

From MEDICAL MANAGEMENT CENTRE
DEPARTMENT OF LEARNING, INFORMATICS,
MANAGEMENT AND ETHICS
Karolinska Institutet, Stockholm, Sweden

ON THE FIFTH DAY:

Improving hip fracture care

A study of processes, costs and outcomes

Susanne Löfgren



**Karolinska
Institutet**

Stockholm 2011

All previously published papers were reproduced with permission from the publisher.

Published by Karolinska Institutet. Printed by Universitetsservice US-AB

© Susanne Löfgren, 2011
ISBN 978-91-7457-567-5

**In keep six honest servings-men
(They taught me all I know);
Their names are What and Why and When
And How and Where and Who**

*Kipling
(The Elephant's Child, Just so stories 1902)*

ABSTRACT

This thesis analyses a research and development project on hip fracture care that was conducted between 2006 and 2010 at the Karolinska University Hospital, Stockholm, Sweden. The thesis is a case study of this change project that was intended to decrease the time to operation for hip fracture patients, to discharge these patients within 5 days of admission and to empower these patients in their post-operative care. Two sites of the hospital were used: at Huddinge, the patients formed the study group; at Solna, the patients formed the control group. The general aim of the thesis is to advance our knowledge of the facilitators and hindrances in organisational change by studying the hip fracture project. The thesis presents four studies that arose from the project.

Study I is a patient register study that describes the demographic characteristics of hip fracture patients and characteristics of their hospital care in Stockholm County in the years 1998-2007.

Pettigrew and Whipp's framework for managing change, describing context, process and content, was used as the basis of the analysis in Study II and Study III.

Study II is a case study that analyses the change project aimed at improving hip fracture care in terms of the factors that facilitated or hindered its outcomes. This study examines the dimensions of process and context.

Study III evaluates the outcome of a novel intervention approach that used a new post-operative rehabilitation programme aimed at patient empowerment. This study examines the dimension of content in strategic change.

Study IV compares the costs and outcomes of the study group with those of the control group resulting from the two ways of organising hip fracture care. This study compares lengths of hospital stay and, using three costing measures, compares direct medical costs of such care.

The thesis reaches the following conclusions:

Between 1998 and 2007, in Stockholm County, the number of hip fracture patients and the length of their post-operative hospital stays were constant even as the numbers of elderly persons increased considerably. Overall, the ratio of hip fracture patients to the general population decreased by 16% in these years.

The attempt to redesign the care process at admission decreased the time to diagnosis and the waiting time because the nurses wrote the referrals to radiological examination. However, there was no increase in the rate of patients operated on within 24 hours of admission.

A coordinated care model based on an individually designed, post-operative rehabilitation programme that included patient empowerment reduced the length of hospital stay, led to earlier returns to pre-accident housing, and was less costly than fragmented care. **On the fifth day** for discharge was an overly optimistic goal. Hip fracture patients cannot easily be compared to hip replacement patients even though the surgical methods in many cases are similar. The findings may have implications for initiatives that are intended to optimise the organisation of care. It requires evaluation of improvement initiatives, including the extent of top management commitment and the use of champions or change agents. The participation of all involved in such initiatives is essential.

LIST OF PUBLICATIONS

- I. Löfgren, S., Ljunggren, G., Brommels, M. No ticking time bomb: Hospital utilisation of 28,528 hip fracture patients in Stockholm during 1998-2007. Scandinavian Journal of Public Health. 2010;38:418-425
- II. Löfgren S, Hansson J, Øvretveit J, Brommels M. Context challenges the champion: Improving hip fracture care in a Swedish university hospital. International Journal of Health Care Quality Assurance. Accepted for publication in Vol 25 Issue 2
- III. Löfgren S, Flodin L, Ekström W, Hedström M, Lindberg L, Ryd L. Empowerment - A way to improve post-operative rehabilitation for hip fracture patients? In manuscript
- IV. Löfgren S, Rehnberg C, Ljunggren G, Brommels M. A comparison of costs and outcomes of two models for organising hip fracture care. In manuscript

CONTENTS

1	Prologue.....	1
2	Introduction	2
2.1	An initiative to improve hip fracture care.....	2
2.2	Hip fracture.....	2
2.3	Review of the literature	5
2.3.1	Organisation of hip fracture care	5
2.3.2	Change, improvement and implementation research.....	7
2.3.3	Outcomes of hip fracture care.....	9
2.3.4	Costs of hip fracture care	9
2.3.5	Conclusion.....	10
3	Aim and objectives.....	11
3.1	General aim.....	11
3.2	Specific objectives.....	11
4	Overview of the thesis.....	12
5	Material and Methods	13
5.1	Study setting	13
5.2	The intervention of the research and development project	14
5.3	Study design	15
5.3.1	Study I	17
5.3.2	Study II	17
5.3.3	Study III.....	17
5.3.4	Study IV	17
5.4	Analysis	18
5.4.1	Statistical methods	18
5.4.2	Content analysis	19
5.4.3	Triangulation	19
5.5	Ethical considerations.....	19
6	Findings	21
6.1	The four studies summarised	21
6.1.1	Study I: Hospital utilisation by 28,528 hip fracture patients .. in Stockholm County during 1998-2007	21
6.1.2	Study II: Context challenges the champion:..... Improving hip fracture care in a Swedish university hospital.....	23
6.1.3	Study III: Empowerment: A way to improve..... post-operative rehabilitation for patients with hip fracture?	25
6.1.4	Study IV: Coordination pays: A comparison of costs..... and outcomes of two ways of organising hip fracture care.....	27
7	Discussion.....	29
7.1	Context.....	29
7.1.1	The size of the hospital	29
7.1.2	Development of the need for hip fracture care.....	30
7.1.3	Organisation of hip fracture care	30
7.2	Content.....	30
7.3	Process	31
7.3.1	Project leader	31

7.3.2	Striving for change	32
7.4	Intermediate and patient outcomes.....	33
7.5	Bringing it all together: finding explanatory mechanisms	34
7.6	Methodological considerations	37
8	Conclusion	40
8.1	On the fifth day	40
8.2	Change strategies	40
8.3	Implications for care	40
8.4	Suggestions for future studies	41
8.5	Sammanfattning på svenska	42
9	Acknowledgements	44
10	References.....	47

LIST OF ABBREVIATIONS

ADL	Activities for daily living
A&E	Accident and emergency department
ASA	American Society of Anaesthesiologists classification
BPR	Business Process Re-engineering
CEO	Chief executive officer
CPB	Cost per bed-day
CPP	Cost per patient
CQI	Continuous Quality Improvement
DRG	Diagnose related groups
EUR	Euro
EQ-5D	The 5-dimensional scale of the EuroQol
EuroQol	An instrument for measuring health related quality of life
GW	Geriatric ward
HRQoL	Health related quality of life
ICD-10	International Classification of Diseases, 10 th edition
LOS	Length-of-stay
NBHW	Swedish National Board of Health and Welfare
NCSP	Nordic Classification of Surgical Procedures
NQF	The National Quality Forum
OA	Osteoarthritis
OpT	Operations theatres
OS	Orthopaedic surgery
OW	Orthopaedic ward
PCR	Patient care register
RD	Radiology department
RI	Rehabilitation institution
Rikshöft- SAHFE	The Swedish National Hip Fracture Register
SALAR	Swedish Association of Local Authorities and Regions
SEK	Swedish crowns
SPMSQ	Short Portable Mental Status Questionnaire (Pfeiffer test)
TQM	Total Quality Management
WHO	World Health Organisation

1 PROLOGUE

I have never planned my career. It has been my “walk of life”. Many opportunities have come my way, and I have seized some of them. I became involved in this research and development project because of such an opportunity. It was a privilege to study the project from the beginning even though I was not involved in the planning. I believe my participation strengthen the research. In fact, I found the research so fascinating that it is the subject of my thesis.

I have extensive health care experience from my work as a physiotherapist. I have worked in a geriatric ward, as a private practitioner and, for many years, as a head of a primary care department. After those twenty years of work, I took a position as an administrator in the central administration of the Stockholm County Council. In this position, I had to learn new things and see health and health care from another perspective. I worked closely with the politicians and with general health and health care issues, mostly those issues related to rehabilitation. In all my work and different positions, I have been concerned with improving and developing health care. And I have learned a lot. Making changes in health care, especially in organisation, is a challenge.

In 2006, the initiator of a hip fracture care management project invited the Medical Management Centre at Karolinska Institutet, Stockholm to provide a researcher who could take part in, study and evaluate the hip fracture care research and development project. The reason for including a researcher was to learn more about implementation and change processes in a complex health care organisation. I was fortunate to be the researcher given this opportunity.

My responsibility as researcher was to follow, describe, explain and evaluate the changes, the outcomes and the factors that either facilitated or hindered the implementation of the programme.

2 INTRODUCTION

2.1 AN INITIATIVE TO IMPROVE HIP FRACTURE CARE

On the fifth day most patients who have had hip fracture operations ought to be able to leave the hospital.

In 2006, an orthopaedic surgeon at Karolinska University Hospital Huddinge, Stockholm, Sweden, launched a research and development project with the aim of improving the care of hip fracture patients. Specifically, the focus was on introducing patient empowerment in a personalised rehabilitation programme, reducing the time from admission to surgery, and providing patients and their relatives with more information on the care process.

Because of the increased risk of death for hip fracture patients, from a human perspective it is essential that their care be well organised and competent. Moreover, from a societal perspective, such care should also be cost effective. There are more hospital days because of osteoporosis-related hip fractures than ischemic heart-diseases, breast cancer and prostate cancer combined; there are almost as many days for such fractures as for stroke patients (1).

The project leader set the 5-day goal and wrote in the information provided to the patients and their relatives: “We want to improve care by letting the patients become more involved in and more responsible for their own rehabilitation”. Thus, his wish was to empower the patients for some aspects of their post-operative care.

In Sweden, on average, the hospital stay of hip replacement patients is five days. The project leader thought that this patient group was treated in much the same way and with the same surgical methods as the hip fracture patients.

2.2 HIP FRACTURE

The care context for hip fracture patients in Sweden is regulated by the Health and Medical Care Act (SFS 1982:763, 2§) that states that the entire population have the right to a high standard of health and medical care on equal terms. According to the National Board of Health and Welfare (NBHW) (SOSFS 1996:24) in Sweden, good health care should be available to everyone according to their needs. Furthermore, patients should take part in both the planning and decision making as far as their treatment and care.

The cost to the Swedish health care system from hip fracture patients is significant. These patients, who require 25% of the orthopaedic surgery hospital days, are the largest patient group in departments of orthopaedic surgery (2). In a global perspective, over 200 million individuals today are estimated to suffer from osteoporosis (3, 4), a condition that puts elderly persons at high risk of hip fractures. Today the population in the Nordic countries is at the highest risk level (5, 6), and the risk grows exponentially after people reach the age of 50 years (7). In Stockholm, the number of elderly people

is increasing, and the public health reports estimate an increase in the number of hip fractures (8, 9). Several studies on hip fracture care report on the efforts to reduce costs (10-13). Many efforts have been made to improve the hip fracture care in Sweden. One such effort was the issuance of new guidelines for hip fracture care in 2003 by NBHW (14).

Hip fracture is the generic name for fractures of the proximal femur, shown in Figure 1. The fracture, which is often the result of a fall in a person with osteoporosis, is a significant cause of morbidity and mortality in the elderly (15, 16). In Sweden, each year about 18,000 individuals suffer of hip fracture. Women have nearly three-fourth of all hip fractures. The mean age of women with hip fractures is 82 years. Since the year 2000, the trend is that men are sustaining more hip fractures. Today, men have around 30% of all hip fractures (17).

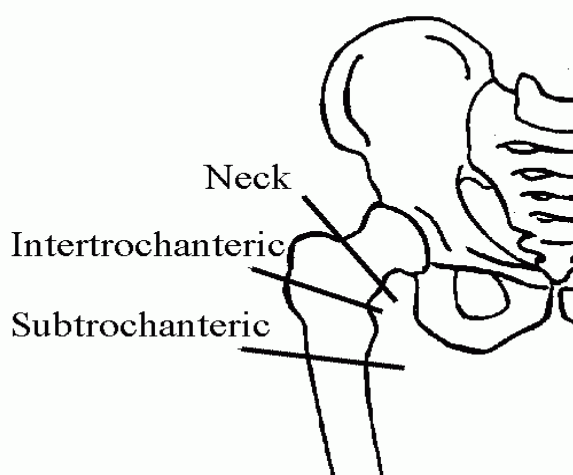


Figure 1. Modes for different types of femur fractures, cervical fracture, femur neck fracture (ICD-10 classification S 72.0) trochanteric fracture, intertrochanteric fracture (S 72.1) subtrochanteric fracture (72.2)

Hip fracture is an acute injury. More than 90% of hip fractures occur as a result of falls, most of them by people over 70 years of age. Risk factors for falls in the elderly include advanced age, medication use, cognitive impairment and sensory deficits (18). Most falls occur as people go about their daily activities at home (19). Because patients with both a hip fracture and impaired cognitive ability may not be treated optimally in acute care, it is important to identify these patients as well as counteract their acute confusional state (13, 20). Acute confusional states, which affect between 30-60% of all hip fracture patients, are common complications related to hip fractures (21, 22). A common mental test for assessment of cognitive function used in most hospitals in Sweden is the Short Portable Mental Status Questionnaire (SPMSQ), which is also called the Pfeiffer-test (23). Patients with a hip fracture have a higher mortality rate in the first half-year following the fracture than control groups (3, 24). Between 14-36% of all hip fracture patients die in the first year after the hip operation, and men have a higher death rate than women (25, 26).

In Sweden, the Swedish Association of Local Authorities and Regions (SALAR) is responsible for the central administration of more than 50 national quality registers. The medical profession established these registers, which are unique resources in Swedish health care, in order to support quality improvement in clinical work. The national quality register for hip fractures, which began in 1988, is called the Swedish National Hip Fracture Register (Rikshöft-SAHFE). The register contains various details about the patients, such as age, sex, the fracture, the operation, length-of-stay cognition, accommodation, etc. The register contains the results of four-month and one-year follow-ups with information on, for example, surgery, rehabilitation, complications and self-reported quality of life.

2.3 REVIEW OF THE LITERATURE

2.3.1 Organisation of hip fracture care

There are a number of innovative models for the care of patients with hip fractures that are used in various countries. These models have been developed and implemented over many years with the first randomised control study performed more than 30 years ago (27). The models, which are heterogeneous and frequently a combination of different models, are differentiated primarily by the roles assigned to the involved professionals. The construction of the models depends more on the available resources and the local organisations than on the evidence (28). It is a challenging task to draw a conclusion about which model or organisation is optimal or superior in terms of patient or economic outcomes. However, the traditional practice in service organisations of prioritising staff needs over consumer needs is no longer acceptable. It is time to research the way we organise and deliver such services (29).

The treatment results and the resource utilisation in hip fracture care may be closely connected to each country's health care organisation. For example, in one country, acute care may be separated from rehabilitation that is provided by another institution. In other countries, all patient services may be provided in a coordinated "chain of care" in which several medical and surgical specialities – plus orthopaedic surgery, general medicine, geriatrics and rehabilitation – are linked from one hospital to another in different combinations.

Several authors have described different organisation models for the hip fracture patient group. However, it is difficult to draw any general conclusions from this research (12, 30-34). Some studies support the implementation of OrthoGeriatric models of care while others support multidisciplinary patient pathways. There are also studies that argue that older patients who are transferred to a tertiary care facility for treatment of acute hip fractures experience poorer outcomes than non-transferred patients (31-33). Better patient outcomes have also been found when patients experience co-managed care. For example, such research suggests that a hip fracture patient who is over 65 years old should be considered a complex patient rather than only an orthopaedic patient. The explanation is that a hip fracture in an elderly frail individual may result in complications that are best handled by a geriatrician. Research also recommends that a hospital should have a minimum of 100 hip fractures surgeries annually (35).

Figure 2 presents examples of different models of integrated care for the management of hip fracture patients.

Further studies of hip fracture care are needed because it seems there is still a difference of opinion on how to identify and organise the best ways to improve the quality of hip fracture care.

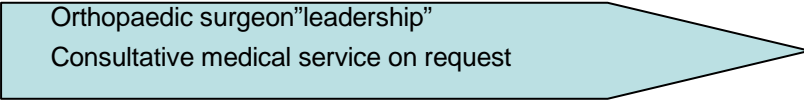
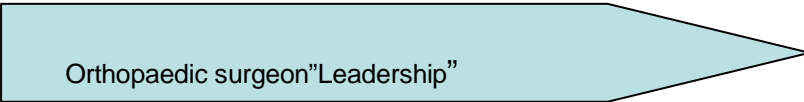
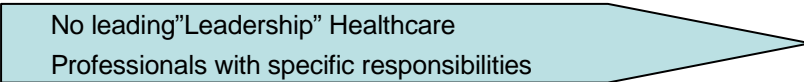
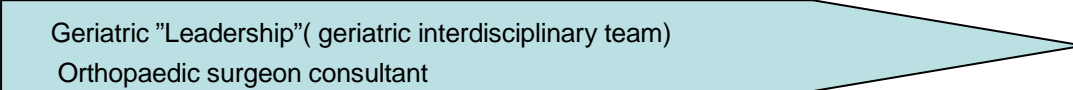
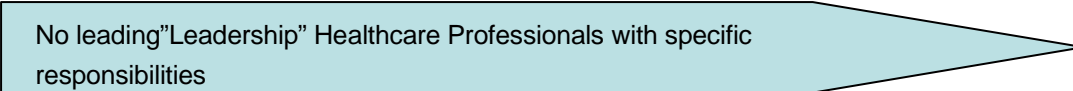
Pre-operative	Post-operative	Post-operative rehabilitation	Rehabilitation in association with fracture
A Traditional model-Orthopaedic ward 			Geriatric ward or Rehabilitation unit
B Consultant Team- Orthopaedic ward 			Geriatric ward or Rehabilitation unit
C Interdisciplinary Care/Clinical Pathway- Orthopaedic ward 			Geriatric ward or Rehabilitation unit
D Geriatric-led fracture service- Geriatric/rehabilitation ward 			
E Geriatric Co-managed care/OrthoGeriatric unit 			

Figure 2. Examples of different organisations of integrated care for the management of hip fracture patients. Adapted from Giusti (28)

2.3.2 Change, improvement and implementation research

In many reported attempts to improve patient care, many approaches have been proposed. However, it is unclear if any of these approaches is more effective than others. It is possible to change behaviour, but such change generally requires developing approaches tailored to specific settings and target groups (36). When planning complex changes in health care practice, considerations of various kinds need to be addressed. The nature of change, its context and the characteristics of the professionals and patients should all be considered in the planning stages (37).

Øvretveit (38) argues that concepts and theories from research on change are useful in planning, implementing and evaluating redesigned health care systems and processes. This change management literature, which has its roots in organisational development, has also given rise to action research, which is an approach useful in evaluating change initiatives (38, 39). Such literature also emphasizes the importance of top management engagement, broad participation of those involved and affected by the change, the use of champions and change agents, and the importance of early success (38).

Shortell (40) says any modification in an organisational structure or behaviour, new or not new to the organisation, is a change. Innovation implies change, but not all changes involve innovation.

Kotter and Grol have interesting ideas on change and implementation models. Kotter (41) uses an 8-step model: developing urgency, building a guiding team, creating a vision, communicating for buy-in, enabling action, creating short-term wins, don't let up, and making it stick. Each step has three phases. The first is 'creating a climate for change', the second phase is 'engaging and enabling the whole organisation', and the third phase is 'implementing and sustaining the change'. For Kotter, change has both a situational and an emotional component.

Grol (42, 43) writes that the various approaches may provide different perspectives on optimal care. He argues that it is not realistic to expect that one approach can solve all the problems in health care delivery because of the complexity of improvements and changes. There is no evidence that any of the popular models of improving clinical performance is superior to others. According to Grol, models must be integrated and bridges built if health care is to be effective.

Grimshaw et al. (44) note the increasing recognition of the failure to translate research findings to the importance of using active dissemination and implementation strategies. Although there is a growing body of research on the effectiveness of different implementation strategies, such strategies are not always easily accessible to policy makers and professionals. In their overview of systematic reviews of professionals behaviour change interventions published between 1996 and 1998, Grimshaw et al. found that 41 reviews covered a wide range of interventions and behaviours. They found that, in general, passive approaches are generally ineffective and unlikely to result in behaviour change. Most other interventions are effective only in some circumstances; none is effective under all circumstances. Multifaceted interventions

targeting different barriers to change are more likely to be effective than single interventions.

Guidelines implementation has been researched in the study of new scientific knowledge or successful strategies used to change professional practice. Grol and Grimshaw (36), who have comprehensively summarised this research, identify three types of barriers to change: the practice environment (organisational context), prevailing opinions (social context), and knowledge and attitudes (professional context). Successful measures are expert consultations, interactive small group discussions, reminders, and computerised decision support (45). Changes of practice have been promoted by professional opinion leaders and supported by access to continually updated knowledge databases. These changes have utilised experts, emphasised measurement and offered advanced informatics support (46). Other influences on provider performance and patient outcomes are organisational and financial structures, the high burden of work and the poor work coordination (47). The best prospects for practice change stem from a self-initiated learning process with an experienced problem as a trigger. When the focus is on a professional's own practice, especially in comparison with the practice of colleagues, a professional is open to advice from another professional expert. In addition to this "mental unblock", other requirements need to be met. The work organisation needs to be supportive, not obstructive. Routines and standards need to be adjusted to the new behaviour. Responsibility and incentives need to facilitate, not hinder, the change.

Quality management approaches have traditionally used process-oriented techniques and models to make improvements in in-patient care systems. Such approaches, which are considered appropriate for health care and for patient pathway framework, include Total Quality Management (TQM), Continuous Quality Improvement (CQI) and Business Process Re-engineering (BPR) (48-50). Another well-known approach is the Plan-Do-Study-Act cycle that Berwick and Nolan (51, 52) and Batalden and Stolz (53) describe. This cycle is sometimes also called the Breakthrough Model. Lean production or lean manufacturing, the generic term for the Toyota Production System, is one of the most recent improvement theories from industry that is based on a production philosophy that evolved in the automobile industry. This philosophy, as applied in recent years to health care organisation, aims first to deliver patient-centred care -- the right care to the right patient at the right time. Its second aim is to reduce or eliminate waste of time and waste of materials (54, 55).

Greenhalgh et al. define the characteristics of innovation in health care service delivery and organisation as follows: "a set of behaviours, routines and ways of working" (56), along with "administrative technologies and systems, which are linked to providing or supporting health care, implemented in a planned way, and discontinuous with previous practice and perceived as new by a proportion of key stakeholders, and directed at improvement" (57). This definition makes "innovations" a concept closely related to quality improvement and change management because the innovations may only be new to the implementing organisations and therefore perceived as new only to them. Greenhalgh et al. (56) point that there is a consensus on the strategies useful in promoting individual change among professionals and their practice. The challenge is to better understand how organisation-wide change is achieved.

2.3.3 Outcomes of hip fracture care

A commonly used measurement of outcomes in hip fracture care is the length-of-stay (LOS). The National Quality Forum (NQF) uses LOS, among others, as a quality indicator. LOS is also often used in studies that compare different methods and ways of treating in-hospital patients (58).

The waiting time for surgery, which differs significantly among countries, is an outcome measure that reflects the difference in their health care organisation. In Sweden, the NBHW guidelines for hip fracture care recommend that hip fracture operations be performed within 24 hours of admission. In many other countries, 48 hours is the recommended time frame.

When evaluating health care interventions, it is important to try to capture the patient's opinion of his/hers health-related quality of life. Health-related quality of life is one important measure that is used to evaluate the need for health care interventions. The measure of the patient's opinion of how he/she feels may be added to other, more medically oriented outcome data (59). One commonly used instrument is EQ-5D because it is short and easy for patients to handle. EQ-5D is the first part of the instrument EuroQol, which is a standardised, non-disease specific instrument (60). EQ-5D has five dimensions: mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Each dimension has three levels of severity. EQ-5D has been used in several clinical studies with hip fracture patients (11, 61-63) and with patients with other health problems or diseases (64, 65).

Measures for mortality and survival rates must be handled with caution. It is difficult to draw credible conclusions from small amounts of data and from short-term interventions.

2.3.4 Costs of hip fracture care

Because health care resources are limited, there is naturally an interest in assessing the value received for money spent on health care treatment, programmes and organisation. The economic impact of hip fractures on health care has been studied in several ways over the years (10, 11, 66, 67). The costs and consequences of alternative treatment strategies, which can be compared using economic calculations, are often evaluated based on a synthesis of data from a range of sources. In situations where two treatment options under consideration are identical from a clinical perspective, the evaluation becomes a comparison of costs only (68).

Health care costs are usually extracted from accounts with often little attention paid to what is required in order to make comparisons among organisations. Cost estimates and evaluations have been developed and refined over the years. The crudest measure is average ward-specific cost per bed day (CPB). This measure is calculated by dividing the sum of costs for a department by the number of bed day used.

Another measure, introduced in Sweden in the mid-1980s, is the diagnose-related group (DRG) system. In this measure, the costs of individual patient care episodes are recorded with an appropriate share of the overhead included (69).

A third measure is health costs per patient per care episode (CCP). Since 1999, the Swedish Association of Local Authorities and Regions (SALAR) has overseen a project in which the aim is to introduce this method for calculating health care costs. To date, in Stockholm, only in-hospital care at the acute hospitals is included in this measure (70).

For the funder's point of view, price is the parameter of greatest interest. Prices agreed on in contracts or set by funders in tariffs make the costs to the funders predictable.

To my knowledge, no recent studies report comparisons of different methods to calculate hip fracture care costs.

2.3.5 Conclusion

The organisation of hip fracture care is strongly connected to the health care organisation in a country. Several studies show that elderly hip fracture patients transferred for rehabilitation after acute hip fracture surgery have poorer outcomes than non-transferred patients (12, 30-34). On the whole, coordinated care seems to produce better patient outcomes.

All initiatives to improve patient care or to innovate in a health care organisational structure are changes. Although many change models have been developed, it is still unclear if any improvement model is more effective and efficient than others. There are complex social interventions, and the interplay between context, content, process and outcome must be carefully described and evaluated (71).

There are several outcome factors for hip fracture care. These factors include hospital length-of-stay (LOS) used as a quality indicator, waiting time to surgery, mortality rates and the patient's opinions of their health-related quality of life.

Costs can be calculated in different ways - examples are the average ward-specific cost per bed (CPB), diagnose-related group (DRG) system and care cost per patient (CCP) and tariffs.

Few, if any, recent studies have combined all these approaches in the analysis of the effort to improve hip fracture care.

3 AIM AND OBJECTIVES

3.1 GENERAL AIM

The general aim of the thesis is to increase our knowledge about how organisation and processes of care can be changed and improved by using hip fracture care as a case.

3.2 SPECIFIC OBJECTIVES

1. To describe the changes in the demographic characteristics and utilisation of hospital care for hip fracture patients in Stockholm County in the years 1998-2007. (Study I)
2. To describe and explain a programme of changes to improve hip fracture care and outcomes, and the factors that either facilitated or hindered the implementation. (Study II)
3. To evaluate the effect of a novel intervention approach with an individually designed, post-operative rehabilitation programme aimed at patient empowerment. (Study III)
4. To compare two ways of organising hip fracture care for an in-patient episode taken into consideration the effect on length-of-stay and direct medical costs calculated using three different measures. (Study IV)

4 OVERVIEW OF THE THESIS

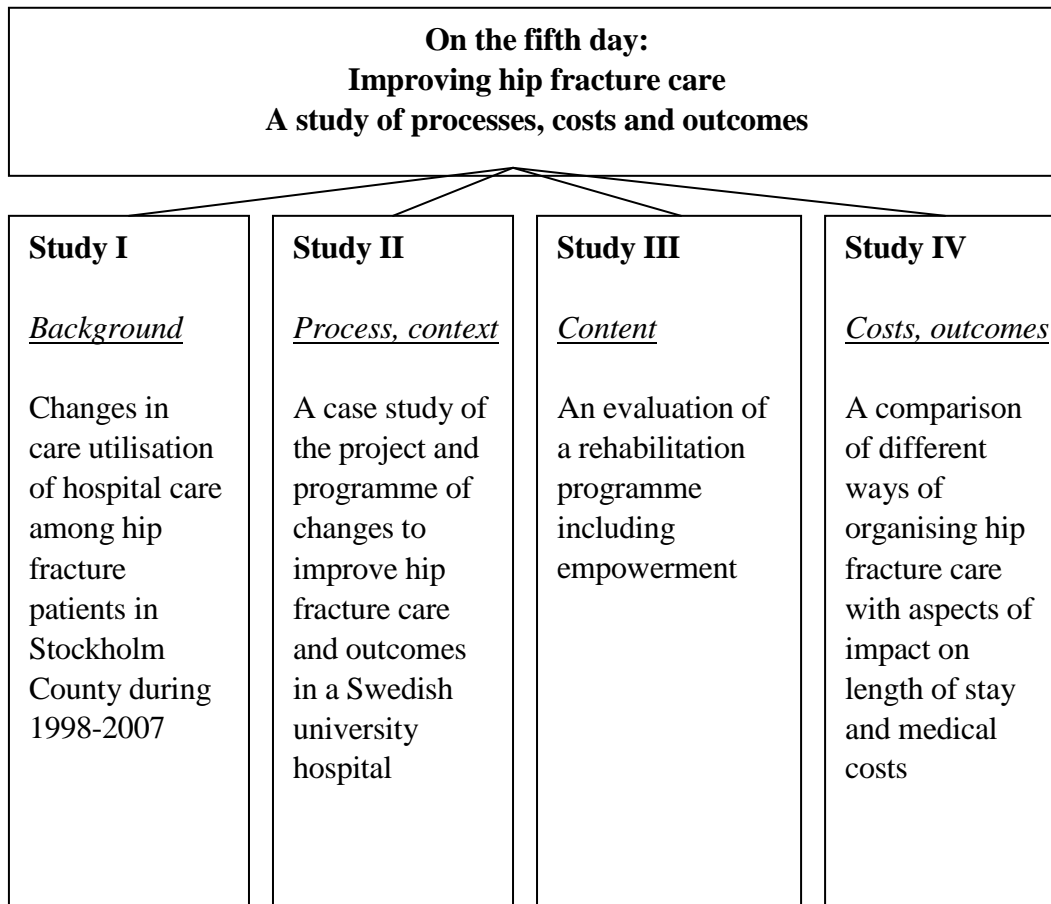


Figure 3. Overview of the different components of the thesis

5 MATERIAL AND METHODS

In this thesis I have used a mixed methods design. The research designs, interventions, data and data analysis methods of the four studies are shown in Table 2 on page 20.

5.1 STUDY SETTING

The research and development project analysed in this thesis took place at the Karolinska University Hospital, the largest university hospital in Stockholm that serves a population of about two million people in the Stockholm County. The hospital has a tripartite mission: research, education and clinical care. The hospital is a result of a merger between the Karolinska Hospital and Huddinge University Hospital. Today, the hospital has two sites, 30 km apart, one north of Stockholm in Solna and one south of Stockholm in Huddinge. The hip fracture research and development project was conducted at the site in Huddinge; the Solna site was used as a control for the project. The site in Huddinge is the only university hospital in the county that has a geriatric department. The orthopaedic department is divided between the two sites, and both sites use the same surgical protocol and methods.

The organisation of hip fracture care differs between the two sites (see Figure 4). The main difference in the care organisation is that at Huddinge the patients stay in the hospital throughout the whole care episode while the patients at Solna are transferred to another medical facility for rehabilitation after a few days in the orthopaedic ward.

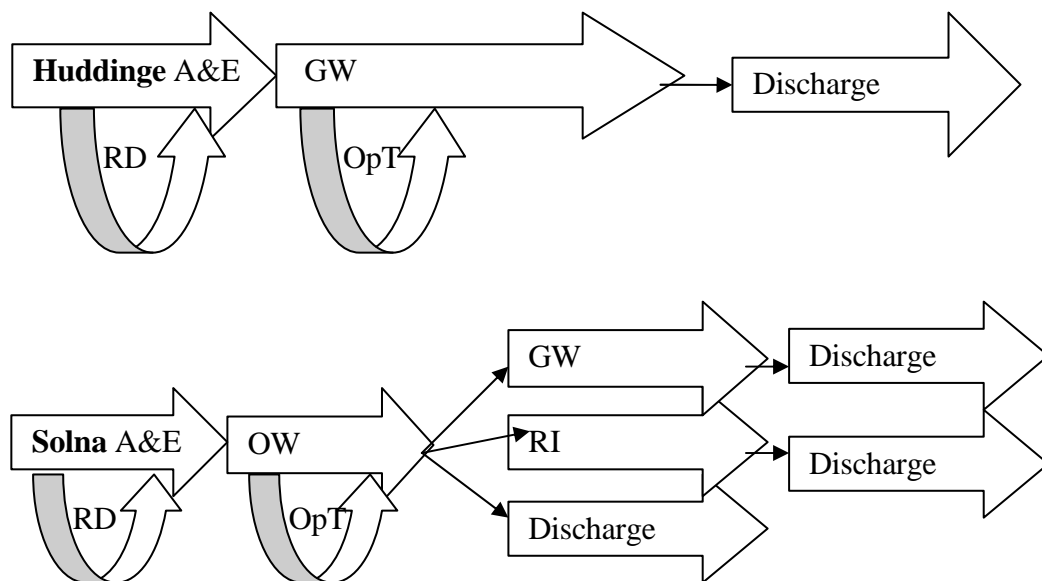


Figure 4. The different patient pathways at the Huddinge and Solna sites
Abbreviations: A&E=accident and emergency department, GW=geriatric ward, RD= radiology department, OpT=operation theatres, OW=orthopaedic ward, RI=rehabilitation institution

5.2 THE INTERVENTION OF THE RESEARCH AND DEVELOPMENT PROJECT

The project, which aimed at improving hip fracture care, introduced three distinct interventions at the study site: a redesigned care process involving the geriatric ward, a programme for patient empowerment, and the distribution of an information package to patients and relatives. It was not the aim of the project to reduce the time from pre-operative arrival to the emergency department to a firm diagnosis to surgery.

Patients at the Huddinge site were admitted to the geriatric ward and then transferred to the operation theatre for surgery. Post-operatively, patients were assigned to one of four rehabilitations care tracks. An attending geriatrician evaluated each patient's medical condition according to the American Society of Anaesthesiologists (ASA) classification (72), and made a clinical assessment of the patient's cognitive function. The geriatrician was assisted by an occupational therapist who evaluated the status of the patient based on his/hers pre-accident situation and on an activity for daily living (ADL) taxonomy (73). Based on these assessments and a quality of life assessment (EQ-5D) (74, 75), the patient and the geriatrician agreed on which care track suited the patient best. The intended rehabilitation plan was presented to the patient as a contract.

Track 1: Essentially healthy patients (ASA 1-2), without cognitive dysfunction. The aim was to return the patients home on the 5th day after surgery.

Track 2: Physically more fragile patients (ASA 3-4), without cognitive dysfunction. The aim was to return the patients to home on the 9th day after surgery.

Track 3: Patients living in a nursing home or other institutional accommodation. The aim was to return the patients to the same institution on the 4th day where mobilisation would continue.

Track 4: Patients who came from their own homes, but because of the social situation, could not return home safely. New housing (i.e. admission to an institution) and combined community services had to be planned.

The empowerment programme followed principals established by the World Health Organisation (WHO) (76) that consist of eight guidelines for good interaction. The aim of the programme was to support the autonomy of the patients and to counteract their negative feelings such as fatigue and weakness. During a one-year period prior to the start of the programme, the staff members at the geriatric ward were trained in how to support empowerment by coaching and supervision. The purpose of this training was to help the staff members become confident in the use of the new approach. The WHO guidelines were used in training the staff members to become more sensitive and aware of the patient condition and needs. The goal was that the staff members should serve as collaborators and coaches to the patients rather than as caregivers.

An information package was developed and distributed to the patients and their relatives. The information described the four rehabilitation care tracks in detail. A drawing showed the fracture and indicated the intended osteosynthesis. If the patient

had cognitive problems the information was phrased in an adjusted way. In these cases, more detailed information was given to the relatives.

5.3 STUDY DESIGN

In social science research, the researcher may use case studies, experiments, surveys, narratives and analysis of archival information. Several frameworks for evaluation and analysis of changes and development work have evolved the attempts to highlight the complexity of health care organisations.

To capture the complexity of innovations in health care, I used a case study research design in Study II (77). The Pettigrew and Whipp (78) framework was used. The data analysis was based on qualitative basic content analysis (79). The same framework was also used in Study III (Figure 5).

Yin (77) describes a case study as a research strategy that comprises an all-encompassing method covering the logic of design, data collection techniques and specific approaches to data analysis. Yin defines a case study as an empirical inquiry that investigates a contemporary phenomenon within its real life context, especially when the boundaries between the phenomenon and context are not clearly evident. According to Yin, case studies can be based on any mix of quantitative and qualitative evidence and must always include direct and detailed observations as evidence.

Pettigrew and Whipp (78) introduce three dimensions to the research on strategic change: content, process and context. The content dimension mainly aims at the “What” that is to be developed and achieved. The process dimension provides the path for the implementation of the procedures and methods used to achieve the goal. The context dimension concerns the internal and external environments, that is, the “Where” of the process. Pettigrew and Whipp emphasise the importance of the continuous interplay among these strategic dimensions for success. They argue that the implementation of change is an iterative and cumulative reformulation process in which successful change is the result of the interaction among these strategic dimensions. They state that it is important in the analysis of the change process to report the outcomes as well. Based on their substantial empirical research, Pettigrew and Whipp also describe some interrelated factors relevant to the successful management of change: a positive environmental assessment, human resources, and an overall consensus for change.

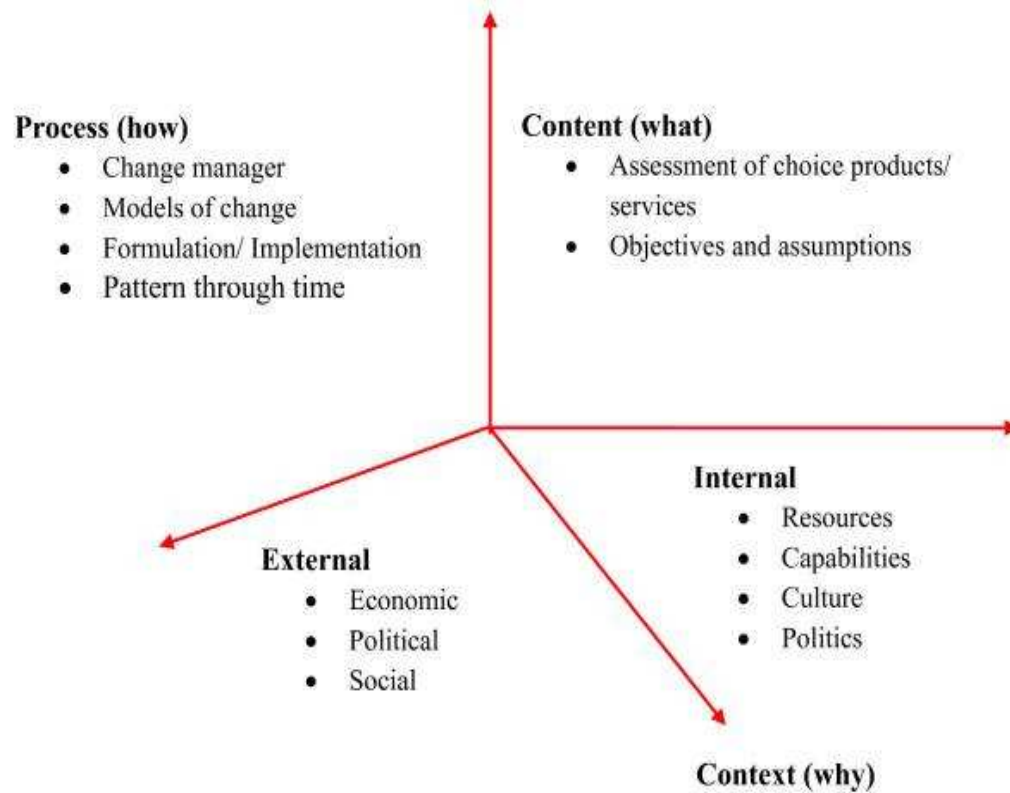


Figure 5. A model of strategic change and competitive success

Source: Pettigrew, A. and Whipp, R. (1993), *Managing Change for Competitive Success*, Oxford: Blackwell

5.3.1 Study I

Study I was an epidemiological study, utilising register data. The Patient Care Register (PCR) from the Stockholm County Council that compiles and store care utilisation was used. In the register, close to 100% of hospital care is covered. Diagnoses are coded according to the International Classification of Diseases, 10th edition (ICD-10). Procedures are coded according to the Nordic Classification of Surgical Procedures (NCSP). The Stockholm County Council uses the database for mandatory reporting to the NBHW and to the National Patient Registers as well as to the Swedish Association of Local Authorities and Regions. Some of the data obtained from the Stockholm PCR was compared with data from the Swedish National Hip Fracture Register (Rikshöft-SAHFE). The study period was the years 1998-2007. Changes in demographic and clinical characteristics data were examined.

5.3.2 Study II

A case study design was used in Study II. Yin (77) recommends such a design when the investigator is looking for answers to “How” and “Why” questions, when the investigator has little control over events, and when the studied phenomenon is within a real life context. The design is commonly used in qualitative inquiries where the intention is to capture the implementation process. In Study II, the questions concerned the programme theory, the perception of the patients by the staff members, the effect on quality of the patient care, and the facilitating and hindering factors for care.

5.3.3 Study III

Study III was a prospective comparative study that describes the research and development project from February 2009 through January 2010. A total of 503 hip fracture patients, aged 65 years or older, were in the study that was made at the Huddinge and Solna sites. Huddinge patients were treated according to the new, specially designed rehabilitation programme in the geriatric ward (the study group). Patients at Solna were treated in the orthopaedic ward and followed departmental routines in the post-operative process (the control group). The effects on LOS, the return to previous housing, and the mortality rate were studied.

5.3.4 Study IV

Study IV was a cost and outcome analysis with the same patient groups as in Study III. The costs were estimated using the three different calculation approaches: CPB, DRG and CPP (see Section 2.3.4). A comparison was made of the two different ways of organising hip fracture care taking into consideration the effect on direct medical costs for an in-patient episode, on LOS and on the patients’ health-related quality of life.

5.4 ANALYSIS

5.4.1 Statistical methods

An overview of statistical methods used in Study I-IV is presented in Table 1.

Table 1. Overview of statistical methods used in study I-IV

	Study I	Study II*	Study III	Study IV
Chi-square (χ^2)			X	X
Chi-square for trend			X	X
Independent t-test			X	X
Regression analysis			X	
Mann-Whitney test				X
Friedman's test				X
Standardisation with the direct method	X			

* Study II was based on qualitative data, where I used content analysis and triangulation.

In study I, the annual incidence figures were calculated using the direct method. The principle of direct standardisation is that age and sex group rates of the study population are applied to the standard population. The hip fracture population was weighted with weights that were proportional to the age and sex distribution of the Stockholm County population.

Study III, the nominal variables of sex, fracture type and mortality were tested by chi-square test, and the ordinal variables age by the chi-square for trend. An independent t-test was employed to compare the LOS at the two sites. Levene's test was used to test the assumption that each group has the same variance, and the Mann-Whitney test was performed when violated. All tests were two-sided. A logistic regression analysis was made to examine the relationship between death as an outcome variable and age, sex and type of hospital as the explanatory variables.

In Study IV, the Mann-Whitney test was used to examine the differences in HRQoL measured by EQ-5D between the Huddinge and Solna sites. By using Friedman's test, I observed that the distributions of the different dimensions were not the same in the three time periods.

The statistical analysis was performed using SPSS 18.0 for Windows software (SPSS, Chicago, Illinois).

5.4.2 Content analysis

Weber (79) says that content analysis is a research method that uses a set of procedures to make valid references from text. This method can be used for many purposes to reflect cultural patterns of groups, institutions or societies, and to describe trends in communication content. A central idea in content analysis is that the many words in a text are classified into fewer content categories. Words and phrases classified in the same category are presumed to have the same meaning. According to Weber, after the coding in categories, the researcher interprets and explains the results using relevant theories. Content analysis can also be defined as a research method for subjective interpretation of content of text data through a systematic classification process of coding and identifying themes or patterns.

In study II, a basic content analysis (77, 79-81) was used for all interviews. Content analysis classifies textual material, reducing it to more relevant, manageable bits of data. The interviews were transcribed word by word and read through in order to obtain an understanding of the text. Thereafter, the text was coded and grouped into categories. The data were organised into categories and classified according to the three main themes of Pettigrew and Whipp's framework. To ensure trustworthiness of the findings, two researchers independently read the findings and then jointly discussed them in relation to the original texts. In this analysis, NVivo 8.0 software was used.

5.4.3 Triangulation

Triangulation refers to the use of more than one approach in the analysis of data. The methodology is often used in social and behavioural research. Webb (82) writes: "Once a proposition has been confirmed by two or more independent measurement processes the uncertainty of its interpretation is greatly reduced. The most persuasive evidence comes through a triangulation of measurements processes". Data triangulation and methodological triangulation were used to compare data from different sources and to compare identified patterns. For instance, interview data were compared to data from plans, the project leader's goals, clinical guidelines and minutes from meetings. These comparisons were made to establish the consistency in data (cross-data validation) (29, 82, 83) to minimise the undue influence of single dataset, and to reduce researcher bias.

5.5 ETHICAL CONSIDERATIONS

The four studies were conducted according to the Helsinki Declaration and were approved by Stockholm Regional Ethical Review Board. According to Swedish law (SFS 203:460) approval from the relevant ethics committee is required for research that may have a physical or psychological influence on the participants. In Study II, all interviewees agreed to participate in the research. They were informed about the voluntary nature of their participation and their right to decline to participate. Data are presented so that individual participants remain anonymous. Quoted remarks used in the reports do not include information that could identify the interviewees. In the instances where the position of an interviewee is unique and therefore might be disclosed, the interviewee gave his/her consent to be featured in the case description.

Table 2. Compilation of designs and methods used in the four studies.

Study	Design	Intervention
<i>Study I</i> No ticking time bomb	Epidemiological Register study	No
<i>Study II</i> Context challenges the champion	Mix methods single case study	Introducing empowerment in a new personalised rehabilitation programme and a new patient pathway
<i>Study III</i> Empowerment - A way to improve..... hip fracture care?	A prospective comparative study	Introducing empowerment in a new personalised rehabilitation programme
<i>Study IV</i> Coordination pays	Cost and outcome analysis	Introducing empowerment in a new personalised rehabilitation programme

Cont.	Methods	Data analysis	Time
<i>Study I</i>	Register data	Descriptive data analysis direct method	2008-09
<i>Study II</i>	Interviews Archive data and performance statistics	Pettigrew and Whipp's strategic change model Qualitative content analysis Triangulation	2009-10
<i>Study III</i>	Length of stay Mortality Ability to return to previous housing	Pettigrew and Whipp's strategic change model Statistical evaluation, Chi 2 Independent t-test	2009-10
<i>Study IV</i>	Cost per bed day, DRG, Cost per patient Length of stay EQ-5D	Economic comparison Statistical calculations, Mann-Whitney test Friedman's test	20011

6 FINDINGS

6.1 THE FOUR STUDIES SUMMARISED

6.1.1 Study I: Hospital utilisation by 28,528 hip fracture patients in Stockholm County during 1998-2007

The study identifies all acute hospital care for hip fractures in the region. In Sweden, people with hip fractures make up the largest patient group in Orthopaedic departments, utilising 25% of in-hospital days.

The Swedish NBHW guidelines recommend surgery within 24 hours of admission for hip fractures and make suggestions regarding mobilisation and active rehabilitation of hip fracture patients. The guidelines also suggest preventive actions and treatment for hip fractures and osteoporosis.

The register in the study is a central patient care register (PCR) that can be used to perform population-based, diagnosis-specific time series analyses. Hospital care has almost 100% coverage in the register. The study identifies all patients from 1998 to 2007 who had a hospital stay due to a hip fracture (ICD-10 codes S72.o,S72.2,S72.2) and had undergone hip surgery (NCSP codes NFB09-99 and NFJ39-99). Hospital stays that occurred immediately after the acute-care phase (e.g., during rehabilitation or geriatric care) were also identified and included in the episode of care. This data was compared with data from the Swedish National Hip fracture Register (Rikshöft-SAHFE). The comparison revealed no major differences between the two datasets.

The study shows that 28,528 hip fracture patients were hospitalised in Stockholm County in the years 1998-2007. During these years, the population of Stockholm County increased by 10.5%. The annual population figures for Stockholm County were obtained from official County statistics. Age- and sex-standardised annual incidence figures were also calculated.

The study covers all hip fracture patients in a population that represents some 20% of the population of Sweden. The annual number of hip fracture patients was constant in the years of the study. The average age of all these patients was 80.4 years. The study revealed a small decrease in the number of hip fractures among women 65-74 years of age and a larger decrease among women 75-84 years of age. For men and women 85 years and older, the number of patients varied year-to-year, but there was no trend suggesting an increase in the number of hip fractures. Among men, there was a slight increase in the group 85 years and older; this increase was a deviation from the general trend. During these years, it was an increase of men and women 65 years or older in the population in Stockholm County but the standardised incidence decreased by 16% (Figure 6).

The analysis of the two alternative surgical treatment methods for hip fractures reveals an increase in hip replacements and a decrease in osteosynthesis. The average length-of-stay decreased by 1.4 days, in acute care departments. Therefore, the utilisation of

acute hospital care for hip fractures decreased because of shorter hospital stay. However, if in-hospital rehabilitation or geriatric care immediately following the acute hospital stay is included in the calculation, the average length-of-stay for in-hospital care increased by 1.3 days.

The age- and sex-standardised mortality rate decreased over the 10-year period of the study. There was a marked decrease in in-hospital mortality rate with a tendency for a reduction in the mortality rate at 4 and 12 months after discharge.

Some researchers in Sweden have reported similar decreases in the number of hip fractures, but researchers and public authorities in other countries have reported an increase in the number of hip fractures. It is possible that the Stockholm County Council's intensification of its programme to prevent accidental falls and to treat osteoporosis may partially explain this positive trend. Overall, the average length-of-stay in orthopaedic departments in Stockholm County, as well as in Sweden, has gradually decreased. This is a remarkable trend considering the continued increase in the number of elderly people in the population.

The conclusion is that the number of hip fractures patients has remained constant during the period of this study. However, because of the increase in the population in the same period, the ratio of hip fracture patients to the general population has decreased. The length of hospital stay for hip fracture patients has generally decreased. There has also been a decrease in the mortality rate in the hip fracture group. As far as surgical intervention, there has been an increase in hip replacements and a decrease in osteosynthesis.

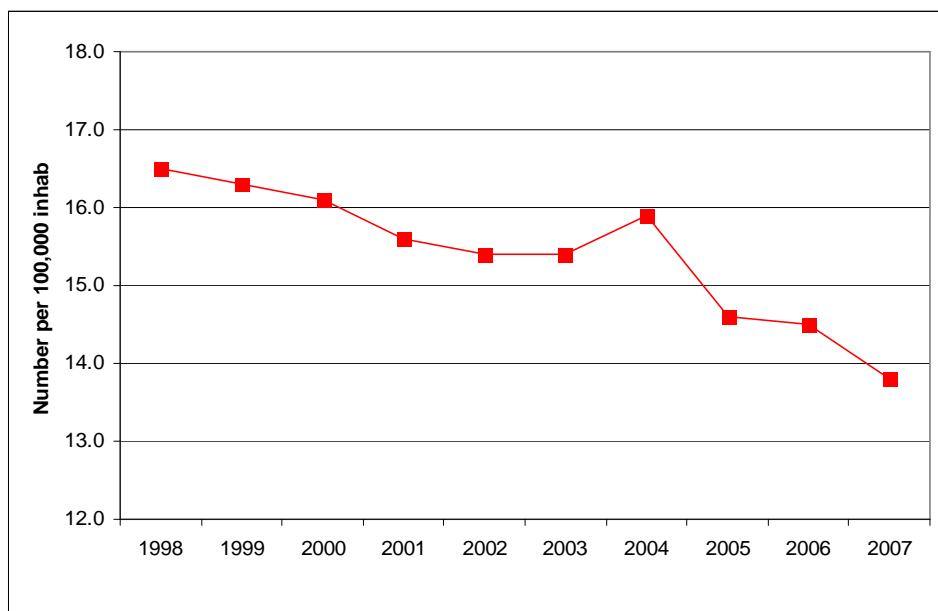


Figure 6. Proportion of hip fractures in Stockholm County 1998–2007 per 100,000 inhabitants, standardised by age and sex

6.1.2 Study II: Context challenges the champion:

Improving hip fracture care in a Swedish university hospital.

Many change project studies report short-term effects, but few studies report organisation-wide success. Some studies report an overall 70% failure rate in change programmes. Given these generally negative results, opinion leaders' and change agents' support for change is particularly important in professional organisations.

The study describes and explains the design and implementation of the change programme aimed at improving hip fracture care and its outcomes. The specific research questions were: 1) What were the assumptions or "programme theory" underlying the improvement initiative? 2) How did the initiative affect the quality of patient care? 3) How did the initiative affect the perception of personnel about hip fracture patients? 4) Which factors facilitated or hindered the initiative.

The study covered the years 2006 to 2009. A mixed methods case study design, based on Pettigrew and Whipp's framework for strategic change, was used. Following this framework, data were collected on the *content* of the initiative, the *process* of the initiative, and the organisational *context* of the initiative. In addition, data were collected on the intermediate and final *outcomes* of the initiative.

The primary *content* of the initiative was the introduction of patient empowerment in a new, personalised rehabilitation programme. Another aspect of the *content* was defined as the effort to reduce the time from patient admission to hip fracture operation. The project team members called the planned redesigned patient pathway the "Jungle Path".

The *process* of the initiative referred to the actions taken by the project leader, the project team members and others in implementing their initiative for the pathway redesign and patient empowerment. These actions were intended to reduce the time from admission to operation, and to advance patient empowerment over post-operative care.

The *context* of the initiative was the large university hospital where some staff members supported the change while other staff members resisted it. For the two groups past experiences in development work, and their wish to help a neglected patient group added nuance to the *context*.

The *outcomes* of the initiative on process quality were measured as the proportional rate of hip fracture patients operated on within 24 hours of admission.

The findings of this study reveal the limits on what an enthusiastic and respected project leader and project team members can achieve in attempting a change initiative. The findings provide the following answers to the research questions:

1: Which assumptions or “programme theory” guided the initiative?

The project leader used a “programme theory” based on the assumption that the data on the poor prognosis of hip fracture patients and the concern about the low priority given to their treatment would stimulate others to take action. This assumption, while intuitive, seemed consistent with what is known as an effective strategy.

2: How did the initiative affect the quality of patient care?

The population of hip fracture patients operated on in 24-hour timeframe increased only slightly. However, the evidence suggests that because the nursing staff paid more attention to this patient group, there was an improvement in the quality of care.

3: How did the initiative affect the perception of personnel about hip fracture patients?

There is evidence that nursing staff recognised these patients were a “forgotten group”, and that insufficient attention was paid to requirement to treat the patients within 24 hours of admission. The “Jungle Path”, as the patient pathway was named, and the discussions it initiated led to an increased focus on this patient group.

4: Which factors facilitated or hindered the initiative.

The most important facilitating factors related to the project leader: his dedication to the project, his seniority, and the professional respect others had for him. Additional facilitators were the authorisation of emergency care nurses to order analgesics and radiology examination and the use of a largely stable, multi-professional care improvement team. Hindering factors were the lack of information on the guidelines and the criticism concerning their evidence base. The many competing development activities that took place in parallel with the project in a hospital of large size may also have been hindering factors.

The research and development hip fracture project can be contrasted with a top management-driven initiative at the hospital that used a structured change model based on lean management principles. That initiative, which also involved local improvement teams, had a corporate support unit that developed a line command with regular reporting to top management. By contrast, the hip fracture project was a clinical research and development project, initiated by a senior orthopaedic surgeon who formed a highly dedicated team of clinical staff. However, this team did not use sophisticated methods and did not have formal authority to require other departments to make changes.

The change approach, which was led by a project leader who was a “physician champion,” may be described as a “bottom-up” approach. He did not include a patient pathway sub-project in the research proposal. The “birth” and “growth” of the “Jungle Path” was thus an emergent rather than a planned approach to organisational change.

6.1.3 Study III: Empowerment: A way to improve post-operative rehabilitation for patients with hip fracture?

This study describes the rehabilitation programme and its results measured as LOS, mortality rate, and return to previous accommodation. In the research on potential of patient empowerment, previous studies have shown that there is a need to attend to each patient's resources when developing appropriate rehabilitation programmes. In this research and development project, patient empowerment was defined as "gaining control over and mastery of daily activities aimed at the same level of daily activities after rehabilitation as before the hip fracture".

The new specially designed rehabilitation programme at Huddinge included: 1) Patient empowerment supervised by the nursing staff; 2) Personalised rehabilitation care tracks; and 3) An information package provided to the patients and their families. The empowerment programme followed the principles established by WHO that recommended eight guidelines for good patient interaction. The aim of the empowerment programme was to support patient autonomy, to counteract negative patient feelings such as fatigue and weakness, and to help patients achieve their highest rehabilitation potential.

The primary effect variable was LOS, defined as "the time in emergency hospital and rehabilitation in direct connection with the hip fracture". Patients at the intervention site (Huddinge) were discharged after rehabilitation in the geriatric ward directly to their post-hospital accommodation. At the comparison site (Solna), a rehabilitation period in an outside institution was routinely included in the post-operative care. The results show that the observed LOS was significantly longer – almost 4 days – at Solna although there was very little variation in LOS among the age groups. Empowerment did not affect mortality rate. There was a significant difference in the "return to the same housing as before fracture" between the groups: 90% of patients from Huddinge returned to the same housing compared to only 80% of patients from Solna.

The application of the Pettigrew and Whipp framework for strategic change in the analysis of the data gives a picture of the *content*, *process*, and *context*, as well as the outcomes.

The *content* of the strategic change was the redesigned rehabilitation programme with its emphasis on empowerment, rehabilitation care tracks and the information package, all within one entity. This study found that the programme with coaching in new behaviours, built on a WHO programme for improving interaction between caregivers and children, also was appropriate for interaction between caregivers and elderly patients.

The *process* of strategic change was the application of the programme in post-operative rehabilitation. Each patient was encouraged to take command of his/her own mobilisation according to his/her ability. In order to achieve the stated objective, all staff groups supported and coached the patients.

The *context* of the strategic change was the difference in care organisation between Huddinge and Solna. The coordinated rehabilitation programme (at Huddinge) emerged as superior to the fragmented rehabilitation programme (at Solna). Patient empowerment and personalised treatment may help patients to "return home" sooner.

The *outcomes* of the strategic change revealed a reduction in LOS by almost 4 days at the Huddinge site compared to the Solna site. The project leader's original assumption was that the hip fracture patient group would resemble patients admitted for elective osteoarthritis hip surgery with a target LOS of 5 days. However, as a group, hip fracture patients are not easily compared to hip replacement patients who have elective surgery, even though the surgical methods for the two groups are similar in many ways. Nevertheless, it appears that the empowerment programme helped decrease LOS significantly as well as supporting patients to return to previous housing.

6.1.4 Study IV: Coordination pays: A comparison of costs and outcomes of two ways of organising hip fracture care

This study reports on costs and outcomes analysis of two ways of organising hip fracture care. It is known that the care of hip fracture patients consumes a significant share of health care expenditures, but less known about the effects on treatment outcomes and resource utilisation of different ways of organising that care. Acute care for hip fractures may be separated from rehabilitation that is performed in another institution. In other situations, the full episode of care may be provided in the same location.

The objective of this study was to compare these two ways of organising hip fracture care, in particular the effect on direct costs for an in-patient episode, length of hospital stay, and the health-related quality of the patient's life.

Accounting methods may differ among hospitals and among regional and national health care systems. Costs may be calculated according to the average ward-specific cost per bed day (CPB), according to cost items allocated to the costs per patient per episode (CPP) or according to the cost of diagnose-related group categories (DRG). To my knowledge no previous studies have compared these different methods of calculating costs of hip fracture care.

In this study, costs for the complete care episode were estimated using three costing methods: CPB, CPP and DRG. All three costing methods included the most important cost items. Costs of hip fracture care have not previously been calculated in Sweden with these different costing methods for complete care episodes.

A measure of the outcome of a medical procedure is the improvement in health-related quality of life (HRQoL) taking the patient's perspective into consideration. In this study, the health status profile, EQ-5D, was used to make this measurement. The patients' reported health-related quality of life was measured at admission, and at 4 months and 12 months after hospital discharge.

At Huddinge, where the orthopaedic surgeons and geriatricians worked together, there were positive effects on LOS and cost of care. The findings of this study show that the coordinated care model at Huddinge resulted in a significantly shorter LOS (3.9 days shorter) than the fragmented care model at Solna. The distribution of in-hospital days is shown in Figure 7. The findings also favour the coordinated care model at Huddinge because of the reduction in costs, which ranged from 9% to 42%, depending on costing method used. The cost of care at the rehabilitation units per day was significantly lower than at the geriatric departments at the other hospitals. Some of the costs variations indicate selective referral patterns. Patients with minor medical needs at Solna were presumably sent to rehabilitation units while patients with greater medical needs were sent to geriatric departments. That routine may explain why LOS was shorter in the rehabilitation units than in the geriatric departments.

The calculations revealed a broad range in the cost of a complete care episode: from SEK 76,288 (EUR 7,183) to SEK 130,699 (EUR 12,307)¹. The largest cost difference (42%) was observed using the CPB calculation. However, CPB is a rough measure and does not account for differences in the patient-mix, which can differ significantly between a geriatric department and an orthopaedic department.

The DRG cost for the complete care episode at Huddinge was 27% lower than at Solna. Based on DRG payments, the fragmented model at Solna was 37% more costly compared with the coordinated care model at Huddinge over the complete care episode. This difference was far lower (9% difference) when CPP was used, indicating that a more precise costing method reduces the cost differential. The costing of treatment and care, like “product costing”, relies on cost estimations and cost allocation rules based on conventions. Therefore, they do not reflect “true costs”. On the other hand, the consistency in differences among the three costing methods as applied to the two care models strengthens the argument that the coordinated model at Huddinge is more cost efficient than the fragmented model at Solna.

As calculated by the three costing methods, the coordinated care model at Huddinge was neither inferior nor superior in terms of quality of life measured by EQ-5D. The patients at both sites felt that their health-related quality of life had deteriorated one year after the fracture, which is understandable given the advanced age of the patients.

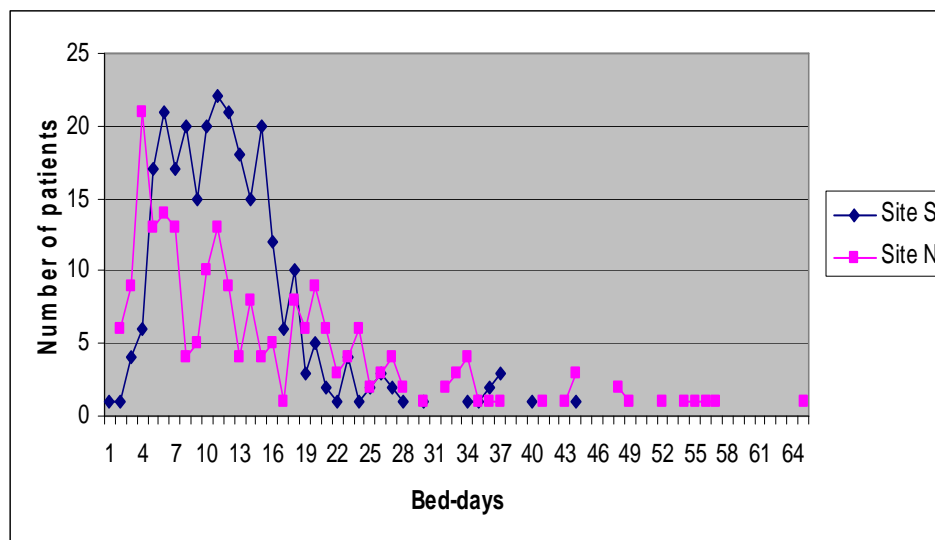


Figure 7. The distribution of in-hospital days at site S= Huddinge and Site N = Solna

¹ Bank of Sweden 2009 average exchange rate: 1 euro = SEK 10.62)

7 DISCUSSION

The main findings of the four studies are:

The background, Study I, revealed that between 1998 and 2007, the rate of hip fractures declined by 16% while the number of hip fracture patients and their utilisation of hospital services remained constant even though the absolute number of elderly persons and the proportion of at-risk, elderly persons in the population in Stockholm County grew considerably.

The initiative to redesign the care process at admission shortened the time to diagnosis and the waiting time to radiology department because the nurses wrote the referrals. However, there was no increase in the rate of patients operated on within 24 hours of admission.

A coordinated care model based on an individually adjusted rehabilitation programme that included patient empowerment reduced the length of hospital stay, led to earlier returns to pre-accident housing, and was less costly than fragmented care.

Health care quality improvement programmes are complex social interventions. They can only be properly evaluated and understood if the interplay between context, content, process and outcome is well described and evaluated (71). Pawson and Tilley (84, 85) state that whether the ideas in change programme have sustainable effects or not depends on i) the individual capacities of the change agents/project leader, ii) the interpersonal relationship in the group responsible for the change effort, and iii) the institutional balance between the organisation and the wider infra-structural system. All these aspects were taken into consideration in the use of the Pettigrew and Whipp framework in this research. I use the framework in an attempt to bring the bits and pieces of my findings together.

7.1 CONTEXT

The Karolinska University Hospital, which is the biggest university hospital in Stockholm, serves a population of about two million people in the Stockholm County. The hospital has two sites: Huddinge and Solna. In this research, Huddinge was the study site and the Solna site was the control site. Huddinge is the only university hospital in the county that has a geriatric department in the hospital. The university hospital orthopaedic department has activities at both sites.

7.1.1 The size of the hospital

The size of the hospital may have been a complicating factor. There were six different departments involved in the change process aimed at operating on the hip fracture patients within 24 hours of admission. Shortell et al. (86) report that larger hospitals are less likely to have group-oriented cultures that emphasise teamwork, empowerment and related attributes. Such attributes, which are known to promote staff involvement in change processes, contribute to the success of such processes.

As the hip fracture research and development project was on-going, the newly appointed chief executive officer (CEO) of the Karolinska University Hospital launched a lean thinking-inspired process improvement programme in the hospital. That programme was carefully planned, methodologically rigorous and top-down driven. The hip fracture project, which was inconsistent with this approach, was eventually terminated. It is obvious that context, which was an extremely important consideration, should be considered in the analysis.

7.1.2 Development of the need for hip fracture care

The utilisation of hospital care because of hip fractures seems to have stabilised at the same level after the turn of the millennium in Stockholm County. The predicted increase in hip fracture cases also seems to have levelled. Given that the size of the patient group is still very considerable – the risk is higher in the Nordic countries than elsewhere (5, 6) it is important to find an organisation that provides efficient treatment and high quality care. There are other important initiatives that can reduce the risk of hip fractures e.g. prevention of osteoporosis and falls but those initiatives are outside the scope of my study.

7.1.3 Organisation of hip fracture care

New care models have been developed in the hope of finding the best care for various geriatric patient groups (28) (see Figure 2 for some of these models). The hip fracture care organisation at Huddinge is most similar to Model D in Figure 2, and the hip fracture care organisation at Solna is most similar to Model A in Figure 2. The fact that the same hospital has different organisations at the two sites has a historical background. Huddinge, unlike Solna, has a geriatric department in the hospital that provides acute care. At Solna, by contrast, acute care is separated from geriatric rehabilitation. It should be noted that local organisation and resources are often the foundation of a care model, but they do not, however, provide the best evidence of the actual care (28). It is the professionals in the organisations who primarily define the models.

New surgical methods and technological advances have led to specialisation and increased organisational fragmentation in hospital care. Such methods and advances have also meant that patients often have to wait during moves between departments and wards (87, 88). The project leader's goal in this project was to reduce this situation of long waiting times. Such delays indicate poor quality in health care and have no beneficial effect on patient outcomes. The research shows that many attempts have been made to streamline the patient's journey through the hospital, but few seem to have been successful (89).

7.2 CONTENT

The most important content in the hip fracture care improvement initiative was the development of the new, personalised rehabilitation programme that introduced patient empowerment. The intent of the rehabilitation programme was to strengthen the patient's position and to shorten the patient's hospital stay. The principals used in the empowerment programme were established by WHO. The guidelines for these

principles were designed to strengthen the interaction between mother and child, but they were so general that they suited this elderly group of hip fracture patients.

Personalisation of rehabilitation programmes may be a way to take advantage of each patient's ability in a respectful way. Such programmes improve both patient care and patient outcomes. The information package given to patients and their relatives was one element of the programme. Informing the patient of what is happening in his/her situation helps the patient, as the main character take command of his/her rehabilitation. Although this research showed that patient empowerment did not seem to have an effect on patient's quality of life as measured by the EQ-5D scale, it is still reasonable to assume that the empowerment is of great value both to patients and to staff members. Other research supports this conclusion (90-92).

One of the objectives of the work with the patient pathways through the hospital was to achieve the goal of the national hip fracture guidelines that recommend an operation within 24 hours of admission. We, as health care professionals, say we comply with the principles of evidence-based medicine. The guidelines in Sweden are based on medical evidence and on medical optimisation for the patients. And here we can get into trouble because much of the research about time to surgery for hip fracture patients comes from researchers in other countries with different health care systems and with different routines and structures of hospitals and medical organisations. The many reports from other countries, which claim 48 hours is acceptable, have led to discussions among Swedish orthopaedic surgeons about what "evidence-based" means. My interviews disclosed that many of the interviewees, both physicians and nurses, did not even know that the Swedish guidelines existed. It has not been investigated whether this lack of knowledge is the result of poor information or of an attitude that the information is unimportant. As long as the profession has differing opinions about the evidence, the guidelines will not be implemented.

7.3 PROCESS

The processes of change were the actions taken by the project leader, the project team members and the clinical staff in their plan for the pathway redesign and patient empowerment. A number of activities were launched, mainly by the project leader, but also by a dedicated and active project team. Indeed, the high cohesion and continuity of the project team combined with an extensive networking by the project leader to raise interest generally for the patient group and the aims of the initiative were important features of the process. The project team tried to increase its credibility by referring to national guidelines that supported the aim of the initiative. Yet the lack of "method" stands out in the analysis of the process.

7.3.1 Project leader

The Pettigrew and Whipp framework was useful in examining how context of the process improvement change affects what can and cannot be achieved, and the ability of a project leader to achieve such change. The framework showed that while an energetic and respected clinician/project leader could achieve some changes, the context both facilitated and hindered that achievement.

The study revealed that the project leader could communicate a forceful vision, could engage many clinical staff members, and could create the conditions for some change in the patient pathway. However, without an overarching and clear plan that the top management and staff members would actively support, the chances of making the change successfully were limited. Clinical guidelines were insufficient to convince other key clinicians to support the change.

It is possible that the lack of more systematic project management method and continuous improvement methods contributed to the failure to achieve the project goals. However, it is also possible that had such methods been used, it would still have been difficult to overcome the orthopaedic surgeon's resistance to change in their work practice.

The project leader took a broader role than a typical change agent and was more actively involved in the details of the change. He did not originally include the patient pathway sub-project in his research proposal. During the first year of planning, he realised it was necessary to reorganize the care in order to achieve the overall aims of the project.

The interpersonal relationship in the project group was excellent and many difficult issues were solved quickly and smoothly, such as the nurses' referrals to the radiology department. This result shows that it is important for change leaders and trusted change agents to lead change processes in professional organisations (93). However, while the project leader communicated his vision clearly and thereby engaged many clinical staff members, he was unable to convince his colleagues - the orthopaedic surgeons - to prioritise the operation for the hip fracture patient group. The goal of time to surgery for hip fracture patients of 24 hours was not achieved.

The project leader as a change agent was a "champion". Damschroder (94) states that "champions" typically create conditions for change by protecting those involved from organisational rules and systems that may be barriers, by building support for new practices, by facilitating the use of organisational resources and by promoting coalitions of stakeholders. These were all actions taken intuitively by the project leader.

The project leader did not use any of the established change models. He often worked ad hoc, dealing with the situations as they rose. He used his enthusiasm as a driving force for change. Yet some of his actions were also deliberative in that they resembled the actions described in the change literature, particularly by Kotter (41). The project leader followed the eight steps in Kotter's model; developing urgency, building a guiding team, creating a vision, communicating for buy-in, enabling action, creating short-time wins, don't let up, and making it stick.

7.3.2 Striving for change

Two change initiatives were made in the research and development project. The first attempt at the geriatric ward – the patient empowerment – was carefully planned and implemented as an educational programme that dealt with how to empower hip fracture patients in their rehabilitation. The new rehabilitation programme with the four care

tracks was also personalised with its adaptations to patient abilities and needs. The staff members, who were very dedicated, said that as the result of the empowerment training, they had a more positive image of the patient group. The second attempt – the patient pathway – called the “Jungle Path” – began when the project leader realised that the process from admission to operation to the geriatric ward had to be reorganised if waiting times for surgery were to be reduced. The guidelines recommendation of an operation within 24 hours of admission after hip fracture incident had not been met. A team of representatives from the six involved departments participated in the process. The process from admission to diagnosis was successfully reorganised, but there was no change in the later stages because the central actors did not agree to the 24-hour recommendation. Interestingly, earlier initiatives at the same hospital to improve hip fracture care were also unsuccessful (95, 96).

Grol (42, 43) argues that, because of the complexity in health care, it is not realistic to expect that there is one method for improving health care that can solve all problems. There is no evidence that any of the popular models for improving clinical performance is superior to others.

Grol and Grimshaw (36) have comprehensively summarised the literature on guidelines implementation. In this summary, they identified three types of barriers to change: the practice environment (organisational context), prevailing opinions (social context), and knowledge and attitudes (professional context). A barrier may also result from the guidelines’ lack of credibility (97). Both social and professional barriers were evident at Huddinge. The best prospects for practice change stem from a self-initiated learning process, with an experienced problem as a trigger. Responsibility and incentives need to facilitate, not hinder, the change (43).

According to Ham (98), “The implication is that quality improvement initiatives have to be applied in a way that recognises the distinctive features of hospitals, particularly the autonomy of physicians”. There are sources that report a failure rate of 70% in all change programmes initiated (99).

Despite the growing body of research on the effectiveness of different implementation strategies, the explanation for this high rate of failure may be that change programmes are not always easily accessible to policy makers and professionals (44).

7.4 INTERMEDIATE AND PATIENT OUTCOMES

The original goal of the research and development project analysed in this thesis was to enable hip fracture patients to take active role in their rehabilitation and to begin mobilisation earlier. The second goal that emerged during the project was improving the care process in order to reduce time to operation. The empowerment programme led to shorter length-of-stay, a higher proportion of patients returning home earlier, and lower costs compared to the traditional model of hip fracture care. The “Jungle Path” meant that the patients were diagnosed sooner. In addition, staff members came to realise the importance of paying close attention to the hip fracture patients. However, the proportion of patients operated on within 24 hours did not increase.

The hip fracture population is, on the whole, elderly and fragile. Many of these patients have co-morbidities that require geriatricians to participate in their care. In this study, the outcomes were better in the care that was co-managed by geriatricians and orthopaedic surgeons. Other research reaches the same conclusion (30-34). For example, Miura et al.(12) have shown beneficial results on both length-of-stay and costs in a before-and-after study of a geriatrician-led hip fracture programme.

7.5 BRINGING IT ALL TOGETHER: FINDING EXPLANATORY MECHANISMS

The findings from Study II, III and IV are reported in previous sections of this thesis according to the Pettigrew and Whipp framework under the headings of context, content, process and outcomes. (Study I set the scene by analysing how challenging hip fractures are to the health care system.) What does the big picture look like?

Macaulay et al. (100) write that realist evaluation or review is “a qualitative approach to synthesising qualitative, quantitative, and mix-methods evidence from programme interventions”. More specifically, such evaluations or reviews look for *mechanisms* that can tie the interventions to context and outcome, answering the questions of “what works, how, for whom and in what circumstances” (84, 85). Next, emulating the process of a realist evaluation, I identify the key features or activities under each of the four headings in Pettigrew and Whipp’s framework and discuss how they are interrelated and suggest concepts from the change management literature that form candidate explanatory mechanisms. That big picture is illustrated in Figure 8.

EXPLANATORY MECHANISMS

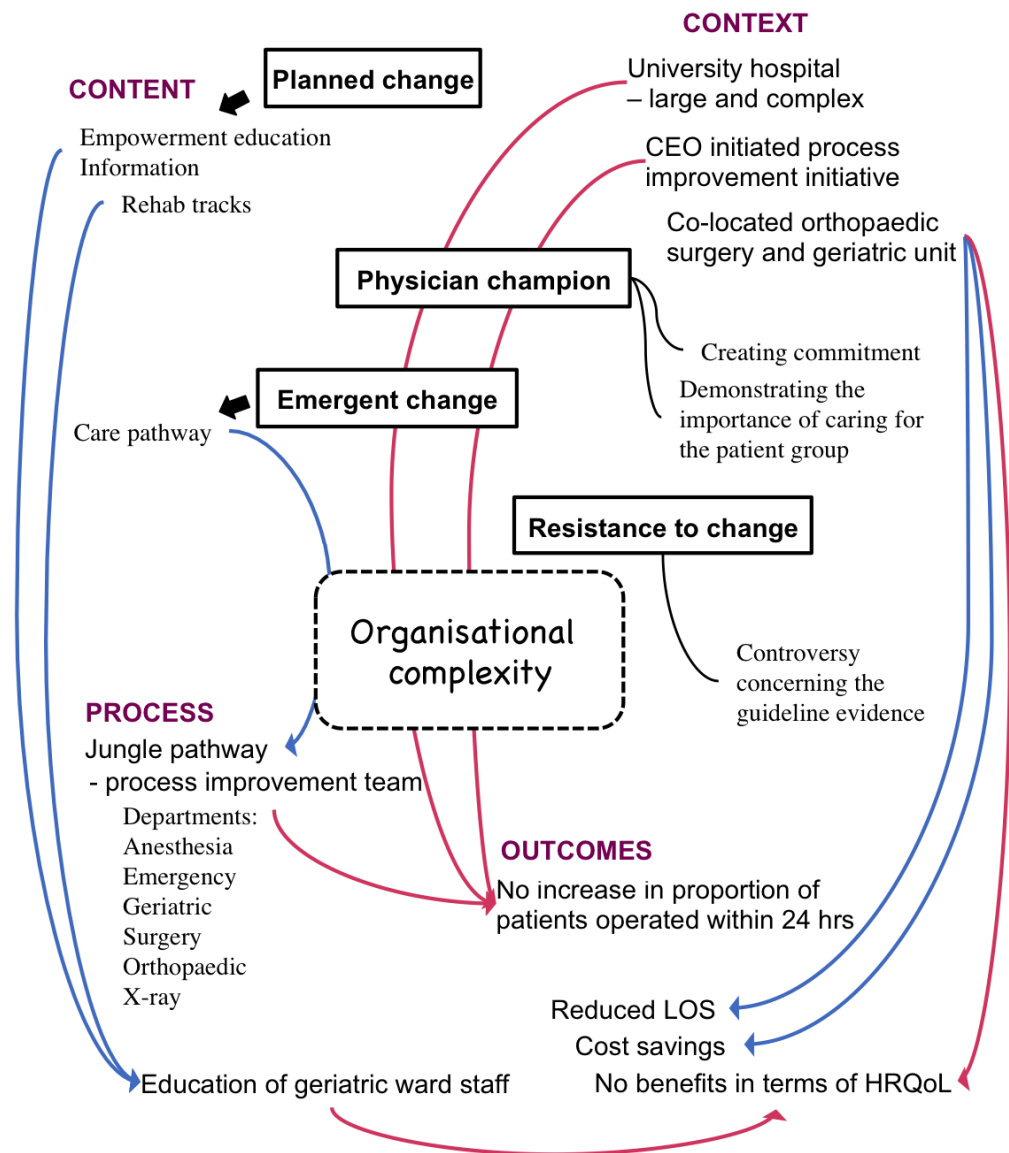


Figure 8. Explanatory mechanisms

The key content or programme intervention were the empowerment programme, the four rehabilitation care tracks at the geriatric department, and the initiative to redesign the patient pathway for hip fracture patients from admission to surgery.

The process - how the programme interventions were performed – had two main parts. An educational programme at the geriatric department motivated and trained staff members to engage in patient education and support. The programme also provided information to patients and relatives, adapted to each of the four post-operative rehabilitation tracks.

The educational programme was part of the original research and development project that the project leader proposed. During the implementation of the project, he noted that

the waiting time from admission to the emergency ward to surgery exceeded the time limit recommended by the national guideline for hip fracture care. In the hope of shortening that time, he redesigned the patient pathway so that it involved all departments participating in the care. To that end, he formed an improvement team of clinicians involved with the care of hip fracture patients.

The context was a large university hospital with two sites. At one site, a geriatric ward – specially organised for rehabilitation for elderly and often frail patients with multiple conditions – was co-located with the orthopaedic department that was responsible for the hip fracture operations. Meanwhile, the hospital CEO launched a hospital-wide “flow project” aimed at improving patient care processes, beginning with the emergency department processes.

As described next, I could document several outcomes of the research and development project. The patient pathway redesign was aimed at increasing the proportion of hip fracture patients operated on within 24 hours. That goal was not achieved. The analysis of hip fracture care in the project compared to an approach over the full care episode revealed a reduced LOS and lower costs as calculated by three different costing methods, but no benefit in terms of self-reported, health-related quality of life.

The empowerment programme was carefully planned and implemented as an educational programme for the geriatric ward staff. The programme was a *planned* approach to change (101). In contrast, the decision to launch the care process improvement effort at the six involved departments was made during the project. The project leader named the initiative the “Jungle Path” and is best described as an emergent approach to change (101).

The coordinated care at the geriatric ward presumably made it easier to introduce the empowerment education programme and likely contributed to the positive outcomes, measured over the full episode of care. However, because the introduction of the hospital-wide process improvement initiative interfered with the emergency ward process redesign attempt, the initiative’s goals were not reached, and eventually the initiative was terminated. In addition to a *competing* change initiative, the *complexity* of the hospital organisation very likely explained this failure.

The project leader’s high profile as a *change agent* was central to both the change initiatives in the project. “Champion” is a more accurate description of the project leader, given the dedication he inspired among the staff – and also among the other involved departments. In addition, he championed the importance of paying attention to this frail patient group with its alarmingly high mortality rate. These change initiatives were also met by *change resistance*, especially among some influential orthopaedic surgeons. Such resistance had a significant effect, particularly on the care process initiative.

In summary, this thesis shows how, in an organisation of high complexity, both planned and emergent changes may occur. Planned change uses the beneficial conditions created by the co-location of activities needed to produce a positive outcome; these activities are greatly enhanced by a respected clinical leader – a

champion. Through such planning, it may be possible to overcome some of the resistance to change that evolves among key stakeholders.

7.6 METHODOLOGICAL CONSIDERATIONS

This thesis scrutinises a case – the organisation of hip fracture care in a Swedish university hospital. In the research, a mixed approach of both quantitative and qualitative research methods was used. The case is also a collection of four studies, each of which applies a different study design.

Study I analysed in-hospital care for hip fracture patients in Stockholm County during 1998-2007. The data for the study is from the hospital discharge register (“patient care register”, PCR) that lists all hip fracture patients admitted to regional hospitals during those years. Consequently, the differences among age and gender groups and the development trends observed are factual. The coverage of the region’s PCR is as close to 100% as can be practically achieved because all hospitals and care providers, which are funded by the county, are required to report to the register. Other researchers have found that the accuracy of the PCR information is high. The main diagnosis (hip fracture) is very reliable.

However, there are indications of underreporting of secondary diagnoses such as dementia or delirium that require a higher degree of care. As the PCR is the data source for diagnose-related payments to the providers, there is a strong financial incentive to improve the reporting of all diagnoses, especially secondary diagnoses. Despite the possibility of underreporting, because the PCR contains information on all in-hospital care, gross hospital care utilisation figures are not distorted.

In order to assess the generalisability of the PCR data for Stockholm County to the whole of Sweden, the PCR statistics were compared with those recorded in the national quality register. This register reports hospital utilisation per hospital throughout Sweden (thus, it is possible to compile regional aggregates). A weakness of Study I is that long-term or residential care is not included in the PCR as those forms of care are the responsibility of municipalities (local authorities), not the counties. Because there is some overlap between rehabilitation and recovery after surgery in acute care hospital wards and long-term care institutions, there is a risk that the discharge register information slightly underestimates total rehabilitation utilisation during the acute care phase.

In Study II, a single case study was used. The rationale for such study is that it makes an in-depth investigation of a situation possible. The improved care model for hip fracture patients has both unique and general traits. The empowerment programme, which was aimed at a group of elderly and mostly fragile patients and included the four rehabilitation care tracks, was novel. The initiative to reduce waiting times for surgery in the emergency department represents a typical process improvement project. In a case study, it is essential to describe the chain of events as comprehensively as possible by collecting data from several sources and from many points of view (data and methods triangulation). In this study, the data sources were documents (e.g., formal reports, minutes of meetings, and interviews) and participant observations.

A single case takes place in a specific context, here, the Karolinska University Hospital, Stockholm, Sweden. Yin (77) underlines that case studies rely on analytical generalisation rather than statistical generalisation. Here I applied analytical generalisation to link the results to relevant theory. However, as Yin also notes, the advantages of the case study method make it a preferred method when studying complex social interventions. By applying analytical induction empirical patterns and explanations can be generated – taking into account the special conditions identified in the case – that might be used to inform decisions in comparable situations. Flyvbjerg (102) also argues that “the force of example” is underestimated. All in all, generalising the findings from the case to other settings requires careful consideration. Additional exploratory studies that use a variety of research methods should increase our understanding of successful strategies for improving patient pathways.

Study III, a novel hip fracture care model was compared to standard hip fracture care in a prospective study. The university hospital, where the study was conducted, performs orthopaedic surgery for hip fracture patients at two sites. Thus, it was possible to compare patient care at the two sites. As the hospital has one uniform catchment area, patients were not systematically directed or selected to either of the two units. A comparison of patient demography and clinical characteristics at the two sites revealed no significant differences between them. Both orthopaedic surgery units were part of the same clinical department, had the same organisational culture applied the same surgical procedures. Hence, the probability that surgical and care practices would differ between the two sites was small.

There were two main differences between hip fracture care at the two sites. The first difference was the use of the patient empowerment programme at the geriatric ward at the study site; the second difference was that the geriatric ward at the study site cooperated closely with the orthopaedic surgeons.

The outcomes variables in this study were the length-of-stay (a process indicator), the mortality rate and ability to return to pre-fracture housing. Length-of-stay is an exact measure, calculated as time between admission and discharge dates. As the study included all hip fracture patients treated at the two sites during the study period, the difference observed in length-of-stay was correct. The study revealed no difference in mortality rates at the two sites. The study revealed a significant difference in ability to return to pre-fracture housing. A limitation of this comparative study is that the patients were not randomly selected to receive treatment at either site. However, this seems a minor problem since the only significant difference between the two sites as far as hip fracture patients are related to the care model studied.

Study IV was a cost and outcome analysis of the two models for organising hip fracture care at the two sites. The study uses the same patient data as Study III. Outcome measures were length-of-stay and self-reported health-related quality of life. Three costing methods were used to compensate for the fact that “product costing” (the cost of patient care episode) is an approximation. Length-of-stay was computed as in Study III. HRQoL was assessed using the EQ-5D survey form that many studies have shown

to be valid and reliable in different contexts across national borders. The calculation of the costs of patient care episodes relies on cost estimations and cost allocation rules and does not use “true costs”. However, the consistent results from the three costing methods justify the conclusion that a systematic difference between the two care models exists. A limitation of the study concerning the cost calculations is that the care episodes do not include the rehabilitation provided after discharge in long-term or residential care, the responsibility of municipalities. This omission may underestimate the costs of the acute care episode, but there are no indications that the omission distorts the comparison between the two sites.

Study III and IV compared two organisational models of care as part of a “natural” rather than strict controlled experiment. The two studies analysed total patient populations at both sites. Although no differences were found as to patients’ sex, age and type of hip fracture at the two sites, a randomised, controlled trial is needed to firmly establish whether the indicated results on the benefits of the coordinated care model are valid. The intervention was carried out in the specific context of the Karolinska University Hospital, Stockholm, Sweden. Therefore, the findings of this thesis may not be duplicated in other settings. Nevertheless, the case study analysis, Study II, provides specific information about which context factors and features of implementation process should be taken in account when applying the coordinated care model elsewhere.

8 CONCLUSION

8.1 ON THE FIFTH DAY

On the fifth day for hospital discharge was an overly optimistic goal. The original assumption in the project was that some hip fracture patients would resemble patients admitted for elective osteoarthritis hip surgery as far as LOS. It was found in the project, however, that hip fracture patients cannot easily be compared to hip replacement patients who have elective surgery even though the surgical methods are similar. The hip replacement patient mentally prepares for surgery and for a hospital stay; the hip fracture patients does not have the luxury of such preparation.

8.2 CHANGE STRATEGIES

The findings indicate that a “bottom-up” change strategy, implemented by an enthusiastic project leader who acts as a clinical “champion”, can draw attention to a neglected group of patients. In this study, the project leader successfully assembled a group of clinical staff members from different departments who were willing to work for the same goal – a better care for an elderly, fragile patient group. Several improvements were achieved such as rapid referral to radiology and rapid diagnosis of the fracture. Moreover, a new, personalised rehabilitation programme was developed that was administered by staff members who had been trained to empower patients in their own rehabilitation.

The major problem with implementing the change strategy was the orthopaedic surgeons’ resistance to the recommended 24-hour guideline for the time between hip fracture diagnosis and operation. This resistance seemed to arise from the results of evidence-based medicine that showed a 48-hour guideline was acceptable.

8.3 IMPLICATIONS FOR CARE

The findings of this thesis show that a coordinated health care organisation for hip fracture patients, compared to fragmented, results in shorter length-of-stay, supports the introduction of individual rehabilitation and is less costly. Such coordinated health care can be developed in clinical practice and need not affect the whole hospital structure. If the treatment of hip fracture patients is to improve, then the entire continuum of care at a hospital must be strengthened. This requires top management support.

The findings of this thesis may have implications for other initiatives that are intended to optimise the organisation of hip fracture care. Such optimisation requires evaluation of improvement initiatives, including the extent of top management commitment and the use of champions or change agents. The participation of all those involved in such initiatives is essential.

8.4 SUGGESTIONS FOR FUTURE STUDIES

During the time I studied this research and development project and wrote this thesis, many new and relevant questions have been posed about implementing change initiatives and about hip fracture care.

- Does change saturation make further changes more difficult?
- How do we find the mechanisms that can facilitate the sharing of knowledge and programmes that improve hip fracture care?
- What kind of programmes will engage and empower patients?
- How will an empowered patient effect the future health care organisation?
- How can we learn which organisation is most beneficial to patients?

This thesis focuses narrowly on an in-hospital care project. Other researcher may seek answers to these broader questions.

“NOTHING CHANGES UNLESS BEHAVIOUR CHANGES”

Andrew Pettigrew

8.5 SAMMANFATTNING PÅ SVENSKA

Som forskare på Medical Management Centre, Karolinska Institutet, Stockholm, Sverige blev jag inbjuden att ta del i, studera och utvärdera ett höftfrakturprojekt. Syftet var att lära mer om implementering av förändringsprocesser i en komplex organisation. Det övergripande målet för avhandlingen är att öka kunskapen om hur organisation och vårdprocesser kan ändras för att öka vårdkvaliteten illustrerat genom vården av höftfraktur patienter. Som exempel användes ett projekt som genomfördes på Karolinska Universitetssjukhuset, Huddinge. Syftet med projektet var att omhändertagandet av patienter med höftfraktur skulle förbättras genom ett individualiserat rehabiliteringsprogram där tonvikten lades på att låta patienten behålla sin självständighet.

Patientgruppen kräver stora resurser inom sjukvården speciellt inom ortopedin. Majoriteten av patienterna är över 65 år och med en medelålder på 85 år. Antalet höftfrakturer har varit konstant under en 10 års period trots att Stockholms befolkning stadigt ökat och att antalet äldre blivit fler. Dödligheten är mycket hög, 14-36 % av alla patienter är döda inom 12 månader.

I projektet gjordes försök att förbättra vårdkedjan inne på sjukhuset så att patienterna skulle bli opererade i enlighet med Socialstyrelsens rekommendationer dvs. inom 24 timmar. Hypotesen var att patienterna skulle kunna skrivas ut till det boende de kom ifrån inom 5 dagar. Det innebar förkortad vårdtid vilket i sin tur skulle leda till bättre genomströmning på sjukhuset. För att stärka patienterna genom "empowerment" uppmuntrades de av personalen till att vara självständiga i vårdssituationen. Mekanismer som underlättade införandet av programmet var en entusiastisk projektledare/ "en eldsjäl" och en engagerad och positiv personal som upplevde att patientgruppen var viktig och att vården kunde förbättras.

Ett brett spektra av både kvalitativa och kvantitativa data om organisation, processer, patienter, personal och kostnader insamlades och analyserades. Som jämförelse användes Karolinska Universitetssjukhuset, Solna. Organisationen av vården skiljer sig på så sätt att vården är sammanhållen i Huddinge dvs. patienten vårdas hela perioden på geriatriska kliniken inne på akutsjukhuset. I Solna vårdas patienterna först på den ortopediska vårdavdelningen några dagar direkt efter operationen och skrivs därefter antingen hem eller till rehabiliteringsenhet eller geriatrisk klinik bägge dessa typer finns utanför akutsjukhuset. Skillnaden i organisering speglas i kostnaderna. Den sammanhållna vården visade sig vara mindre kostsam än den uppdelade.

Kostnadsberäkningarna gjordes på tre olika sätt Kostnad per vård dag, det grövsta måttet, Diagnos Relaterade Grupper, en beräkningsgrund som används vid ersättning till sjukhusen och Kostnad per patient, den mest detaljerade beräkningsgrunden. Alla tre beräkningssätten gav samstämmigt resultat.

Projektet visade en minskning av vårdtiderna. Skillnaden mellan Huddinge och Solna var 4 dagar. Några minskade väntetider till operation kunde inte påvisas inte heller någon påverkan på dödligheten. Patienternas egen skattning av hälsorelaterad livskvalitet visade ingen skillnad mellan sjukhusen. Flera utvecklingsprocesser startades på Huddinge under samma period. Det största och mest genomgripande var

sjukhusledningens flödesprojekt som i första steget innefattade alla akutprocesser. Höftfraktur projektet kom att delvis ingå i flödesprojektet men inte rehabiliteringsprogrammet med empowerment. Det fortsatte som tidigare.

Slutsatser: Organisering av vården i sammanhållen vård ger kortare vårdtider till lägre kostnad utan att påverka patientens upplevda livskvalitet. Omgivningsfaktorer är viktiga att ta stor hänsyn till i alla förändringsprocesser. Ledningens engagemang och stöd är viktigt även om förändringsarbetet drivs från ”botten-up”. Det förebyggande hälsoarbetet och behandling av osteoporos verkar ha haft positiv inverkan på antalet höftfrakturer i Stockholms län.

9 ACKNOWLEDGEMENTS

“I have learned that people will forget what you said, people will forget what you did, but people will never forget how you made them feel”.

Maya Angelou

Many people have inspired me, helped me and encouraged me during my thesis journey. I am grateful to all of them. Researching and writing this thesis has been one of my greatest challenges in life but also one of the most interesting and most enjoyable. Since I am unable to name all those who have helped me, I will mention some while extending my gratitude to everyone else. First, I want to thank the management of Stockholm County Council who gave me the freedom to work full time on this research project.

I thank the following people:

My main supervisor, Mats Brommels, for believing in me from the beginning of this project and for guiding me through the whole research process. His support and patience during the writing process have only increased my admiration for him and my gratitude to him. His generosity and expertise made my work possible.

My co-supervisor, Johan Hansson, for guiding me in qualitative research methods and for always being willing to read text and offer fruitful feedback.

My co-supervisor, Gunnar Ljunggren, for all his work with the VAL-data base. Without that data, there would have been fewer and less interesting facts comparisons in my research. It was a joy to work with him.

My mentor, Tommy Hansson, for his continuous support. He always gave me a sense of security and trust.

I also thank “the project leader”, Leif Ryd. Without his enthusiasm and his open mind in this project, I could never have researched and written this thesis. He gave me the opportunity to work in the project and provided me with support throughout the whole process. His generosity led to the joyful and interesting journey I have taken.

I thank my co-authors:

John Øvretveit for his expertise and the work on the article that was accepted without revision.

Clas Rehnberg, for discussions and guidance in the economic field of management.

Margareta Dahlberg, Wilhemina Ekström, Lene Lindberg, and Lena Flodin for their intensive work with the Empowerment study and for all the meetings on the data collections. For this work I also thank Åsa Norling, Iwona Olsson, Luigi Belcastro, and Angela la Terra.

I thank my fellow doctoral students at MMC and other scholars and colleagues:

My “Tutti-Frutti” friends Pamela Mazzocato, Helena Hvitfeldt Forsberg, and Vibeke Sparring for always having something nice to say to each other, as well as for their assistance in the preparation for the half-time seminars and their untiring support and advice in the writing of the thesis. And also for all stimulating imaginative planning for future activities.

Carl Savage (now a PhD) for always being so inspiring, enthusiastic and willing to share his knowledge. Carolina Wannheden for teaching me how to manage a computer and making complicated figures and Waqar Ul Hassan for their work with seminars and retreat planning. Sara Tolf, Helena Gustavsson, David Bergman, and all others who participated in the DDP group, GORI meetings and seminars. I am very grateful for their eagerness to engage in discussions and for their good advice and suggestions.

My office mate Göran Tomson, for always giving me positive and generous feedback and for being so enthusiastic about my work.

Monica Nyström, for all her difficult questions and wise counsel at the pre-dissertation. Magna Andreen Sachs, Italo Masiello, and Henna Hasson for generously sharing their knowledge during these years. Duncan Neuhauser, for visiting MMC yearly and providing inspiration and scientific advice in the “Duncan Clinic”.

Pia Hartzell, for her valuable administrative support and enthusiastic help with the thesis cover. Therese Wahlström for her help with the complicated figure.

Everyone at the Department of Learning, Informatics, Management and Ethics for stimulating and supportive milieu.

Mesfin Tessma, for support with statistic calculations and discussions.

Ingrid Smedberg, for helping me with the administration for half-time and dissertation procedures. Ludvig “Ludde” Andersson, for IT-support and saving my documents when a virus infected my computer. Cormac McGrath, for discussion about “swenglish”. Marie Lind, for enthusiastic support and discussions about the cover, and assistance with the cover picture.

I also want to thank The Stockholm County Councils officials. While they are anonymous here, they are not anonymous to me. I greatly value their assistance with information about prices and costs.

Thomas Emilsson, for help when the calculations of the EQ-5D numbers were difficult to make manually. Stig Hagström, for supporting me with the data about Cost per Patient.

I thank Marcia Halvorsen for her excellent help in editing and proofreading my thesis.

I also wish to express my sincere thanks to all the interviewees, healthcare practitioners and patients who participated in the study.

I thank the following friends:

During my life I have met so many people I call my friends. Ann, Birgit and Kajsa friends since school-time. Kristina, Angela Anette, Agneta, Ulla, Catarina, Anna, Lena, and Birgitta, from the years when I worked as a physiotherapist. Torbjörn, Tore, Vivi-Anne, Jan-Åke, Sid, Ragnvald, and especially Sten, from the years in the administration. If Sten had not forwarded the email from Mats I would not have had the

opportunity to do this work. I have too many friends to name them all, but I must also mention Bacchi Wenner. You all have showed such an interest in my work and supported me in so many ways. Thanks for all discussions, lunches, dinners, mails and calls- you are the best friends any one could wish for.

Finally, I thank my family:

My brother, Håkan, his wife Lil. Håkan, who wrote his thesis many years ago, has been a model to me.

My daughter Charlotte, my son Magnus, and his wife Andreea and their beloved daughter Hanna. Many times they asked me, “Why are you doing this?” I always answered very honestly, “Because I enjoy it and I find it so stimulating”. They mean everything to me and I love them dearly.

Finally, I thank my husband, Anders, for being so loving, encouraging and supportive, and for taking care of me, including doing the boring household jobs. I have been quite spoiled. All journeys we made together during the many years have really opened my mind and have given me wonderful periods of relaxation when I needed them most. I will always be grateful for his support and just for being the fine man he is.

At my second MMC doctoral students’ retreat I was introduced to David Whyte’s book, *The Three Marriages*. Whyte claims that it is not the balance of the three parts of life – family-friends, work and self – that is important. Rather, it is to keep the conversation. Happiness depends on all three. In researching and writing this thesis, I have had supportive and understanding family members and friends, interesting, challenging and joyful work, and the chance to grow myself.

Thank you, everyone!

Stockholm, October 2011

Susanne

10 REFERENCES

1. Johnell O, Kanis JA, Jonsson B, Oden A, Johansson H, De Laet C. The burden of hospitalised fractures in Sweden. *Osteoporos Int.* 2005 Feb;16(2):222-8.
2. Thorngren KG. Årsrapport 2001 Rikshöft/ SAHFE. Lund2002.
3. Johnell O, Kanis JA, Oden A, Sernbo I, Redlund-Johnell I, Pettersson C, et al. Mortality after osteoporotic fractures. *Osteoporos Int.* 2004 Jan;15(1):38-42.
4. Keene GS, Parker MJ, Pryor GA. Mortality and morbidity after hip fractures. *BMJ.* 1993 Nov 13;307(6914):1248-50.
5. Roche JJ, Wenn RT, Sahota O, Moran CG. Effect of comorbidities and postoperative complications on mortality after hip fracture in elderly people: prospective observational cohort study. *BMJ.* 2005 Dec 10;331(7529):1374.
6. Soderqvist A, Miedel R, Ponzer S, Tidermark J. The influence of cognitive function on outcome after a hip fracture. *J Bone Joint Surg Am.* 2006 Oct;88(10):2115-23.
7. Elffors I, Allander E, Kanis JA, Gullberg B, Johnell O, Dequeker J, et al. The variable incidence of hip fracture in southern Europe: the MEDOS Study. *Osteoporos Int.* 1994 Sep;4(5):253-63.
8. Stockholms. Folkhälsorapport: Folkhälsan i Stockholms län 2003. Stockholm: Stockholms läns landsting, SMD;2003. Report No.: 2003:1.
9. Stockholms. Folkhälsorapport: Folkhälsan i Stockholms län 2007. Stockholm: Stockholms läns landsting, CFF;2007.
10. Borgstrom F, Johnell O, Jonsson B, Zethraeus N, Sen SS. Cost effectiveness of alendronate for the treatment of male osteoporosis in Sweden. *Bone.* 2004 Jun;34(6):1064-71.
11. Borgstrom F, Zethraeus N, Johnell O, Lidgren L, Ponzer S, Svensson O, et al. Costs and quality of life associated with osteoporosis-related fractures in Sweden. *Osteoporos Int.* 2006;17(5):637-50.
12. Miura LN, DiPiero AR, Homer LD. Effects of a geriatrician-led hip fracture program: improvements in clinical and economic outcomes. *J Am Geriatr Soc.* 2009 Jan;57(1):159-67.
13. Stromberg L, Ohlen G, Svensson O. Prospective payment systems and hip fracture treatment costs. *Acta Orthop Scand.* 1997 Feb;68(1):6-12.
14. Swedish National Board of Healthand Welfare. Guidelines for care and treatment of hip fractures [In Swedish: Socialstyrelsens riktlinjer för vård och behandling av höftfrakturer]. Stockholm: Socialstyrelsen 2003.
15. Liporace FA, Egol KA, Tejwani N, Zuckerman JD, Koval KJ. What's new in hip fractures? Current concepts. *Am J Orthop (Belle Mead NJ).* 2005 Feb;34(2):66-74.

16. Roberts SE, Goldacre MJ. Time trends and demography of mortality after fractured neck of femur in an English population, 1968-98: database study. *BMJ*. 2003 Oct 4;327(7418):771-5.
17. Thorngren KG. Rikshöft/SAHFE Årsrapport 2006. Lund2007.
18. Fuller GF. Falls in the elderly. *Am Fam Physician*. 2000 Apr 1;61(7):2159-68, 73-4.
19. Nyberg L, Gustafson Y, Berggren D, Brannstrom B, Bucht G. Falls leading to femoral neck fractures in lucid older people. *J Am Geriatr Soc*. 1996 Feb;44(2):156-60.
20. Bowman AM. Sleep satisfaction, perceived pain and acute confusion in elderly clients undergoing orthopaedic procedures. *J Adv Nurs*. 1997 Sep;26(3):550-64.
21. Lundstrom M, Edlund A, Bucht G, Karlsson S, Gustafson Y. Dementia after delirium in patients with femoral neck fractures. *J Am Geriatr Soc*. 2003 Jul;51(7):1002-6.
22. Olofsson B, Lundstrom M, Borssen B, Nyberg L, Gustafson Y. Delirium is associated with poor rehabilitation outcome in elderly patients treated for femoral neck fractures. *Scand J Caring Sci*. 2005 Jun;19(2):119-27.
23. Pfeiffer E. A short portable mental status questionnaire for the assessment of organic brain deficit in elderly patients. *J Am Geriatr Soc*. 1975 Oct;23(10):433-41.
24. Katelaris AG, Cumming RG. Health status before and mortality after hip fracture. *Am J Public Health*. 1996 Apr;86(4):557-60.
25. Lawrence VA, Hilsenbeck SG, Noveck H, Poses RM, Carson JL. Medical complications and outcomes after hip fracture repair. *Arch Intern Med*. 2002 Oct 14;162(18):2053-7.
26. Vidal EI, Coeli CM, Pinheiro RS, Camargo KR, Jr. Mortality within 1 year after hip fracture surgical repair in the elderly according to postoperative period: a probabilistic record linkage study in Brazil. *Osteoporos Int*. 2006 Oct;17(10):1569-76.
27. Gilchrist WJ, Newman RJ, Hamblen DL, Williams BO. Prospective randomised study of an orthopaedic geriatric inpatient service. *BMJ*. 1988 Oct 29;297(6656):1116-8.
28. Giusti A, Barone A, Razzano M, Pizzonia M, Pioli G. Optimal setting and care organization in the management of older adults with hip fracture. *Eur J Phys Rehabil Med*. Jun;47(2):281-96.
29. Fulop N. Studying the organisation and delivery of health services : research methods. London ; New York: Routledge; 2001.
30. Adunsky A, Levi R, Cecic A, Arad M, Noy S, Barell V. The "Sheba" model of comprehensive orthogeriatric care for elderly hip fracture patients: a preliminary report. *Isr Med Assoc J*. 2002 Apr;4(4):259-61.
31. Chong CP, Savage J, Lim WK. Orthopaedic-geriatric models of care and their effectiveness. *Australas J Ageing*. 2009 Dec;28(4):171-6.

32. Gholve PA, Kosygan KP, Sturdee SW, Faraj AA. Multidisciplinary integrated care pathway for fractured neck of femur. A prospective trial with improved outcome. *Injury*. 2005 Jan;36(1):93-8; discussion 9.
33. Wiggers JK, Guitton TG, Smith RM, Vrahas MS, Ring D. Observed and Expected Outcomes in Transfer and Nontransfer Patients With a Hip Fracture. *J Orthop Trauma*. Aug 4.
34. Gonzalez-Montalvo JI, Alarcon T, Mauleon JL, Gil-Garay E, Gotor P, Martin-Vega A. The orthogeriatric unit for acute patients: a new model of care that improves efficiency in the management of patients with hip fracture. *Hip Int*. Apr-Jun;20(2):229-35.
35. Kates SL, Mendelson DA, Friedman SM. Co-managed care for fragility hip fractures (Rochester model). *Osteoporos Int*. Dec;21(Suppl 4):S621-5.
36. Grol R, Grimshaw J. From best evidence to best practice: effective implementation of change in patients' care. *Lancet*. 2003 Oct 11;362(9391):1225-30.
37. Grol R, Wensing M. What drives change? Barriers to and incentives for achieving evidence-based practice. *Med J Aust*. 2004 Mar 15;180(6 Suppl):S57-60.
38. Øvretveit. Change concepts and theories for health service and system implementation and improvement. Stockholm: Medical Management Center, Karolinska Institutet 2006.
39. Øvretveit. Action Evaluation and Health Programmes. A handbook for user focused approach. Oxford: Radcliffe Medical Press; 2002.
40. Shortell SM, Kaluzny AD. Health care management : organization, design, and behavior. 4th ed. Albany, N.Y.: Delmar Publishers; 2000.
41. Kotter JP. Leading change. Boston, Mass.: Harvard Business School Press; 1996.
42. Grol R. Improving the quality of medical care: building bridges among professional pride, payer profit, and patient satisfaction. *JAMA*. 2001 Nov 28;286(20):2578-85.
43. Grol R, Wensing M, Eccles M. Improving patient care : the implementation of change in clinical practice. Edinburgh ; New York: Elsevier Butterworth Heinemann; 2005.
44. Grimshaw JM, Shirran L, Thomas R, Mowatt G, Fraser C, Bero L, et al. Changing provider behavior: an overview of systematic reviews of interventions. *Med Care*. 2001 Aug;39(8 Suppl 2):II2-45.
45. Hysong SJ, Best RG, Pugh JA. Clinical practice guideline implementation strategy patterns in Veterans Affairs primary care clinics. *Health Serv Res*. 2007 Feb;42(1 Pt 1):84-103.
46. Davenport TH, Glaser J. Just-in-time delivery comes to knowledge management. *Harv Bus Rev*. 2002 Jul;80(7):107-11, 26.
47. Wensing M, Wollersheim H, Grol R. Organizational interventions to implement improvements in patient care: a structured review of reviews. *Implement Sci*. 2006;1:2.

48. Diehl M. Health system re-engineering: a CPRS economic decision model. *Proc Annu Symp Comput Appl Med Care*. 1995:688-92.
49. Goldman DA. Sustaining CQI. *Int J Qual Health Care*. 1997 Feb;9(1):7-9.
50. Pollitt C. Business approaches to quality improvement: why they are hard for the NHS to swallow. *Qual Health Care*. 1996 Jun;5(2):104-10.
51. Berwick DM. A primer on leading the improvement of systems. *BMJ*. 1996 Mar 9;312(7031):619-22.
52. Berwick DM, Nolan TW. Physicians as leaders in improving health care: a new series in *Annals of Internal Medicine*. *Ann Intern Med*. 1998 Feb 15;128(4):289-92.
53. Batalden PB, Stoltz PK. A framework for the continual improvement of health care: building and applying professional and improvement knowledge to test changes in daily work. *Jt Comm J Qual Improv*. 1993 Oct;19(10):424-47; discussion 48-52.
54. Joosten T, Bongers I, Janssen R. Application of lean thinking to health care: issues and observations. *Int J Qual Health Care*. 2009 Oct;21(5):341-7.
55. Mazzocato P, Savage C, Brommels M, Aronsson H, Thor J. Lean thinking in healthcare: a realist review of the literature. *Qual Saf Health Care*. Oct;19(5):376-82.
56. Greenhalgh T, Robert G, Macfarlane F, Bate P, Kyriakidou O. Diffusion of innovations in service organizations: systematic review and recommendations. *Milbank Q*. 2004;82(4):581-629.
57. Greenhalgh T. Diffusion of innovations in health service organisations : a systematic literature review. Malden, Mass.: Blackwell; 2005.
58. Aebbersold A. NQF Endorses Patient Outcome Measures for High-Impact Conditions. 2010.
59. Bowling A. Measuring health : a review of quality of life measurement scales. 2nd ed. Buckingham ; Philadelphia: Open University Press; 1997.
60. Brooks R. EuroQol: the current state of play. *Health Policy*. 1996 Jul;37(1):53-72.
61. Tidermark J, Bergstrom G, Svensson O, Tornkvist H, Ponzer S. Responsiveness of the EuroQol (EQ 5-D) and the SF-36 in elderly patients with displaced femoral neck fractures. *Qual Life Res*. 2003 Dec;12(8):1069-79.
62. Tidermark J, Zethraeus N, Svensson O, Tornkvist H, Ponzer S. Femoral neck fractures in the elderly: functional outcome and quality of life according to EuroQol. *Qual Life Res*. 2002 Aug;11(5):473-81.
63. Ekstrom W, Miedel R, Ponzer S, Hedstrom M, Samnegard E, Tidermark J. Quality of life after a stable trochanteric fracture--a prospective cohort study on 148 patients. *J Orthop Trauma*. 2009 Jan;23(1):39-44.

64. Cheung YB, Tan LC, Lau PN, Au WL, Luo N. Mapping the eight-item Parkinson's Disease Questionnaire (PDQ-8) to the EQ-5D utility index. *Qual Life Res.* 2008 Nov;17(9):1173-81.
65. Linde L, Sorensen J, Ostergaard M, Horslev-Petersen K, Hetland ML. Health-related quality of life: validity, reliability, and responsiveness of SF-36, 15D, EQ-5D [corrected] RAQoL, and HAQ in patients with rheumatoid arthritis. *J Rheumatol.* 2008 Aug;35(8):1528-37.
66. Dy CJ, McCollister KE, Lubarsky DA, Lane JM. An economic evaluation of a systems-based strategy to expedite surgical treatment of hip fractures. *J Bone Joint Surg Am.* Jul 20;93(14):1326-34.
67. Strom O, Borgstrom F, Zethraeus N, Johnell O, Lidgren L, Ponzer S, et al. Long-term cost and effect on quality of life of osteoporosis-related fractures in Sweden. *Acta Orthop.* 2008 Apr;79(2):269-80.
68. Drummond MF, Aguiar-Ibanez R, Nixon J. Economic evaluation. *Singapore Med J.* 2006 Jun;47(6):456-61; quiz 62.
69. Medin E, Anthun KS, Hakkinen U, Kittelsen SA, Linna M, Magnussen J, et al. Cost efficiency of university hospitals in the Nordic countries: a cross-country analysis. *Eur J Health Econ.* Jul 29.
70. Sveriges kommuner och landsting (SKL). Nationella KPP-principer. Stockholm 2006.
71. Walshe K. Understanding what works--and why--in quality improvement: the need for theory-driven evaluation. *Int J Qual Health Care.* 2007 Apr;19(2):57-9.
72. Owens WD, Felts JA, Spitznagel EL, Jr. ASA physical status classifications: a study of consistency of ratings. *Anesthesiology.* 1978 Oct;49(4):239-43.
73. Törnquist K SU. Towards an ADL taxonomy for occupational therapists. *Scan J Occup Ther.* 1994;1:69-76.
74. Brazier JE, Walters SJ, Nicholl JP, Kohler B. Using the SF-36 and Euroqol on an elderly population. *Qual Life Res.* 1996 Apr;5(2):195-204.
75. Tidermark J. Quality of life and femoral neck fractures. *Acta Orthop Scand Suppl.* 2003 Apr;74(309):1-42.
76. WHO/ICDP World Health Organization. Improving Mother/Child Interaction to promote Better Psychosocial Development in Children. Geneva 1998. Report No.: WHO/MSA/MHP/98.1.
77. Yin RK. Case study research : design and methods. 4th ed. Los Angeles, Calif.: Sage Publications; 2009.
78. Pettigrew AM, Whipp R. Managing change for competitive success. Oxford, OX, UK ; Cambridge, Mass., USA: B. Blackwell; 1993.
79. Weber P. Basic content analysis. 2nd ed. Lewis-Beck M, editor. Iowa City: Sara Miller McCune, Sage Publications, Inc.; 1990.
80. Silverman. Doing Qualitative Research. 2nd ed. London: Sage Publications.; 2005.

81. Silverman. *Interpreting Qualitative Data: Methods for Analyzing Talk, Text and Interaction* 3rd ed. London 2006.
82. Webb EJ. *Unobtrusive measures; nonreactive research in the social sciences*. Chicago,: Rand McNally; 1966.
83. Denzin NK. *The research act in sociology: a theoretical introduction to sociological methods*. London,: Butterworths; 1970.
84. Pawson R, Greenhalgh T, Harvey G, Walshe K. Realist review--a new method of systematic review designed for complex policy interventions. *J Health Serv Res Policy*. 2005 Jul;10 Suppl 1:21-34.
85. Pawson R, Tilley N. *Realistic evaluation*. London ; Thousand Oaks, Calif.: Sage; 1997.
86. Shortell SM, O'Brien JL, Carman JM, Foster RW, Hughes EF, Boerstler H, et al. Assessing the impact of continuous quality improvement/total quality management: concept versus implementation. *Health Serv Res*. 1995 Jun;30(2):377-401.
87. Parnaby J, Towill DR. Seamless healthcare delivery systems. *Int J Health Care Qual Assur*. 2008;21(3):249-73.
88. Walley P. Designing the accident and emergency system: lessons from manufacturing. *Emerg Med J*. 2003 Mar;20(2):126-30.
89. Olsson LE, Karlsson J, Ekman I. The integrated care pathway reduced the number of hospital days by half: a prospective comparative study of patients with acute hip fracture. *J Orthop Surg Res*. 2006;1:3.
90. Aujoulat I, d'Hoore W, Deccache A. Patient empowerment in theory and practice: polysemy or cacophony? *Patient Educ Couns*. 2007 Apr;66(1):13-20.
91. Ayme S, Kole A, Groft S. Empowerment of patients: lessons from the rare diseases community. *Lancet*. 2008 Jun 14;371(9629):2048-51.
92. Walter U, Schneider N, Plaumann M. [Empowerment for the elderly]. *Gesundheitswesen*. 2008 Dec;70(12):730-5.
93. Ovretveit J. The Norwegian approach to integrated quality development. *J Manag Med*. 2001;15(2):125-41.
94. Damschroder LJ, Banaszak-Holl J, Kowalski CP, Forman J, Saint S, Krein SL. The role of the champion in infection prevention: results from a multisite qualitative study. *Qual Saf Health Care*. 2009 Dec;18(6):434-40.
95. Svensson O, Stromberg L, Ohlen G, Lindgren U. Prediction of the outcome after hip fracture in elderly patients. *J Bone Joint Surg Br*. 1996 Jan;78(1):115-8.
96. Thor J, Herrlin B, Wittlov K, Skar J, Brommels M, Svensson O. Getting going together: can clinical teams and managers collaborate to identify problems and initiate improvement? *Qual Manag Health Care*. 2004 Apr-Jun;13(2):130-42.

97. Forsner T, Hansson J, Brommels M, Wistedt AA, Forsell Y. Implementing clinical guidelines in psychiatry: a qualitative study of perceived facilitators and barriers. *BMC Psychiatry*.10:8.
98. Ham C, Kipping R, McLeod H. Redesigning work processes in health care: lessons from the National Health Service. *Milbank Q*. 2003;81(3):415-39.
99. Balogun J, Hope Haily V. Exploring Strategic Change. 2nd ed. London: Prentice Hall.; 2004.
100. Macaulay AC, Jagosh J, Sella R, Henderson J, Cargo M, Greenhalgh T, et al. Assessing the benefits of participatory research: a rationale for a realist review. *Glob Health Promot*. Jun;18(2):45-8.
101. Bamford DR, Forrester PL. Managing planned and emergent change within an operations management environment. *International Journal of Operations & Production Management*. 2003;23(5-6):546-64.
102. Flyvbjerg B. Five misunderstandings about case-study research. *Qualitative Inquiry*. 2006;12(2):219-45.