proficiency at work. The acquired competence is a resource for the staff when performing their daily work tasks.</td>
<td>Ensures staff's proficiency when performing job tasks.</td>
</tr>
<tr>
<td>Establish work routines</td>
<td>Each ASIH-unit should establish internal work routines for guiding the daily work and controlling the work performance. The work routines are initially established by each unit's operating manager but is improved on a continuous basis with input from the unit's staff. The work routines should be established in accordance to national regulations and guidelines in Sweden, which apply to all ASIH-units. The national guidelines for advanced home care are issued by NBHW. Healthcare regulations concerning advanced home care are issued by the Swedish Parliament. The work routines as well as the national regulations and guidelines represent the control aspect of all remaining functions except for the function Receive alert notification.</td>
<td>Ensures the quality and standard of advanced home care. Ensures coordination in performing work tasks.</td>
</tr>
<tr>
<td>Arrange work plan</td>
<td>The individual work plans for ASIH’s staff are arranged by the staff themselves in co-operation with the unit’s operating manager in order to achieve coordinated schedules as well as to ensure staff and transport availability. The staff’s scheduling process is based on existing information surrounding admitted patients and can be influenced by work related calls, certain information regarding patients’ personal requests, communication with other staff or unforeseen needs for rescheduling. The consistency of the work plans depends to a great degree on the staff’s overall workload.</td>
<td>Avoids scheduling conflicts and ensures a level of work efficiency. Activated by functions Admit patient, Make phone calls, Deliver care and Respond to call or message. Activates function Deliver care and may...</td>
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<td><strong>Order medication, equipment or material</strong></td>
<td>ASIH staff order healthcare material or equipment from the local medical aid center and medication from Apodos or hospital pharmacies according to patients' requests or needs. ASIH staff should be proficient in using the ordering systems with the help of available decision support tools. A factor that affects the temporal aspect and the performance of this function is the staff's overall workload.</td>
<td>Ensures medication, equipment and material availability during care Activated by functions Deliver care, Respond to call or message and Manage patient data May activate functions Store medication, equipment or material and Prepare medication, equipment or material</td>
</tr>
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<td><strong>Store medication, equipment or material</strong></td>
<td>ASIH keeps a storage for medical supplies and medication that can be delivered to patients for regular use and for urgent purposes.</td>
<td>Enables delivery of medication, equipment and material to patients Activated by function Order medication, equipment or material Activates function Prepare medication, equipment or material</td>
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<td><strong>Prepare medication, equipment or material</strong></td>
<td>The staff of ASIH performs the necessary preparations of material, equipment or medication prior to visiting patients. Medical preparations could involve sorting medications to ensure that each distributed dosette box contains the correct medications, or verifying that correct patient names are attached to each set of medication bags provided by Apodos. Staff at ASIH also need to make sure that all equipment and materials to be delivered to a patient function properly.</td>
<td>Ensures that adequate medication, equipment and material are to be delivered Activated by function Store medication, equipment or material Activates function Deliver care</td>
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<td><strong>Receive referral</strong></td>
<td>ASIH receive patient referrals from external healthcare providers.</td>
<td>Activates functions Admit patient and Deliver care</td>
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<td><strong>Admit patient</strong></td>
<td>ASIH staff admit patients when they receive referrals from external healthcare providers. This function impacts the staff's overall workload and the magnitude of the patients' geographical distribution.</td>
<td>Ensures patients' access to advanced home care Activated by function Receive referral</td>
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<td>Refer patient</td>
<td>ASIH physicians refer patients to other healthcare providers in cases when the patient’s condition requires a temporary transfer to an external healthcare provider or when the patient’s needs no longer meet ASIH’s patient criteria. The physician is normally notified of the need for a patient referral by a nurse. The physician then decides if a patient transfer would be needed or not. If patient transfer is needed, the physician uses a program for referrals on the office computer to complete the patient referral and send it electronically to an external healthcare provider. This function is controlled by work routines established by each ASIH-unit and national guidelines for referral management. The performance of this function is limited by the staff’s workload and the number of patients.</td>
<td>Ensures that patients receive adequate care from appropriate external healthcare providers. Activated by functions Refer patient and Discharge patient.</td>
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<td>Transfer patient</td>
<td>ASIH transfers patients through referrals either when patients need temporary care (less than 3 days) from external healthcare providers or when they need extensive care from external healthcare providers within a longer time frame. The patients will in the latter scenario be discharged from ASIH in association with the transfer. A factor that affects the temporal aspect and the performance of this function is the staff’s workload.</td>
<td>Ends patients’ care process at ASIH. Activated by functions Refer patient and Discharge patient.</td>
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<tr>
<td>Discharge patient</td>
<td>Patients are discharged from ASIH by their appointed physician in cases when their conditions stabilize or when they have not alerted ASIH through the safety alarm installed in their homes within 6 months’ time. The discharges are registered in the patient journal system and discharge notifications are sent to external healthcare providers. Patients are also discharged in cases when their conditions deteriorate to such an extent that additional care or treatments from external healthcare providers are needed for more than 3 days. In these cases a referral from an ASIH-physician is required. A factor that affects the temporal aspect and the performance of this function is the staff’s overall workload.</td>
<td>Ends patients’ enrollment at ASIH or activates patient transfer process. Activated by Respond to call or message, Manage patient data and Refer patient. Activates function Manage patient data and may activate function Transfer patient.</td>
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<tr>
<td>Manage patient data</td>
<td>ASIH staff apply healthcare information technology in different work tasks. The technology includes an electronic patient journal system in which the staff can register new patient data or retrieve existing patient data. It also includes an order system for medications, a system for managing incoming and outbound referrals and decision support tools (e.g. Vårdhandboken) that may facilitate the staff’s daily work. The staff of ASIH should be</td>
<td>Enables standardized management of patient data. Ensures that adequate procedures for documentation and</td>
</tr>
</tbody>
</table>
proficient at using the technology to accurately handle patient data.

Parts of the stored patient data can be accessed by external healthcare providers.

The performance of this function depends on the staff's workload and the usability of the system.

<table>
<thead>
<tr>
<th>Hand over work</th>
<th>Patient information is verbally passed from the staff going off duty to the staff coming on duty during shift changeovers. The staff coming on duty could then use the information for care delivery.</th>
<th>Ensures continuity and efficiency of workflow</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The staff going off duty are required to document information from the previous shift in the patient journal system.</td>
<td>Activated by function Arrange work plan</td>
</tr>
<tr>
<td></td>
<td>The performance of this function depends on the number of patients that the staff going off duty have assisted as well as their overall workload.</td>
<td>Activates functions Deliver care and Manage patient data</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Receive alert notification</th>
<th>ASIH receives patient alert for urgent matters through a safety alarm installed in their homes.</th>
<th>Activates function Deliver care</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ASIH takes appropriate measures when receiving these alerts. Staff should be physically available for the patient within 30 minutes from the alert.</td>
<td>Establishes communication paths between ASIH and multiple involved parties</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Respond to call or message</th>
<th>Staff at ASIH-office respond to calls from patients, next-of-kin, field staff and external healthcare providers. Conversely, field staff may also respond to calls from ASIH-office. The nature of these calls are described below.</th>
<th>Establishes communication paths between ASIH and multiple involved parties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Patient or next-of-kin calls ASIH to ask questions regarding their care or request medication/care. Such requests might occur in connection to errors in work plan schedules.</td>
<td>Activated by function Make phone calls</td>
</tr>
<tr>
<td></td>
<td>Field staff call ASIH for information regarding patient visits, e.g. medication dosage, access code to residential building or transportation availability.</td>
<td>May activate functions Make phone calls, Arrange work plan, Manage patient data and Deliver care</td>
</tr>
<tr>
<td></td>
<td>External healthcare providers call ASIH for information regarding patient referrals and transfer issues.</td>
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<tr>
<td></td>
<td>Upon receiving a call, the office-based ASIH nurse may retrieve patient data from the patient journal system (see function Manage patient data) and if needed, consult with the multi-professional team responsible for the patient in question, in order to assist the caller.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>information retrieval are applied</th>
<th>Activated by functions Make phone calls, Respond to call or message and Deliver care</th>
</tr>
</thead>
<tbody>
<tr>
<td>May activate functions Make phone calls, Deliver care, Order medication, equipment or material and Discharge patient</td>
<td></td>
</tr>
</tbody>
</table>
The staff may thereafter make follow-up calls to this patient in order to make sure that everything is in order.

New patient data is registered in the patient journal system by the nurse after the call.

The performance of this function is limited by the nurse's workload and the number of calls.

<table>
<thead>
<tr>
<th>Make phone calls</th>
<th>Establishes communication paths between ASIH and patients/next-of-kin, field staff and external healthcare providers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Activated by functions Respond to call or message and Manage patient data</td>
</tr>
<tr>
<td></td>
<td>May activate functions Respond to call or message, Arrange work plan, Manage patient data and Deliver care</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Deliver care</th>
<th>Ensures delivery of adequate care</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Activated by functions Prepare medication, equipment or material, Manage patient data, Respond to call or message, Arrange work plan, Hand over work and Received referral</td>
</tr>
<tr>
<td></td>
<td>Activates function Manage patient data and may activate functions Arrange work plan, Order medication, equipment or material, and Refer patient</td>
</tr>
</tbody>
</table>

The staff at ASIH call patients or next-of-kin to follow-up on questions regarding patient visits or patients' conditions.

The staff may also call patients or next-of-kin after communicating with other staff for delivering updated information or obtaining information regarding unclear issues.

Field staff call ASIH-office for information regarding patient visits, e.g. medication dosage, access code to residential buildings or transportation availability.

Office-based staff of ASIH call field staff for delivering information regarding patient visits and transport availability.

The staff at ASIH normally visit patient homes to deliver treatments as well as healthcare material, equipment or medication according to their scheduled work plans.

Occasionally some urgent situations can also trigger the delivery process. The staff may then provide support in order to stabilize patients' conditions.

An example of an urgent situation is when patients do not have enough medication or healthcare material due to errors in scheduling or storing the subject of delivery. Such errors can also be mitigated as staff coordinate their work plans to compensate for the error by visiting the patient in reasonable time.

The performance of this function is limited by the accessibility of healthcare material, equipment or medication. The staff's workload and the geographic distribution of patients are other factors that limit the function performance.
References to Appendix

