Implementation of eHealth patient–provider communication tools into routine practice

Facilitators and barriers from the perspectives of patients, middle managers and health care providers

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SUMMARY

Background

Although there is growing evidence of the positive effects of eHealth patient–provider communication tools for patients and health care providers, their implementation into clinical practice continues to be a challenge. There is substantial knowledge about the many facilitators and barriers that possibly *can* affect implementation success. However, little is known about how the different facilitators and barriers act across different eHealth tools, stakeholders and contexts, or about their relative importance for implementation success.

Aims

The overall aim of this dissertation was to gain in depth insight about facilitators and barriers affecting the implementations of two eHealth patient–provider communication tools into routine clinical practice, from the perspective of three stakeholder groups: patients (study I), middle managers (study II) and health care providers (study III). One tool is used at the point of care and one over the Internet. *Study I* examined the reasons why patients, despite having access, did not use an Internet-based patient–provider communication tool (IPPC) (secure email). *Study II* examined middle managers' perceptions and experiences of barriers, facilitators, management role, responsibility, and action taken in the implementation of an interactive tailored point of care eHealth tool for symptom assessment and communication (Choice) into clinical practice. *Study III (1)* explored health care providers' experiences of facilitators and barriers in the implementation of the secure email IPPC into routine practice using the Consolidated Framework for Implementation Research (CFIR), (2) assessed the ability of the different constructs of CFIR to distinguish between high and low implementation success, and (3) compared the study findings with those from other studies that used the CFIR to discriminate between high and low implementation success.

Methods

Descriptive, qualitative research design was used for the research described in this dissertation. Data were generated from individual interviews with 22 patients who had access to but did not use the secure email IPPC (study I), nine middle managers who were responsible for the implementation of the symptom assessment and communication tool

Choice (study II) and 17 health care providers who responded to messages from patients via the secure email IPPC (study III). Data were analyzed by means of content analysis.

Results

In study I, the results showed that even if the patients did not use IPPC, they appreciated the availability and the possibility of using it when needed. Their reported reasons for not using the IPPC fell into three main categories: (1) they felt that they did not need the IPPC and had sufficient access to information elsewhere, (2) they preferred other types of communication such as telephone or face-to-face contact with their health care providers, or (3) they were hampered by IPPC attributes such as login problems.

In study II, nurse managers reported conscientiously supporting the implementation of the symptom and communication tool Choice, but workloads prevented them from participating in the process as fully as they wanted. Physician managers reported less contribution to the implementation of Choice. The implementation process was influenced by facilitating factors such as perceptions of benefits Choice offered to the patients and to their own work. Influencing barriers were physician resistance, contextual factors and difficulties for frontline providers in learning a new way of communicating with patients when patients rather than care providers defined the problems and symptoms to be discussed in the consultations.

In study III, twenty-eight CFIR constructs were addressed in the interviews with the health care providers who had responded to patient messages via the secure email IPPC. Twelve of the constructs distinguished between high and low implementation units. Health care providers' belief in the intervention as useful for themselves and their patients was important for implementation success, as well as the implementation process itself. In addition, institutional factors such as structural characteristics of the units, available resources, culture, and implementation climate influenced the implementation of IPPC. A comparison of constructs across this and two other studies that also used the CFIR to discriminate between high and low implementation success showed that 24 CFIR constructs distinguished between units with high versus low implementation success in at least one study; eleven constructs distinguished in two studies. However, only two constructs (patient need and resources, and available resources) consistently distinguished between units with high and low implementation success in all three studies.

Consistently *across* the three studies, independent of contexts and eHealth tools, the most important factor affecting the implementation was the health care providers' and managers' personal belief in the tool as useful for themselves and their patients. This seemed to be a premise for implementation success. Other factors that affected the implementation in all three studies were related to differing perceptions between patients and health care providers concerning the patients' needs, that the tools challenged existing patient and health care provider roles, the degree of careful planning of the implementation process, management engagement and support from key personnel involved in the implementation.

Conclusion

This dissertation describes one of the first studies to combine experiences from several stakeholder groups across different contexts regarding the facilitators and barriers encountered when implementing various eHealth patient–provider communication tools into routine practice. It is also one of the first to suggest which facilitators and barriers are of *particular* importance for the success of an implementation compared to others.

The findings show that eHealth patient–provider communication tools can be successfully implemented into regular care. Although there were barriers to the use of the eHealth tools, facilitating factors seemed able to outweigh them, as the implementations to a large extend succeeded in four of five units in each study in this dissertation.

The CFIR framework was helpful as theoretical framework for guiding study III, and for framing the result and discussion sections for the dissertation. However, the dissertation also points at some previously unreported weaknesses in the CFIR framework. First, it suggests greater emphasis on the presence of the *patients* in the CFIR framework, as the patients are currently placed under the outer setting domain, indicating a peripheral role in the implementation process. While this may be natural for many traditional implementations, it is somewhat counterintuitive for patient-centric interventions. This dissertation also revealed how implementations that affect patients' and health care providers' *roles* only is sparsely covered in CFIR. Implementing eHealth patient–provider communication tools can profoundly affect the established roles of all involved, patients as well as health care providers, and may for example require new communication and collaboration patterns, as shown in this study. Thus CFIR might be strengthened if the role dimension were given

greater consideration. Findings from this dissertation can thus contribute to the refinement of CFIR to become a more succinct and parsimonious framework for planning and evaluation of eHealth implementation studies.

ABBREVIATIONS AND DEFINITIONS

CFIR	Consolidated Framework for Implementation Research.
Choice	An interactive tailored patient assessment and communication tool for patients and their health care providers.
eHealth	Tools and services using information and communication technologies (ICTs) that can improve prevention, diagnosis, treatment, monitoring and management (European Commission, 2016).
Determinants	Factors that act as facilitators or barriers, and have positive or negative impact on the implementation (Fleuren et al., 2004).
Implementation	The process of putting to use or integrating evidence-based interventions within a setting (Rabin et al., 2008).
Implementation science	The scientific study of methods to promote the systematic uptake of research findings and other evidence-based interventions into routine health practice to improve the quality and effectiveness of health services and care (Eccles and Mittman, 2006).
Implementation strategy	A systematic intervention process to adopt and integrate evidence-based health innovations into usual care (Powell et al., 2012).
IPPC	Internet-based Patient–provider Communication tool.
IT	Information technology.
Middle Managers	Managers who are in the middle of the organizational hierarchy and have one or more managers reporting to them. Frontline managers are managers at the first level of the organizational hierarchy who have frontline employees reporting to them (Parand et al., 2014). In this dissertation, middle manager is used as collective designation for both frontline and middle management levels.

Patient-Centered Care	Care that is respectful of and responsive to individual patient preferences, needs and values, ensuring that patient values guide all clinical decisions (Institute of Medicine, 2001).
Theoretical framework for implementation	A graphical or narrative representation of the key factors, concepts, or variables to explain the phenomenon of implementation (Moullin et al., 2015).
Qualitative content analysis	A research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns (Hsieh and Shannon, 2005).

LIST OF PAPERS

Paper I

Varsi C, Gammon D, Wibe T, Ruland CM. Patients' reported reasons for non-use of an internet-based patient–provider communication service: qualitative interview study. Journal of Medical Internet Research. 2013;15(11):e246.

Paper II

Varsi C, Ekstedt M, Gammon D, Borosund E, Ruland CM. Middle Managers' Experiences and Role in Implementing an Interactive Tailored Patient Assessment eHealth Intervention in Clinical Practice. Computers, Informatics, Nursing: CIN. 2015 May 18.

Paper III

Varsi C, Ekstedt M, Gammon D, Ruland CM. Using the Consolidated Framework for Implementation Research to Identify Facilitators and Barriers for the Implementation of an Internet-Based Patient–provider Communication Service in Five Settings: A Qualitative Study. Journal of Medical Internet Research. 2015;17(11):e262.

1. INTRODUCTION

The growing number of persons with chronic or long term illnesses is one of the biggest health care challenges worldwide, threatening the infrastructure of health care systems due to increased pressure and costs (World Health Organization, 2005). In order to meet this challenge, eHealth technologies are being developed to offer new opportunities for delivering health care. Solutions for electronic patient–provider communication have become high-priority areas for health services delivery as they allow patients and health care providers to stay connected outside face-to-face visits. Furthermore, the use of eHealth facilitates new models for chronic care (Gammon et al., 2015, Gee et al., 2015), such as the widely used Chronic Care Model (Bodenheimer et al., 2002, Coleman et al., 2009, Wagner et al., 1996). A rapidly growing research literature documents that eHealth patient–provider communication tools have positive impact on patient–provider communication, health outcomes, patients' understanding and management of own illness and engagement in own care, and that patients receive care based more on their needs and preferences (Borosund et al., 2014, Chen et al., 2013, Grimsbo et al., 2011, Heyn et al., 2013, Kruse et al., 2015, Ruland et al., 2010, Ruland et al., 2013, Wibe et al., 2012).

However, there is a gap between the positive results obtained with eHealth patient–provider communication tools in research trials, and the success of their implementation into routine health care practice (Elbert et al., 2014). A number of policy-related, technical, organizational, contextual, and process-related barriers have been reported to hamper successful implementation at both patient and health care provider level (Duncan and Murray, 2012, Wallwiener et al., 2009).

This dissertation seeks to contribute to a better understanding about facilitators and barriers, also referred to as determinants in the literature (Fleuren et al., 2004). More specifically, it examines which factors were essential to the successful implementation of two different eHealth patient–provider communication tools in routine health care, one used at the point of care and one over the Internet. This dissertation assesses commonalities and differences between implementations of a range of eHealth tools and contexts. The facilitators and barriers for the implementations are explored from three perspectives: patients and health care providers, who are the two parties in the communication, and middle managers, who play a key role and are often in charge of the implementation at unit level.

The first study of this dissertation addresses the factors that influence patients' non-use of eHealth communication tools. While a number of studies have addressed patient outcomes and satisfaction with such tools, only a few have investigated barriers and reasons for patients' non-use (Goel et al., 2011, Nijland et al., 2009, Ronda et al., 2014). Such information is valuable for future development and implementation of eHealth communication tools to align the tools to the patients' needs and preferences (Irizarry et al., 2015). This dissertation contributes to knowledge in this area by exploring why patients who had access to a secure email tool did not use it (study I).

The second study addresses the middle management perspective of perceived facilitators and barriers, the managers' role, responsibility, and actions taken in the implementation of eHealth communication tools into clinical practice. Although the middle managers play a key role and are often in charge of the implementation at unit levels (Birken et al., 2013, Ingebrigtsen et al., 2014), their role in implementation processes is understudied (Kirchner et al., 2012, Reichenpfader et al., 2015). This dissertation adds knowledge by investigating middle managers' role perceptions and experiences of the implementation of the specific tool "Choice" one year after its implementation into routine practice (study II). This interactive tailored symptom assessment and communication tool is designed for use at the point of care (Ruland et al., 2010)

Finally, study III addresses how health care providers perceive facilitators and barriers when implementing an internet-based eHealth communication tool into routine health care. Although a number of studies have addressed similar issues (Wallwiener et al., 2009), few have investigated and compared how facilitators and barriers can act differently in different contexts (Shimada et al., 2013), and few have done a comparison across settings by means of theoretical frameworks for implementation research (Damschroder and Lowery, 2013, Gilmer et al., 2013). This dissertation contributes to knowledge in this area by exploring how health care providers' experienced facilitators and barriers in the implementation of a secure email tool into routine practice in five different hospital units. The study was done using the Consolidated Framework for Implementation Research (CFIR) (Damschroder et al., 2009) as guidance for data collection and analysis. Furthermore, the study assesses the ability of the different constructs of CFIR to distinguish between high and low implementation success, and compares the findings with those from other studies that used the CFIR to discriminate between high and low implementation success (study III).

1.1 Overall aim and specific objectives

This dissertation is a part of two larger practice-based trials conducted in regular clinical practice investigating the use and effectiveness of the secure email IPPC and the point of care symptom assessment and communication tool Choice. The focus of this dissertation was the implementation of these tools in those contexts where the trials took place.

The overall aim of this dissertation was to elucidate experiences of three different stakeholders about the facilitators and barriers when implementing eHealth patient–provider communication tools into routine practice, and assess CFIR's applicability and usefulness for guiding the study. The specific objectives were:

I. To examine patients' views of an Internet-based patient–provider communication service (IPPC) and their reasons for non-use of the tool (study I).
II. To examine middle managers' perceptions of barriers, facilitators, management role, responsibility, and action taken in the implementation of an interactive tailored eHealth tool for symptom assessment and communication (Choice) at the point of care into clinical practice, one year after implementation (study II).
III. To identify and compare health care providers' experiences of facilitators and barriers in the implementation of an Internet- based patient provider communication service (IPPC) into routine practice using the Consolidated Framework for Implementation Research (CFIR), assess the ability of the different constructs of CFIR to distinguish between high and low implementation success, and compare the study findings with those from other studies that used the CFIR to discriminate between high and low implementation success (study III).

In these three studies, the data were generated through individual interviews with patients (study I), middle managers (study II) and health care providers (study III). The findings across the three sub-studies are examined within the CFIR framework's five domains: 1) Intervention characteristics, 2) Outer setting, 3) Inner setting, 4) Characteristics of persons involved, and 5) Process. Findings from the dissertation contribute to science by increasing the understanding of implementation facilitators and barriers across contexts and eHealth communication tools, and to practice by a providing guidance for clinicians about what to pay attention to in the implementation of eHealth patient–provider communication tools into ordinary practice. The findings also contribute to the understanding of CFIR's applicability and usefulness in guiding eHealth implementation studies.

2. BACKGROUND

The prevalence of chronic and long term illnesses is globally increasing (World Health Organization, 2014, World Health Organization, 2014) as the population grows older and progress in medical treatments allows people to live longer with their chronic conditions (Norwegian Institute of Public Health, 2010, Syse and Pham, 2014). Persons with long-term illnesses meet challenges in their everyday life on a number of dimensions, such as medication challenges and limitations in daily living due to functional and cognitive impairment (Anderson, 2010, Lehnert et al., 2011). This implies challenges for the individuals when managing the burden of chronic illnesses, which they to a large extent must handle on their own at home (Thorpe et al., 2010). It is therefore important that they have the ability and skills required to manage their conditions on a day-to-day basis (Wolff et al., 2002). At the same time, the increasing number of persons in need of long-term follow-up poses new challenges for the health care systems due to increased pressure and costs (Anderson, 2010, Lehnert et al., 2011, World Health Organization, 2014, World Health Organization, 2014). Efforts to address these challenges include a wide range of initiatives, spanning from elevating chronic diseases on the health agenda of key policymakers, to providing better evidence about risk factor control, and persuading policymakers of the need for change in health systems (Yach et al., 2004). Health care has until now primarily been organized around an acute, episodic model of care which might not be optimal to meet the needs of those with chronic conditions (Thorpe et al., 2010, World Health Organization, 2002, Yach et al., 2004). Better ways to meet the needs of persons with chronic conditions is needed (Thorpe et al., 2010, World Health Organization, 2002) and new ways of delivering care can benefit from more actively engaged patients who take more responsibility for their own health and health care (Hibbard and Greene, 2013). There is also an increasing patient wish and demand for increased involvement in decision making (Chewning et al., 2012).

Accumulated evidence supports the Chronic Care Model to guide practice redesign and transformation of care for patients with long-term conditions from acute and reactive to proactive and planned care, where informed and activated patients can interact with prepared, proactive health care teams (Bodenheimer et al., 2002, Coleman et al., 2009, Wagner et al., 1996). Studies show that positive results follow when patients are activated, empowered, take part in their own treatment and care, and have effective communication with their health care providers, which are the key components of what is defined as Patient-Centered Care (Institute of Medicine, 2001). The positive results include improved patient care (Cramm and

Nieboer, 2015), improved treatment effectiveness (Wasson et al., 2006), positive change in self-management behaviors (Hibbard et al., 2007), better health outcomes (Coleman et al., 2009, Simmons et al., 2014) increased well-being (Cramm and Nieboer, 2015), fewer limitations in daily activities and physical functioning and less time lost from productive work (Wasson et al., 2006). The involvement of patients in their own care also enhances patient engagement (Kane et al., 2015) and builds trust and encourages mutual problem solving with health care providers (Constand et al., 2014). Finally, cost-effectiveness studies have shown that highly activated patients are less prone to use costly hospitalizations and emergency department visits, compared to less activated patients (Hibbard and Greene, 2013, Kane et al., 2015).

eHealth solutions may play an important role in managing chronic illness and achieving efficient care according to these principles for the growing number of people with chronic illnesses (Solomon, 2008). eHealth technologies allow new ways of delivering of health care at the point of need (Kreps and Neuhauser, 2010) and they are part of a trend toward patient-centric models (Li and Wilson, 2013). eHealth tools have been shown to support patient activation (Solomon et al., 2012) productive patient–provider interactions and improve health outcomes (Elbert et al., 2014, Gee et al., 2015). The importance of utilizing eHealth to meet the need for health systems change has been emphasized by authorities and health care organizations worldwide. This includes using eHealth as means to improve access to care, improve quality of care, give patients increased control over their care and make the health care sector more efficient and cost effective (European Commission, 2012, Norwegian Directorate of Health, 2016, World Health Organization, 2013).

eHealth communication technologies are used in a wide range of areas, such as interactive websites, web portals, telehealth applications, email, online communities, gaming and computer-automated reminders (Kreps and Neuhauser, 2010). The following definition of eHealth is used in the dissertation: "T*ools and services using information and communication technologies (ICTs) that can improve prevention, diagnosis, treatment, monitoring and management*" (European Commission, 2016). In the description of the definition, the authors explain that eHealth includes information and data sharing between patients and health service providers, hospitals, health professionals and health information networks (European Commission, 2016), and thus includes the potential for providing health care through use of eHealth communication tools over the Internet as well as at point of care. The eHealth

communication tools whose implementation is studied in this dissertation are: 1) asynchronous secure email communication over the Internet, called *IPPC* in the following, and 2) an interactive tailored patient assessment and communication tool used at the point of care, called *Choice* in the following.

Despite the rapid development and large number of eHealth communication tools and positive research results, their implementation into routine health care settings has proven to be difficult (Ozkaynak et al., 2014, Rabin and Glasgow, 2012). In a recent review of reviews, Elbert and colleagues state that an increasing number of studies have shown eHealth interventions to be effective or at least suggest that evidence is promising, so that the attention now "*should be given to the development and evaluation of strategies to implement effective/cost-effective eHealth initiatives in daily practice, rather than to further strengthen current evidence"* (Elbert et al., 2014). This statement underlines the gap between what is known about the effect and usefulness of eHealth tools and how to successfully bring it into clinical practice. More knowledge is needed in this area. When implementing an eHealth tool into a specific context, there is need for detailed information about how specific facilitators and barriers might affect the implementation (Berry, 2011, Elbert et al., 2014, Wallwiener et al., 2009), how the intervention can behave differently in different contexts and how use varies between stakeholders. Since the initiation of this dissertation work in 2008, there has been a rapid development within the areas of eHealth and implementation science, yet several have pointed out the lack of studies applying a more comprehensive perspective, where the perspectives of several of the involved stakeholders', from different contexts, are described and compared (Kirchner et al., 2012, Kreps and Neuhauser, 2010, Kuipers et al., 2014). However, some reviews have taken the perspective of multiple stakeholder groups. For example, a recent review presented a synthesis of factors influencing the adoption of self-management solutions from the perspectives of patients, health care providers and managers, but did not assess the relative importance of the facilitators and barriers (Harvey et al., 2015). This dissertation focuses on facilitators and barriers influencing the implementation of eHealth patient–provider communication tools into different contexts of routine health care, from the perspective of three stakeholder groups.

The tools is in alignment with the ongoing society-driven change to more person-centered team-based care, where patients are more involved in their own health and health care, supported by a collaborative team of health care providers (Li and Wilson, 2013, Norwegian Ministry of Health and Social Affairs, 1997). Along with this, there is an increased demand

for the use of eHealth, as it has potential to give patients better care and follow-up, relieve some of the health care resources and reduce the pressure on the health care system (World Health Organization, 2013). Increased use of eHealth is also in line with the population's increased use of IT to handle more and more of the daily life activities, such as banking, travel booking, grocery shopping and communicating with friends and family.

The original plan was to obtain all data from the study of the secure email IPPC implementation, including the data from a randomized controlled trial. Because only 22% of patients in the intervention group used the IPPC, it was highly unlikely to detect group differences in health outcomes and health care utilization. Therefore the randomization was stopped. To enrich the study's implementation focus, it was decided to include data also from the interviews with managers (study II), as there was a gap in the literature of implementation studies regarding what works and why across tools, contexts and stakeholders. The inclusion of the interviews with managers added richness to the study as the management perspective was not addressed in the same specific manner in the IPPC study. By combining data from the implementation of two different eHealth tools in different contexts and obtained from three different stakeholder groups, the dissertation provides an opportunity to assess commonalities and differences across tools and contexts.

The following section summarizes the literature, showing the state of the evidence related to Internet-based secure email (tools with similarities to the IPPC in study I and III) and electronic symptom assessment and communication tools (tools with similarities to Choice in study II). Next, literature related to implementation is summarized, including a description of the Consolidated Framework for Implementation Research (CFIR), used in study III, and in the result and discussion section in this dissertation. Finally, there is a summary of the literature on facilitators and barriers related to the eHealth communication tools, the organization and health care providers, the management, the patients and the implementation process.

2.1 eHealth patient–provider communication tools, use and outcomes

Since this dissertation includes the implementation of two different eHealth communication tools, use and outcomes related to the two forms for eHealth communication tools are presented in the following: 1) asynchronous secure email communication over the Internet,

and 2) interactive tailored patient assessment and communication tools for use at the point of care.

2.1.1 Internet-based secure email

Secure email provides patients and their health care providers with the opportunity for contact over the Internet, and has shown to be a valuable supplement to traditional health services (Caffery and Smith, 2010, Wallwiener et al., 2009). Even if the evidence still is limited (Antoun, 2015), an increasing number of studies indicate that secure email can help patients manage their illness better, improve health outcomes (de Jong et al., 2014, Goldzweig et al., 2012, Grimsbo et al., 2012, Reed et al., 2015, Ruland et al., 2013), reduce depression scores (Borosund et al., 2014, Simon et al., 2011) improve patient-centeredness (Johansen et al., 2012), increase patient engagement and empowerment (Kruse et al., 2015), address unmet communication needs in health care (Kruse et al., 2015, Mold and de Lusignan, 2015, Wibe et al., 2012, Ye et al., 2010), increase patients' satisfaction (Caffery and Smith, 2010, Goldzweig et al., 2012, Kruse et al., 2015, Mold and de Lusignan, 2015), and improve quality of care (Kruse et al., 2015, Kruse et al., 2015).

There is growing interest among patients in using secure email services (de Jong et al., 2014, Goldzweig et al., 2012, Lee et al., 2016), and many patients even expect access to secure email to communicate with health care providers (Lee et al., 2016, McGeady et al., 2008). Having the opportunity to address concerns when they arise without leaving home can in itself act as an intervention and lead to better outcomes such as depression, even if the secure email system is never used (Borosund et al., 2014). Analysis of the content of the messages between patients and health care providers have shown that message volumes are low and the content is appropriate (Byrne et al., 2009) and that email is a vehicle for emotional support and partnership where clinicians can provide patient-centered care (Grimsbo et al., 2011, Roter et al., 2008, Svenningsen, 2014, Wibe et al., 2012).

Health care providers who have used secure email to communicate with their patients have reported appreciating this opportunity (Kruse et al., 2015, Popeski et al., 2015, Ye et al., 2010). They reported finding secure email convenient and useful for some patients (Atherton et al., 2013, Caffery and Smith, 2010, Wallwiener et al., 2009), and perceiving it as a safe and efficient way of communicating with patients (Wallwiener et al., 2009), without spending too much time responding to the messages (Kummervold and Johnsen, 2011). Secure email is

associated with decrease in office visits and telephone contacts (Reed et al., 2015, Shimada et al., 2013) and thus also can save clinician time (Nilsson et al., 2010). No studies have reported harmful effects for either patients or health care providers (Wallwiener et al., 2009). Potential risks can be that the e-mail remains unanswered in a timely fashion and that clinical decisions are being made with incomplete or incorrect information (Popeski et al., 2015). Utilization of secure email is increasingly becoming part of health care policies (Baur, 2012) and is perceived to be a convenient means of patient–provider communication (Caffery and Smith, 2010). Although it is not yet part of routine health care (Antoun, 2015, Lee et al., 2016, Mold and de Lusignan, 2015), some health care organizations have started to offer secure email options to their patients (Cronin et al., 2015, Crotty et al., 2014, Haun et al., 2014, Kaiser Permanente, 2016, Oslo University Hospital, 2015).

2.1.2 Electronic tools for symptom assessment and communication

Electronic tools for symptom assessment and communication can help patients report their symptoms, problems, and priorities for care, and can help health care providers give individually tailored support and follow-up. Choice (Ruland et al., 2010), used in this study, is one example. A growing number of eHealth patient assessment and communication tools have been developed and tested in clinical practice (Berry, 2011, Greenhalgh, 2009, Johansen et al., 2012, Ruland, 2002, Ruland et al., 2010). By helping patients report their symptoms, problems and concerns, the tools can support clinicians and improve patient-centered care (Borosund et al., 2014, Boyce et al., 2014, Chen et al., 2013, Greenhalgh, 2009, Johansen et al., 2012, Ruland et al., 2010). The patients' need for such tools is underlined by their experience of having several unmet needs and that their symptoms are often unknown to health care providers (Lubberding et al., 2015, Xiao et al., 2013). There is growing evidence that well-implemented eHealth patient assessment and communication tools with timely feedback in clinical care settings can improve patient–provider communication (Dubenske et al., 2008, Heyn et al., 2013), patient satisfaction (Chen et al., 2013), monitoring of treatment response and detection of unrecognized problems (Chen et al., 2013, Greenhalgh, 2009, Griffin et al., 2004, Heyn et al., 2013, Mark et al., 2008). These tools can help reduce symptom distress and reduce the need for symptom management support (Ruland et al., 2010), help improve quality of life outcomes (Chen et al., 2013, Griffin et al., 2004) and have positive impact on the clinical process (Boyce et al., 2014). Patients and health care providers have reported eHealth patient assessment and communication interventions to be feasible,

helpful and easy to use (Hjermstad et al., 2012, Mark et al., 2008, Ruland, 2006). Health care providers have reported the interventions as saving time (Boyce et al., 2014), being helpful in detecting, assessing and managing the patients' symptoms (Borosund et al., 2014, Boyce et al., 2014, Chen et al., 2013), and assisting the initiation of sensitive topics (Bendtsen et al., 2007).

2.2 Implementation

While eHealth patient–provider communication tools have provided positive results in clinical trials, their implementation into ordinary clinical practice has shown challenging. It has been widely reported that it takes on average 17 years before new knowledge generated through research is implemented into routine clinical practice (Green et al., 2009, Institute of Medicine, 2001). Furthermore, there is limited understanding of the strategies used to promote utilization of evidence (Bucknall and Rycroft-Malone, 2010). These issues made it evident that there was an urgent need for more knowledge and contributed to the evolution of the new scientific field of implementation science, which addresses research on how to promote the uptake of research findings into routine healthcare. In the wake of the evidence movement and the implementation of Evidence-Based Medicine and Evidence-Based Practice, implementation science has become a scientific field during the last two decades (Fixsen et al., 2009). Research now aims to better comprehend how to make use of and implement new knowledge in health care practice (Nilsen, 2014).

2.2.1 Implementation science and terms

The term implementation is defined as "*The process of putting to use or integrating evidence-based interventions within a setting*" (Rabin et al., 2008). Implementation science seeks to understand and work within real world settings, paying particular attention to the audience that will use the new knowledge, the context in which implementation occurs, and the factors that influence implementation (Peters et al., 2013). Implementation science is defined as *"the scientific study of methods to promote the systematic uptake of research findings and other evidence-based interventions into routine health practice to improve the quality and effectiveness of health services and care"* (Eccles and Mittman, 2006). The definition includes studies of the implementation of both new medical treatment regimes and new procedures, as well as interventions designed to improve the organization of, and

communication between, patients and health care providers to achieve evidence-based, patient-centered and high quality care.

The term implementation has coexisted with several other overlapping and interrelated terms. Implementation, research utilization, knowledge transfer, translational research knowledge translation, knowledge exchange, knowledge integration, diffusion, and dissemination are all terms used to describe the process of moving knowledge and interventions into practice (Graham et al., 2006, McKibbon et al., 2010, Rabin and Brownson, 2012). Several of the terms have been used in other disciplines before they occurred within implementation science. The term diffusion, for example, is originally derived from Roger's sociological theory of Diffusion of Innovations (Rogers, 2003). Roger's five perceived attributes of innovations– relative advantage, compatibility, complexity, trialability and observability – are also widely applied in implementation science models (Nilsen, 2015). Diffusion of Innovations seeks to explain how innovations are taken up in a population, and how new ideas, products and practices diffuse through a social system (Rogers, 2003). The concepts of diffusion are often compared to the terms dissemination and implementation, which are distinguished as progressively more active steps in the process of moving valid and reliable research information into clinical practice (Lomas, 1993). According to diffusion theory, innovations spread through passive processes, whereas dissemination refers to an active and planned effort to persuade target groups to adopt an innovation. Finally, implementation refers to an active and planned effort to mainstream an innovation within an organization (Greenhalgh et al., 2004). These three terms *diffusion*, *dissemination* and *implementation* can be seen as a continuum, with gradual transitions between them (Nilsen, 2014).

Another frequently used term is "Translational research", which focuses on how research moves from laboratories to health care. Translational research was originally understood to refer to integrating advancements in molecular biology with clinical trials, taking research from "bench-to-bedside" (Woolf, 2008). For others, especially health services researchers, translational research refers to translating research into practice, i.e., ensuring that new treatments and research knowledge actually reach the patients for whom they are intended and are implemented correctly (Woolf, 2008). Translational research is divided into stages, T1 – T4 (Rabin and Glasgow, 2012). T1 seeks to move basic biological discovery into health applications primarily through efficacy studies. T2 addresses how health applications move to evidence-based practice guidelines through effectiveness studies. T3 identifies strategies that

can move Evidence-Based Medicine and Evidence-Based Practice into clinical health care by means of implementation research. T4 seek to evaluate the real-world use of evidence-based interventions by means of outcome and scaling-up research (Rabin and Glasgow, 2012). Thus T3 and T4 overlap partially with implementation science. In this dissertation the term implementation is used, as it is the term most frequently used in Europe to denote moving evidence into practice (Graham et al., 2006) and also corresponds best with the term "implementering" in Norwegian.

2.2.2 Management importance and role

Management plays a key role in the implementation of knowledge and interventions into clinical practice (Dopson and Fitzgerald, 2006, Mosson et al., 2013, Sandstrom et al., 2011) and indirectly plays a significant role for patient outcomes (Wong et al., 2013). Reviews have shown that management has an impact on staff motivation and performance (Brady Germain and Cummings, 2010) and that the managers' activities are multidimensional, involving behaviors that are both facilitative and regulatory in their mechanisms of influence (Gifford et al., 2007).

Hospital management is often organized in three levels: senior, middle and frontline management. Senior management has high-level responsibilities, middle managers are in the middle of the organizational hierarchy and have one or more managers reporting to them, and frontline managers are defined as managers at the first level of the organizational hierarchy who have frontline employees reporting to them (Parand et al., 2014). In this dissertation, the terms "middle management" and "middle managers" are used as collective designation for both frontline and middle management levels, as the managers interviewed were too few in number to be considered representative of any specific group, and were therefore merged.

Nurses and physicians perform their managerial roles differently even if they hold the same management position. Physician managers are more often committed to the clinical tasks integrated in their management role, while nurse managers view management as a separate discipline (Johansen and Gjerberg, 2009, Torjesen, 2007). They are socialized differently and develop distinctive professional identities (Currie et al., 2015), and they also use different strategies and different types of power to exert influence in the organization hierarchy (Spehar et al., 2014).

Middle managers' role in health care innovation implementation is to create a context and infrastructure for implementation (Gifford et al., 2007) ,give the employees necessary information (Birken et al., 2012), mediate between strategy and day-to-day activities (Birken et al., 2012, Salmela et al., 2012) and encourage employees to use innovations consistently and effectively (Birken et al., 2012). Middle managers must balance between leading processes, leading a culture and leading relationships (Salmela et al., 2012). Managers also have a central role in drawing up a clear and consistent professional vision, being continuously supportive to the care staff and take an active part in the care practice as role models (Rokstad et al., 2015). A Swedish study showed that when managers provided synchronization of the various implementation activities, this had positive impact on the implementation of Evidence Based Practice (Bäck et al., 2015).

The perspective of managers, who are most often in charge of the practical implementation, has not been studied adequately (Birken et al., 2012, Kirchner et al., 2012, Reichenpfader et al., 2015). Instead, the focus has been on the roles of top managers and physicians (Birken et al., 2012, Parand et al., 2014). To increase success rates, more research is needed highlighting the role of managers in the implementation processes (Parand et al., 2014, Sandstrom et al., 2011). This dissertation adds knowledge to this area by investigating the middle managers' perceptions and experiences of barriers, facilitators, management role, responsibility, and action taken in the implementation of Choice (study II), as well as elucidating the influence of management on implementation of IPPC (study III).

2.2.3 Theoretical frameworks for implementation research

A theoretical framework is defined as a graphical or narrative representation of the key factors, concepts, or variables to explain a phenomenon, in this case implementation (Moullin et al., 2015). The number of implementation frameworks is rapidly increasing. Two recent reviews using slightly different inclusion criteria, found 49 (Moullin et al., 2015) and 61 (Tabak et al., 2012) implementation frameworks. Moullin et al. [2015] grouped the frameworks according to their targeted innovation (intervention, guideline, knowledge, Evidence-Based Practice or implementation programs) and "type" (descriptive, prescriptive, explanatory, or predictive). Tabak et al. [2012] categorized the frameworks on the variables of construct flexibility, focus on implementation activities, and the socioecological framework level.

The relatively early stage of development of the field of implementation is characterized by the lack of *predictive* frameworks, i.e. frameworks that propose directional relationships between the various concepts of implementation, and *prescriptive* frameworks, i.e. frameworks that guide the implementation process via a series of steps. Most frameworks are *descriptive* in that they describe the properties, characteristics, and/or qualities of implementation or *explanatory* in that they specify the linkage and/or relationships between framework concepts (Moullin et al., 2015). Also a diversity and inconsistency of terminology may indicate the early stage of implementation framework development as the field yet lacks shared conceptualizations of problems, potential solutions, and a common language (McKibbon et al., 2010) which has led to that the models constructs are overlapping (Tabak et al., 2012).

Use of frameworks in implementation science is a way to provide better understanding of how and why implementation either succeeds or fails (Nilsen, 2015). Frameworks have a multitude of potential functions in implementation and implementation research. They can help identify appropriate outcomes, measures and variables of interest for implementation studies, and guide evaluation of implementation processes. They can help organize research studies that involve collecting, analyzing, interpreting, explaining and presenting data (e.g. what works, for whom, under what circumstances, and why). They can guide the development of implementation strategies, i.e. systematic intervention processes to adopt and integrate evidence-based health innovations into usual care (Powell et al., 2012). Finally, theoretical frameworks can contribute to building a scientific knowledge base and a common terminology that will allow research results to be generalized and compared (Colquhoun et al., 2014).

In a recent article, Nilsen [2015] proposes a taxonomy that distinguishes between different approaches in implementation science to advance clarity and achieve a common terminology. He organizes the theoretical approaches used in implementation frameworks in five categories (Nilsen, 2015):

(1) **Process models,** which are used to describe and/or guide the process of translating research into practice. Examples: the Stetler Model (Stetler, 2010), the Knowledge to Action Model (Wilson et al., 2011) and the Grol and Wensing Implementation of Change Model (Grol and Wensing, 2013).
(2) **Determinant frameworks,** which describe general types of determinants that are hypothesized or have been found to influence implementation outcomes. Examples: Promoting Action on Research Implementation in Health Services - PARIHS (Rycroft-Malone, 2010) and Consolidated Framework for Implementation Research - CFIR (Damschroder et al., 2009), used in this dissertation.
(3) **Classic theories,** which are borrowed from other fields such as psychology, sociology and organizational theory to provide understanding of and explanation for influences on implementation outcomes. Example: Diffusion of Innovations (Rogers, 2003).
(4) **Implementation theories,** which are developed by implementation researchers by constructing new approaches for specific application within this field or by adapting certain features of existing theories. Examples: Normalization Process Theory - NPT (May and Finch, 2009), Organizational Readiness (Weiner, 2009).
(5) **Evaluation frameworks** which provide a structure for evaluating implementation endeavors by specifying aspects that can be assessed. Examples: RE-AIM Framework - Reach, Effectiveness, Adoption, Implementation, and Maintenance (Glasgow et al., 1999) and Predisposing, Reinforcing and Enabling Constructs in Educational Diagnosis and Evaluation / Policy, Regulatory, and Organizational Constructs in Educational and Environmental Development – the Precede-Proceed model (Green et al., 2005).

In this dissertation, CFIR was used to guide the research process in study III, and was also used to facilitate the synthesis of findings across the three studies and to address the relative importance of the different constructs. CFIR was selected because it is broad and comprehensive, and thus did not act as a limitation to the open approach the study was intended to have. According to Nilsen [2015], CFIR sorts under determinant frameworks, which also is compliant with the study's purpose of understanding facilitators and barriers for the successful implementation of eHealth communication tools. This dissertation can hence contribute to the refinement of CFIR towards a more succinct and parsimonious framework for use in implementation research.

2.2.4 Consolidated Framework for Implementation Research (CFIR)

CFIR (Damschroder et al., 2009) is increasingly used in implementation research. The meta-theoretical basis of CFIR includes a broad number of aspects related to implementation, and CFIR synthesizes the spectrum of terminologies, definitions, and constructs into a consolidated framework. When developing CFIR, the authors used a snowball sampling approach and collected key constructs across 19 different frameworks intended to support dissemination, innovation, organizational change, implementation, knowledge translation and research uptake (Damschroder et al., 2009). The key constructs were then compiled into one consolidated framework. CFIR was developed to help identify and combine potentially relevant constructs in the existing implementation frameworks on which it is based, thus serving to aid comprehensive understanding. All constructs in CFIR have equal weight, and the framework does not distinguish between the relative construct importance. CFIR comprises 39 constructs sorted under five domains: (1) Intervention characteristics, (2) Outer setting, (3) Inner setting, (4) Characteristics of individuals and (5) Process (Damschroder et al., 2009).

The *Intervention characteristics* domain focuses on how aspects of the intervention affect the implementation. Highlighted factors of importance include: the complexity of the intervention; the relative advantage over other alternatives; whether the intervention can be piloted before full-scale implementation; whether the intervention can be adapted to fit local context; the strength and quality of the evidence supporting the intervention; the quality of design and packaging; and costs (Damschroder and Hagedorn, 2011). In this dissertation, the intervention characteristics are addressed in all three studies; patients (study I), middle managers (study II) and health care providers (study III) describe their views of the eHealth communication tools.

The *Outer setting* domain refers to the extent to which the organization has knowledge about and takes into account the patients needs and resources. This domain also includes constructs about the organizations relationship to policymakers, policy and peer pressure (Damschroder and Hagedorn, 2011). In this dissertation, the patients' needs and resources are addressed from the perspective of the patient (study I), the middle managers (study II) and the health care providers (study III).

The *Inner setting* domain focuses on elements within organizations at different levels, such as individual, provider, team, unit and clinic. Factors addressed are the organizational structure,

culture, implementation climate (e.g., compatibility of current work processes and values with the intervention), implementation readiness (e.g., availability of sufficient resources, leadership engagement) and communication and relational networks (Damschroder and Hagedorn, 2011). In this dissertation, aspects from the inner setting domain are addressed from the middle management perspective (study II) and the health care provider perspective (study III).

The domain *Characteristics of the individuals* refers to the individual's knowledge of, and belief in, the intervention and level of confidence in using the intervention. The individual stage of change and the individual's identification with the organization are also included in this domain (Damschroder and Hagedorn, 2011). In this dissertation, the factors related to the interviewed health care providers' knowledge about and belief in the eHealth tools were addressed by descriptions from middle managers (study II) and health care providers (study III).

Finally, the *Process* domain relates to the practical elements of the implementation process, such as the planning, execution, evaluation, and recruitment of supportive resource persons (Damschroder and Hagedorn, 2011). The process domain reflects the Plan-Do-Study-Act cycle (Langley et al., 2009). In this dissertation, the implementation process is addressed in all three studies, and is described by patients (study I), middle managers (study II) and health care providers (study III).

An increasing number of implementation studies have used CFIR, some to detect factors influencing implementation (Kalkan et al., 2014, Ramsey et al., 2014, Sanchez et al., 2014) others to classify these influencing factors as facilitators or barriers (Balas et al., 2013, Lash et al., 2011, Robins et al., 2013). To date, only a few studies have had the evaluation of CFIR as a specific aim (Breimaier et al., 2015, Ilott et al., 2013, Richardson et al., 2012, Rojas Smith et al., 2014). Before this dissertation, only one study existed using the CFIR developers' method of comparing and obtaining distinguishing constructs between units with high versus low implementation success (Gilmer et al., 2013). During the work with this dissertation, one more was conducted (Haverhals et al., 2015). The need for more research to assess and further develop CFIR's applicability in explaining what factors influence the success of implementation and the constructs' relative importance is therefore evident.

2.3 Facilitators and barriers

When implementing new knowledge and interventions into routine clinical practice, facilitators and barriers will affect the implementation process. These factors can have positive or negative impact on the implementation and are also referred to as determinants in the literature (Fleuren et al., 2004). Other common used terms are enablers and barriers, facilitators and barriers, incentives and problems, and mediators and moderators (Wensing et al., 2013). This dissertation utilizes the terms facilitators and barriers. Interrelationships among different determinants can act as barriers to uptake at some sites and as facilitators at others (McCullough et al., 2015).

2.3.1 Facilitators and barriers for the implementation of a variety of eHealth solutions

Facilitators and barriers that can impact the implementation of health care tools and interventions have increasingly received attention. In 2004, Fleuren and colleagues made the first systematic literature analysis of facilitators and barriers of innovations in health care organizations, combined with a Delphi study. They attained consensus on 49 facilitators and barriers categorized into five groups, with determinants related to 1) socio-political context, 2) organization, 3) person/user/health professional, 4) innovation, and 5) facilities (Fleuren et al., 2004). Others have subsequently contributed by studying and systematizing determinants for implementation. Several reviews have summarized research on facilitators and barriers to implementation of computer technology at health care units (André et al., 2008, Gagnon et al., 2012, Huryk, 2010, Li et al., 2013, Lluch, 2011, Mair et al., 2012), electronic health records (McGinn et al., 2011), electronic prescriptions (Gagnon et al., 2014) and various types of telehealth systems (the use of IT to support delivery of health care from a distance) (Broens et al., 2007, Gorst et al., 2014, Li and Wilson, 2013, Obstfelder et al., 2007). Most of the reviews addressed the topic from the perspective of the health care provider or organization (André et al., 2008, Broens et al., 2007, Gagnon et al., 2012, Huryk, 2010, Li et al., 2013, Lluch, 2011, Mair et al., 2012, Obstfelder et al., 2007). Only one addressed the patient perspective (Gorst et al., 2014). Multiple stakeholder perspectives were addressed in two reviews (physicians, other health care providers, managers and patients/public), and common as well as group specific facilitators and barriers related to their professional and individual priorities were identified (Gagnon et al., 2014, McGinn et al., 2011).

Factors of importance for the implementation success in the aforementioned reviews were related to the technology itself (Broens et al., 2007, Gagnon et al., 2012, Gagnon et al., 2014, Huryk, 2010, McGinn et al., 2011), ease of use (Gagnon et al., 2012, Huryk, 2010, McGinn et al., 2011), privacy and security (Broens et al., 2007, McGinn et al., 2011), Internet/IT literacy (Huryk, 2010, Li et al., 2013, McGinn et al., 2011) and economic issues such as financing, costs, reimbursement and other incentives (Broens et al., 2007, Li et al., 2013, Lluch, 2011, McGinn et al., 2011). Organizational factors affecting the implementation were reported to be the structure of the healthcare organizations (Lluch, 2011, Obstfelder et al., 2007), workplace culture (Li et al., 2013), workflow-integration (André et al., 2008, Broens et al., 2007, Huryk, 2010, Li et al., 2013), available resources and workload (Gagnon et al., 2012, Gagnon et al., 2014, McGinn et al., 2011), training and knowledge (André et al., 2008, Broens et al., 2007) and management support (Huryk, 2010). Individual health care provider characteristics affecting the implementation were perceived usefulness and relative advantage (Broens et al., 2007, Gagnon et al., 2012, Gagnon et al., 2014, Li et al., 2013, Obstfelder et al., 2007), motivation (André et al., 2008, Gagnon et al., 2014, McGinn et al., 2011), and perceived effect on patient care and safety (Huryk, 2010). In a review of telehealth experiences among patients with chronic conditions (Gorst et al., 2014), facilitators were listed as: improved self-care, increased access to healthcare, improved health knowledge, ease of use, peace of mind, convenience, effective health management, appreciation of telehealth nurses, and believing telehealth to be as good as or better than in-person care. Individual barriers were listed as: technical problems, believing telehealth to be unnecessary, preference for in-person care, technology anxiety, difficulty remembering to interact with system, need for technical support, and finding telehealth to be a repetitious process (Gorst et al., 2014).

A review of reviews about facilitators and barriers for the implementation of eHealth systems revealed that some areas had as yet attracted relatively little attention, including: (1) the effects of eHealth on roles and responsibilities; (2) risk management; (3) ways to engage with professionals; and (4) ensuring that the potential benefits of new technologies are made transparent through ongoing evaluation and feedback (Mair et al., 2012).

In this dissertation, the focus is on implementation of eHealth *communication* interventions which involve patients *and* health care providers. It is not the technology itself that is of interest, but rather technology as facilitator for communication. Therefore, the literature review in the following sections is focused on implementation of communication tools

involving *both* patients and health care providers, in addition to the middle managers who facilitate the implementation processes. eHealth tools affecting only one of these groups are beyond the scope of this review, as they do not fully address the complexity of involving multiple groups of stakeholders.

2.3.2 eHealth communication tool-related facilitators and barriers

Ease of use of the eHealth communication tool has been shown to be an important determinant for successful implementation. Studies have shown that factors related to the system structure and login procedures affect use (Hsiao et al., 2011, Tjora et al., 2005). For example, a study of a secure email service found that use was hindered because the tool was technically too cumbersome and that using the telephone was more convenient (Hsiao et al., 2011). It has been emphasized that a clear and shared understanding of the features available in the communication service can act as a facilitator (Goel et al., 2011). Furthermore, perceived benefit (Atherton et al., 2013) as well as the possibility of starting on a small scale prior to full implementation (Van Der Wees et al., 2014) were reported as facilitators.

Typical barriers reported are lack of integration into existing routines (Berry, 2011, Greenhalgh, 2009, Van Der Wees et al., 2014), lack of guidance about how to use the tool (Atherton et al., 2013), lack of financial reimbursement (Antoun, 2015, Berry, 2011, Bishop et al., 2013, Ozkaynak et al., 2014, Popeski et al., 2015), and concerns about technology, confidentiality, security, safety and liability (Antoun, 2015, Atherton et al., 2013, Boyce et al., 2014, Cornwall et al., 2008, Popeski et al., 2015, Ye et al., 2010).

Furthermore, there is a considerable difference between eHealth tools used by only one stakeholder group, for example Internet support tools for patients or electronic health records for health care providers, and use of communication tools that involve at least two diverse stakeholder groups: different health care providers who use the tool as part of their care processes and their patients. This interdependency among user groups adds another layer of complexity that affects the success of implementation (Bakken and Ruland, 2009, Ozkaynak et al., 2014). When the communication is conducted in writing instead of talking, and by means of technology, this adds even more complexity to the interaction and it also adds new dimensions to the professional role and the interdisciplinary collaboration between professional groups (Borosund et al., 2014, Wibe et al., 2012).

2.3.3 Organizational and health care provider-related facilitators and barriers

Implementation can be supported and hindered by institutional as well as health care provider related facilitators and barriers. Provider motivation (Koivunen et al., 2008) and workload improvements (Antoun, 2015, Boyce et al., 2014) are described as important facilitators for the implementation of eHealth patient–provider communication tools. Provider perception of having the necessary resources in terms of time (Bishop et al., 2013, Koivunen et al., 2008, Shimada et al., 2013), technology (Koivunen et al., 2008, Shimada et al., 2013) and help (Boyce et al., 2014) are shown to have positive influence on the implementation. Enthusiasm in key personnel such as coordinators (Shimada et al., 2013) and engaged opinion leaders/champions (Van Der Wees et al., 2014) are also reported as key factors for successful implementation. Patient demand can also act as a facilitator (Bishop et al., 2013).

Typical barriers reported to hamper the implementation of eHealth patient–provider communication tools are fear of increased workload or experience thereof (Antoun, 2015, Berry, 2011, Bishop et al., 2013, Boyce et al., 2014, Byrne et al., 2009, Caffery and Smith, 2010, Koivunen et al., 2008, Ozkaynak et al., 2014, Popeski et al., 2015), workflow disruptions (Atherton et al., 2013, Van Der Wees et al., 2014), unsuitability for discussion of mental and sensitive problems (Antoun, 2015), fear of medical errors (Antoun, 2015), lack of resources (Berry, 2011, Boyce et al., 2014, Koivunen et al., 2008) and institutional policy issues (Berry, 2011, Popeski et al., 2015).

Individual provider attitude towards the intervention can affect the implementation (Ozkaynak et al., 2014). Providers who regard the intervention as burdensome (Clark et al., 2009), who do not appreciate it (Boyce et al., 2014), have negative attitudes towards computer use (Koivunen et al., 2008), or do not understand why they should make use of the new technology (André et al., 2008) can negatively affect the implementation. Studies have shown that some health care providers introduce eHealth patient–provider communication tools only to some of their patients (Byrne et al., 2009, Cox et al., 2011) and sometimes forget to introduce the tool to the patients altogether (Gutteling et al., 2008). Willingness to change is reported to be a crucial determinant for the success of implementation (Bishop et al., 2013, Boyce et al., 2014). Furthermore, perceived communication skills (Borosund et al., 2014, Dinkel et al., 2010, Heyn et al., 2012), computer skills (Boyce et al., 2014), lack of relevant training (Boyce et al., 2014, Koivunen et al., 2008) and ethical aspects related to challenging

conversation about sensitive and private issues (Borosund et al., 2014) can also negatively impact the implementation. In addition, when the implementation is organized as a project, lack of communication with the project management can act as a barrier for the implementation (André et al., 2008).

To increase knowledge about these complex factors, it is recommended to include several sites in implementation studies, as an apparently similar intervention may be implemented and accepted in different ways in different settings (Chaudhry et al., 2006, Ozkaynak et al., 2014). Different professions may also have varying perceptions about implementation success (Benzer et al., 2013). However, few studies have explored this (Benzer et al., 2013, Øvretveit, 2011), and no studies comparing eHealth patient–provider communication tools across settings had been published when this dissertation work began. Therefore, one aim of this dissertation was to explore health care providers' experiences of facilitators and barriers in the implementation of secure email IPPC into routine practice, and simultaneously examine differences between units (study III).

2.3.4 Management-related facilitators and barriers

Management has a significant influence on the success of implementation, due to the managers' accountability, commitment and involvement (Birken et al., 2013, Bishop et al., 2013, Bostrom et al., 2013, Lukas et al., 2007, Marchionni and Ritchie, 2008, Shimada et al., 2013). A recent review concluded that managers' time spent, activities and engagement can influence the quality of clinical outcomes, processes and performance (Parand et al., 2014). In a study of implementing evidence-based improvements in patient care, the improvement was greater when the managers were committed to quality, being actively involved in supporting process redesign, and wholly aligned around the importance of quality improvement (Lukas et al., 2007). On the other hand, poor communication and leadership (Szydlowski and Smith, 2009) and lack of support from managers is described as a major barrier to research utilization (Kajermo et al., 2008, Kirchner et al., 2012).

The results from a recent review demonstrate important associations between the skills of the managers and IT adoption (Ingebrigtsen et al., 2014). The more technical informatics skills and prior experience with IT projects a manager has, the more she or he will develop a vision comprising a long-term commitment to the use of IT, which in turn can lead to proactive management behaviors associated with successful organizational and clinical outcomes

(Ingebrigtsen et al., 2014). However, no evidence-based models exist that show which leaders' actions are effective in enabling others to carry out improvement activities, or how this relates to clinical and cost outcomes (Øvretveit, 2010).

2.3.5 Patient-related facilitators and barriers

An increasing number of studies show eHealth patient–provider communication interventions to have beneficial effect on patient care, as summarized in section 2.1. Factors reported to have positive impact on implementation include patients' perception of the service as convenient, efficient and user-friendly (Haun et al., 2014, Wade-Vuturo et al., 2013) and that they feel satisfied with having access to clinical care outside traditional face-to-face visits (Wade-Vuturo et al., 2013, Wibe et al., 2012). However, studies also report challenges related to the implementation of the interventions into routine health care. Unawareness of the existence of the service (Nijland et al., 2009, Ronda et al., 2014) and lack of interest in managing their own illness (Ronda et al., 2014) are reported reasons for non-use. There is also evidence that patients are concerned about privacy and confidentiality (Haun et al., 2014, Plener et al., 2014), trust (Andreassen et al., 2006), safety and security (Atherton et al., 2013, Goel et al., 2011). Furthermore, connectivity problems (Goel et al., 2011, Haun et al., 2014) and insufficient Internet/IT literacy (Bishop et al., 2013, Gutteling et al., 2008, Ronda et al., 2014) are reported patient barriers. In addition, lack of information/motivation (Berry et al., 2011, Bishop et al., 2013, Goel et al., 2011, Haun et al., 2014, Nijland et al., 2009), negative attitude (Goel et al., 2011, Wade-Vuturo et al., 2013), language/cultural issues (Berry et al., 2011) and preference for using other forms of communication (Goel et al., 2011, Nijland et al., 2009), are reported barriers to implementation of eHealth patient–provider communication tools. Many studies have shown that only few of the patients who were offered email actually made use of the service to communicate with their health care providers. A study from four ambulatory practices reported that only 3.2% of the patients used an eVisit service (Jung et al., 2011). A secure messaging system for diabetics was used by 19% of the patients (Harris et al., 2009). An encrypted messaging system was used by 4.3% of parents with chronically ill children (Hsiao et al., 2011). A secure messaging system in internal medicine was used by 31% of the patients (Lin et al., 2005), and two different secure messaging systems in primary care showed 6% use (Byrne et al., 2009) and 52% use (Adamson and Bachman, 2010). Many patients find the tools burdensome (Berry et al., 2011), and eventually stop using them (Eysenbach, 2005, Nijland et al., 2011). Patients' assumptions about providers' opinions

about the service, providers' instructions about the service, and the way providers respond to the patient requests may all act as facilitators or barriers (Berry et al., 2011). Finally, few studies truly focus on the patient perspective in implementation research, and facilitators and barriers affecting the implementation of eHealth patient–provider communication tools are rarely assessed from the patients' point of view. To add to this knowledge, this dissertation explored the reasons why patients who had access to the secure email IPPC did not use it (study I).

2.3.6 Process-related facilitators and barriers

Factors related to how the implementation process is planned and conducted will affect the implementation outcome. It is argued that the implementation process should include facilitating factors such as a motivated team, a positive context, involvement of all relevant stakeholders, commitment of managers and key personnel, good planning and adequate resources and support (Grol et al., 2013).

The planning of the implementation process is described as especially important, and will affect the implementation outcome (Damschroder and Lowery, 2013). For example if the planning phase does not address the preparation of the persons to be involved, this can hinder the implementation (Nilsson et al., 2014) Enthusiastic key personnel in terms of champions and implementation leaders are widely described as important facilitators for implementation success (Abbott et al., 2014, Balas et al., 2013, Mair et al., 2012). However, some have reported mixed importance of key personnel (Damschroder et al., 2011) and also that limited or negative engagement from key personnel can act as a barrier (Breimaier et al., 2015, Mair et al., 2012).

2.4 Summary

In summary, eHealth patient–provider communication tools have shown promising results in trials by improving patient–provider communication, health outcomes, patient activation and patient satisfaction. However, there is a gap between eHealth patient–provider communication tools which have shown promising results in trials, and the success of their implementation into routine health care. Implementation of eHealth tools is affected by facilitators and barriers in many dimensions: the tool itself, the patient, the organization, the health care provider, the management and the implementation process.

While there is substantial knowledge about the large number of factors that possibly *can* affect implementation success, most studies do not address the relative importance of the different factors. Most studies have revealed and described facilitators and barriers without seeing them in relation to each other or identifying which factors are decisive for high versus low implementation success.

The Consolidated Framework for Implementation Research (CFIR) is used in an increasing number of studies. However, there is still need for more research to assess and further develop CFIR's applicability in explaining what factors influence the success of implementation and assess the CFIR constructs' relative importance.

3. INTERVENTIONS AND THEIR IMPLEMENTATION INTO PRACTICE

The tools included in the implementation research in this dissertation are the secure email IPPC and the patient assessment and communication tool Choice. The tools were developed at Center for Shared Decision Making and Collaborative Care Research at Oslo University Hospital. The study was funded by Norwegian Research Council Grant # 191008. Professor Cornelia M. Ruland was the Principal Investigator of the study.

This dissertation is connected to two larger practice based trials conducted in regular clinical practice investigating the use and effectiveness of IPPC and Choice.

The secure email IPPC (study I and III) and the point of care symptom assessment tool Choice (study II) were created to strengthen patient–provider communication. The tools are in line with the principles of the Chronic Care Model (Wagner et al., 1996) and Patient-Centered Care (Institute of Medicine, 2001). The tools were designed to improve fruitful interaction and shared decision making between patients and health care providers, and to help patients address their needs and make them more included and engaged in their own treatment and care. Furthermore, IPPC and Choice aim to support prepared, proactive teams of health care providers in providing individually tailored support and follow-up whether the patients are at the point of care (Choice) or at home (IPPC) (Ruland et al., 2009, Ruland et al., 2010).

A description of the tools is provided in the next sections, followed by a description of the implementation contexts and the implementation processes.

3.1 IPPC – Internet -based Patient–provider Communication Tool

The IPPC (study I and III) was designed to offer patients secure email contact from home with health care providers at the hospital, as well as to support health care providers in providing individually tailored support and follow-up when the patients were at home. IPPC was developed as a practice tool. User requirements were obtained from focus groups with patients, workshops with health care providers, expert reviews of the system conducted by nurses and programmers, and was thoroughly tested for usability (Ruland et al., 2009). A practice-research-network consisting of health care providers, researchers and developers was also established to facilitate the process of developing IPPC (Ruland et al., 2009).

In previous studies the IPPC has been a part of a multi-component eHealth self-management support system called WebChoice (Borosund et al., 2014, Ruland et al., 2013), where the

IPPC module was one of the most appreciated components of the system (Ruland et al., 2013). In a randomized controlled trial, the patients who had access to IPPC reported significantly lower depression scores than the group offered usual care (Borosund et al., 2014). Studies of the content of the messages sent via the IPPC, showed that patients used IPPC actively to pose questions and raise concerns related to symptom experiences, fear of relapses, and uncertainty in everyday life (Grimsbo et al., 2011). Analysis of messages combined with patient interviews showed that the IPPC could help patients fulfill their otherwise unmet information needs (Wibe et al., 2012). Analysis of the nurses' responses to the patient messages showed that nurses were sensitive to patients' emotions (Grimsbo et al., 2012) and that the communication expanded the nurses' ability to exercise patient-centered care (Svenningsen, 2014, Wibe et al., 2012).

3.1.1 Use of IPPC

The IPPC in this dissertation (study I and III) offered patients the opportunity to send messages to, and receive answers from, hospital nurses, physicians, nutritionists, and social workers via secure email. The messages from the patients arrived in the email-box of the coordinating nurse, who had expertise on the patients' respective diagnoses and treatments and had access to the hospital's electronic patient record. Whenever a patient sent a message in the system, the coordinating nurse could respond directly to the patient or forward the message to another provider, depending on the type of question. The other providers could either answer the patient directly or give comments back to the coordinating nurse, who then composed an answer to the patient (see figures 1, 2 and 3).

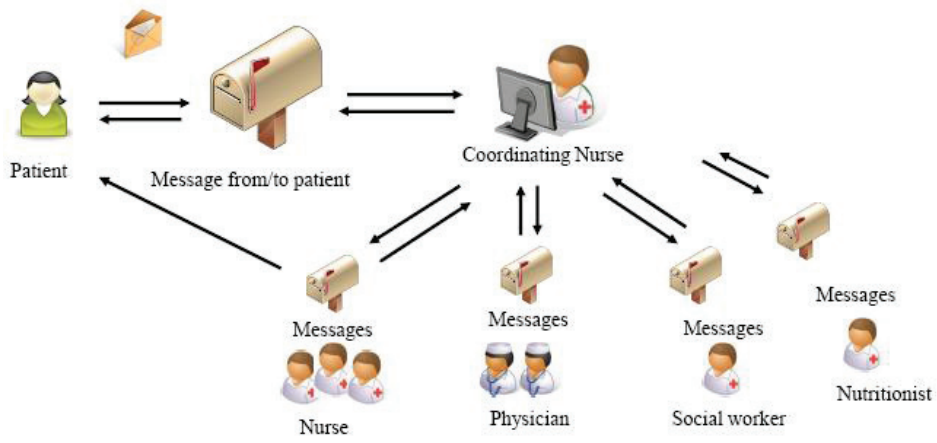

Figure 1 IPPC message flow between patients and health care providers

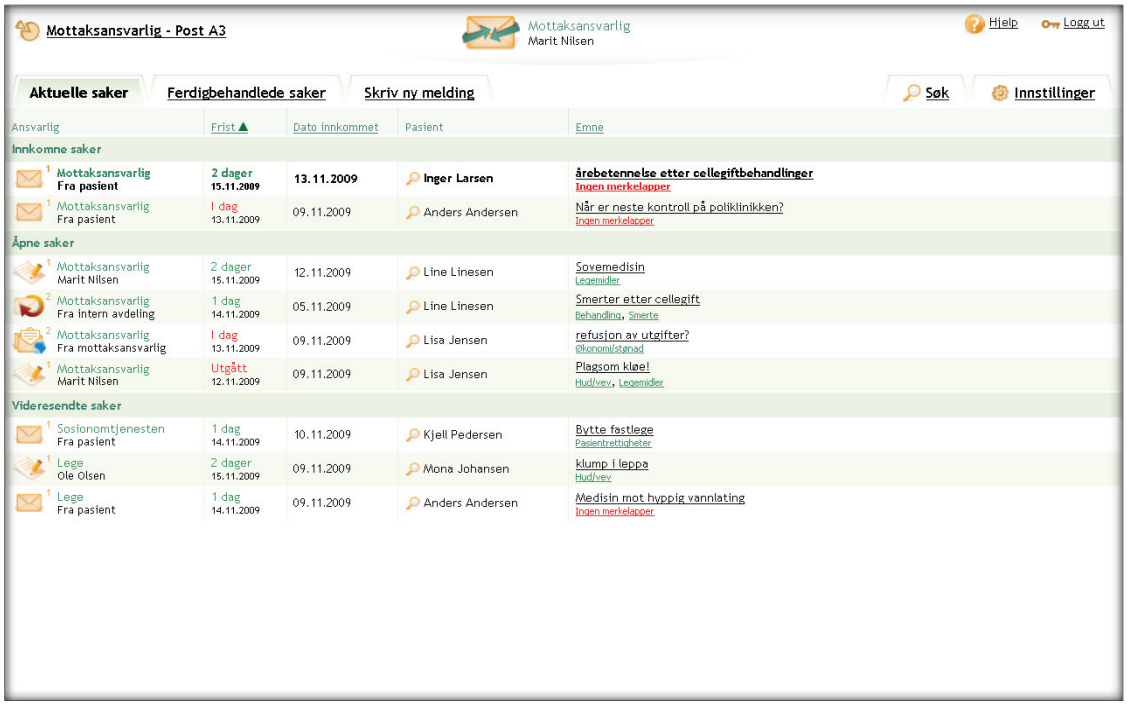

Figure 2 Screenshot of the IPPC overview page of the coordinating nurse [in Norwegian]

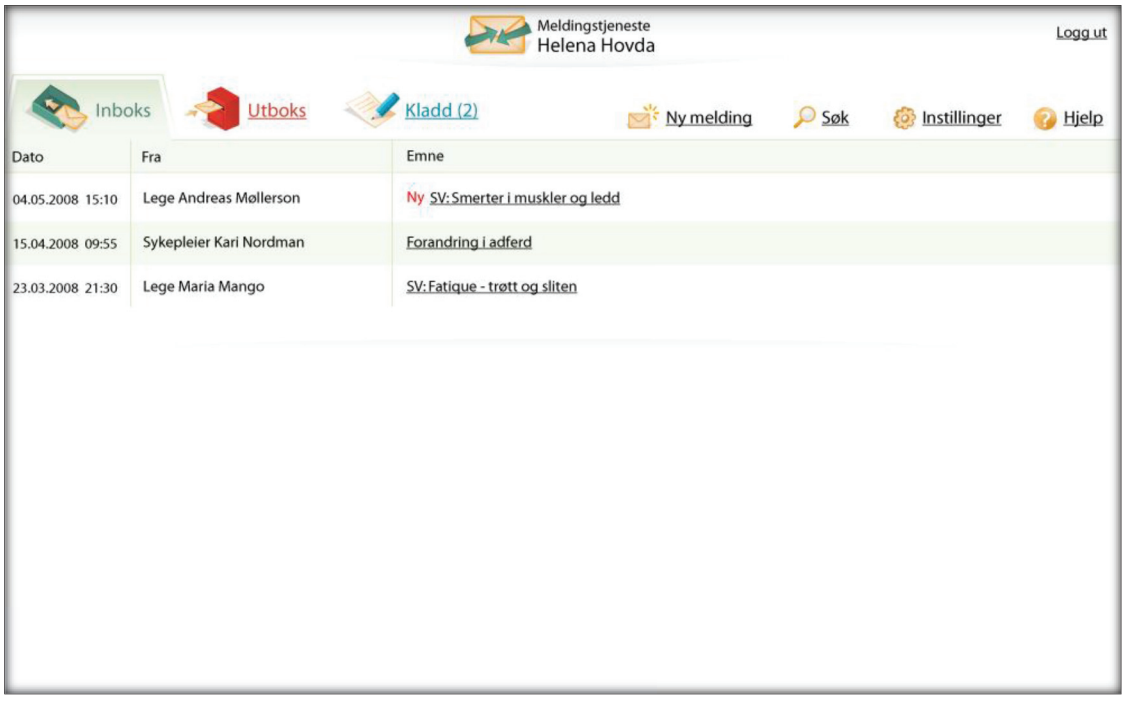

Figure 3 Screenshot of the IPPC overview page of the patient [in Norwegian]

To protect the information sent through the secure email IPPC, patients and health care providers were required to log into the system by means of the strict authentication key BankID. This was the same solution as when logging on to Internet banking, thus not needing to learn a new log in procedure. All data from the system were submitted to a secure server at Oslo University Hospital, using an encrypted connection.

3.1.2 Implementation of IPPC at five units

The secure email IPPC was implemented at five units treating patients with cancer or diverse medical diagnoses at a university hospital in Norway. IPPC was voluntarily implemented as part of the research study; it was not a mandatory intervention within the hospital policy. In the first step of the implementation the unit management designated 3-4 health care providers (nurse, physician, social worker and nutritionist) to the implementation group and use of IPPC, based on their experience, role, and position in the unit.

At each unit, after the nurses had made the first contact with the patients, a research assistant or the PhD candidate introduced the patients to the IPPC study and asked for informed consent. The patients received oral and written information about how to log into and use the IPPC and filled out the demographic and baseline questionnaires. The patients were informed that they could send messages with questions and concerns related to their illness and would receive answers from hospital health care providers. The patients were informed that they could use the IPPC between and after their hospital admissions as much as they wanted over the study period, which lasted for 6 or 8 months, depending on a pre-decided study plan at each unit.

At each unit, routines were pilot tested to streamline IPPC recruitment procedures and discover initial technical problems with the IPPC. All routines were followed up with provider interviews one month after start-up. Only insignificant issues were reported, and by then they had already been solved.

The implementation strategies, e.g. the systematic processes used to adopt and integrate IPPC into usual care (Powell et al., 2012), included 1) recruitment of designated health care providers to operate IPPC, 2) distribution of a user manual for how to log in and use IPPC, 3) one-on-one-training of all participating health care providers on how to operate the system and how to answer the patients' questions, 4) training of nurses in how to refer eligible

patients to the research assistants for potential study inclusion, 5) audit and feedback to participating health care providers and unit managers in terms of monthly emails with the number of patients recruited so far, as well as the number of received and answered IPPC messages, and 6) ongoing support on weekly basis from the research team. The PhD candidate was responsible for the implementation of IPPC in collaboration with the research center and the managers and health care providers involved.

During the study period of 19 to 23 months (depending on unit), 171 patients were offered IPPC. Thirty-eight patients (22%) sent 133 messages (range 1-13). The health care providers wrote 133 responses to the patients (range 0-27), with nurses writing the majority of the responses. Four units offered the secure email IPPC to more than 60% of their eligible patients, and were labeled high implementation units. The fifth unit, however, did not offer the secure email IPPC to more than approximately 15%, and was labeled low implementation unit.

3.2 Choice – Interactive tailored patient assessment and communication tool

Choice (study II) is an interactive tailored patient assessment and communication tool for patients with cancer and their health care providers. Choice was designed to help patients report their symptoms, problems, and priorities for care, and as a means to support health care providers in offering individually tailored support and follow-up at point of care (Ruland et al., 2010). The development of Choice was based on a thorough literature review of symptoms, problems and symptom management in patients with cancer, on interviews with cancer patients, and on focus groups with cancer expert (Ruland et al., 2010, Ruland et al., 2003).

Using Choice, patients reported their symptoms and health problems along physical, functional, and psychosocial dimensions, indicated their degree of distress, and prioritized their need for care for their symptoms. The assessment in Choice is individually tailored to each patient based on their initial response, allowing the patient to focus on aspects that are personally relevant, while omitting those that are not.

In a series of clinical trials, Choice has shown significant beneficial effects on patient care and outcomes. When Choice was used, care was more consistent with patient preferences, more symptoms were addressed, the patients became more active, the providers shared more

information, patients' symptom distress decreased, and the need for symptom management support was reduced (Heyn et al., 2013, Heyn et al., 2012, Ruland, 2002, Ruland et al., 2010, Sandbæk, 2009). Choice has demonstrated satisfactory validity and reliability (Ruland et al., 2007). Nurses and physicians have found Choice useful in clinical practice, but nurses gave consistently higher usefulness ratings than physicians (Ruland, 2006). In interviews, nurses described how Choice had enhanced patient care, and how using Choice made both the patients and the nurses better prepared to communicate and to plan care (Borosund et al., 2014, Sandbæk, 2009). For example, sensitive topics such as fear of dying and psychological problems that had seldom been raised earlier were now addressed through the use of Choice (Borosund et al., 2014), but also were challenging for the nurses to handle (Borosund et al., 2014, Sandbæk, 2009). Nurses also said Choice should receive equal priority to other routines, including sufficient time, space and competence in order to obtain successful implementation (Borosund et al., 2014).

3.2.1 Use of Choice

When using Choice, a nurse invited the patient to fill out the Choice registration on a touch-screen tablet computer (figure 4) prior to being seen by a nurse or physician. The Choice tablet was easy to use: after just a brief introduction, the patients could complete the assessment on their own at their own pace without using provider time.

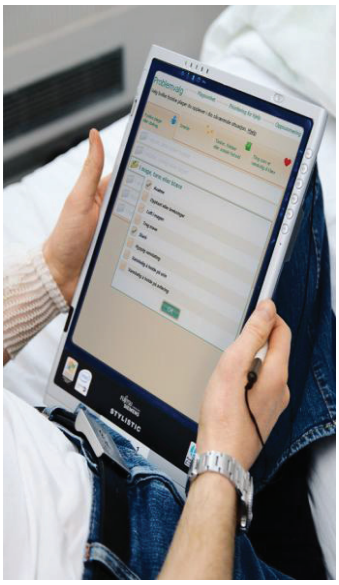

Figure 4 The Choice tablet

When the assessment was completed, the Choice system immediately created a summary that displayed the patients' selected symptoms and distress, prioritized by need for care, thus directing the frontline providers' attention to the problems that mattered most for each patient. This helped the providers offer better-tailored symptom management and care, as well as supporting and improving patient-centered communication. The summary was transferred to the hospital's electronic patient record encompassed within the hospitals security solutions, with a personal copy to the patient. (figure 5). The summary was available to patients and health care providers for use in patient–provider-conversations and in the providers' interdisciplinary meetings.

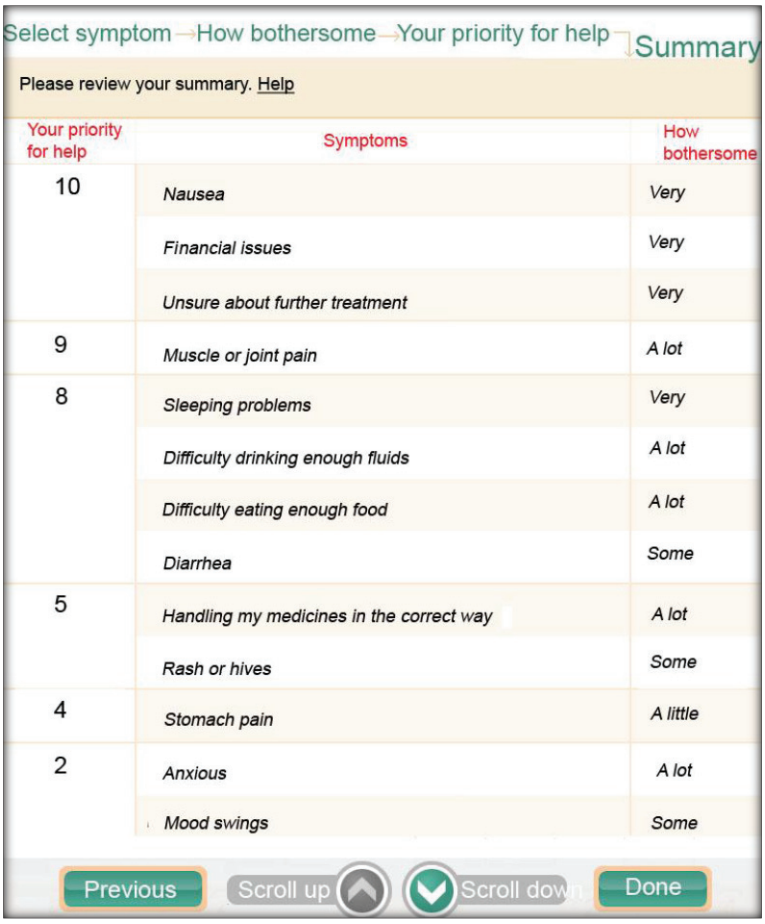

Figure 5 Screenshot of the Choice assessment summary

3.2.2 Implementation of Choice at five units

Based on the units' experiences with Choice during the studies cited above (Ruland, 2006, Ruland et al., 2010) they wanted to continue using Choice in regular care after study completion. The request for use came from the nursing management and Choice was implemented at three inpatient and two outpatient units treating patients with cancer.

The research center that had been responsible for conducting the prior study offered training and support to facilitate the start-up phase of the implementation of Choice into routine practice. The PhD candidate was not involved in the implementation of Choice, but received information from the research center.

The strategy for Choice implementation included 1) information folders about Choice, 2) kick-off meetings for the frontline nurses and physicians at each unit, 3) group training for the frontline nurses on how to operate the intervention and how to introduce Choice to the patients, 4) training sessions in small groups led by two trained research assistants, 5) hands-on training, 6) communication training, 7) guidance for the frontline nurses and physicians on how to use the assessment summary of patients' symptoms in clinical practice, 8) resource group consisting of frontline nurses at each unit who acted as super-users and had the designated role of encouraging frontline nurses and physicians to use Choice, 9) ongoing support on weekly basis from the research center.

At the time of the current study, four of the five units were using Choice in their clinical practice. Choice was offered to the patients at admission to the hospital unit or at outpatient consultations.

3.3 Similarities and differences between IPPC and Choice

The secure email IPPC (study I and III) and the point of care symptom assessment tool Choice (study II) are patient–provider communication tools which both use technology to facilitate communication. They thus share some common characteristics, but they are also different in some ways. IPPC is used over the Internet, exclusively with written communication while Choice is used at the point of care for assessing the patients' perceived symptoms prior to face-to-face communication.

The implementation of the two tools into clinical practice entailed different degrees of complexity. IPPC involved all health care providers in offering IPPC to the patients, but only a few of them were specially designated to respond to messages from the patients in IPPC. The similarity between IPPC and ordinary email decreased the challenges related to unfamiliarity. The main difference from ordinary email is the secure log-in procedure. This was nevertheless not very problematic, as it was the same login as for internet banking, which everyone in the study was familiar with.

Choice, on the other hand, involved all nurses and physicians in use of Choice in the patient–provider communication. It increased the complexity that a tablet computer had to be delivered to all the patients, collected after the patients had completed the assessment, and that the data needed to be transferred to the electronic patient record. Furthermore, involving all health care providers in the follow-up of the patient assessment, and ensuring that the patients were offered follow-up for all reported symptoms was challenging, as the providers had to change their routines for how to communicate with their patients (Borosund et al., 2014). Before Choice, the health care providers themselves planned the content of the encounter; now the assessment summary of patients' voicing their problems was the starting point for the conversation.

The similarities and differences between IPPC and Choice allowed a good basis for studying different eHealth patient–provider communication tools across contexts and stakeholders, and both tools were therefore included in this dissertation.

4. METHODS

In order to understand how facilitators and barriers affected the implementation of the two eHealth patient–provider communication tools across different stakeholders and settings in regular clinical care, a descriptive, qualitative research design was used (Polit and Beck, 2012, Sandelowski, 2000). This approach is appropriate when the literature addressing the research issue is sparse (Brink and Wood, 1998), and when the purpose is to understand aspects of a naturally occurring situation (Polit and Beck, 2012). This dissertation was initiated in 2008 when there was as yet little knowledge about implementation of eHealth tools into clinical practice. Therefore, the flexibility offered by qualitative design was chosen. The research team had some pre-defined research questions, but was also interested in capturing unexpected findings, which qualitative research design enables (Polit and Beck, 2012).

In this dissertation, data were collected by means of individual interviews in all three studies. Through the interviews, the stakeholders' own perspectives on the implementation processes were gathered (Kvale and Brinkmann, 2009). The interviews were semi-structured in that they were conducted according to an interview guide with open-ended questions that focused on themes of interest (Kvale and Brinkmann, 2009). The interview guides were developed on the basis of theory and earlier knowledge, and the questions were developed to answer the specific research questions in each study. Although the interviews contained specific questions on use of the eHealth tools, log-in and other technological aspects, the primary purpose was to explore the stakeholders' attitudes, perspectives and experiences of the tools, as well as perceived facilitators and barriers for the implementations. All interviews were conducted by the PhD candidate. To create a comfortable interview situation the first minutes of the interviews were spent on small talk and ice-breaking exchanges of conversation before the actual interview began. The interviewer then described the purpose of the interview, the main topics that would be addressed, use of tape recorder and the handling of data after the interview. During the interview the interviewer tried to let the respondents tell their stories without interruptions, and encouraged the story telling by active listening in the form of for example nodding. If the respondent diverged too far from the theme, the interviewer asked questions to draw the attention back to the topics in the interview guide.

Qualitative content analysis was used to analyze the transcribed interview data. Content analysis has been defined in different ways and used within different areas, spanning from mass media research to health care studies (Graneheim and Lundman, 2004), and used both

qualitatively and quantitatively (Hsieh and Shannon, 2005). In this dissertation, qualitative content analysis is defined as "*a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns*" (Hsieh and Shannon, 2005). This implies that data were analyzed and interpreted in a systematic and structured way. Through content analysis, it was possible to extract and classify words and sentences into fewer content-related categories which shared the same meaning, as described by Cavanagh (Cavanagh, 1997). The manifest as well as the latent content was analyzed (Graneheim and Lundman, 2004). This means that the visible, obvious components were analyzed, e.g. what the respondents actually said (manifest content) and the underlying meaning of the text was interpreted (latent content). Table 1 provides an overview of aim, objectives, methods and participants in the three studies.

Table 1 Overview over aim, objectives, methods and participants in the dissertation's three studies

	Study I	Study II	Study III
Overall aim	Examine facilitators and barriers when implementing eHealth patient–provider communication tools into different contexts in routine practice from perspectives of key stakeholders.		
Specific objectives	Investigate the reasons for non-use of patients who had access to but did not use the secure email IPPC.	Examine middle managers' perceptions of barriers, facilitators, management role, responsibility, and action taken in the implementation of Choice into clinical practice one year after implementation.	Examine health care providers' experiences of facilitators and barriers in the implementation of IPPC into routine practice and compare differences between units, using the CFIR framework.
Methods	Qualitative descriptive. Data collection: Individual interviews. Data analysis: Content analysis.		
Participants	N=22 Patients	N= 9 Middle Managers	N=17 Health Care Providers

In the next sections, the research protocol for each study is thoroughly described, including study participants, procedure for interviews and analysis. Finally, ethical aspects are discussed.

4.1 Methods study I

The specific objectives of study I was to examine the views of patients who had access to, but did not use, IPPC and the patients' reasons for non-use of the tool.

4.1.1 Study participants

Due to the large number of patients (78%) who had access to IPPC without using it, a purposive sample of non-users was selected. They were interviewed about their reasons for non-use. Inclusion criteria for participation were that the patients had completed their study period (described in chapter 3.1.1), no longer had access to the IPPC and had not made use of the IPPC. In addition, for practical reasons, they had to live within 180 km (110 miles) of the study hospital or have an appointment there. Due to the number of patients who lived further away, interviewing over the telephone (n=8) was subsequently also approved to achieve a sufficient number of interviews.

Eligible patients were contacted by a letter about the study and an invitation to participate. The letter contained information about inclusion criteria and a description of how the interview would be performed. After some days, the PhD candidate contacted patients by telephone to ask for an appointment for an interview. Some patients declined to participate during the phone conversation. In total 31 patients were contacted. Twenty-two patients participated: three women and 19 men. Nine declined participation; four women and five men. The participating patients were between 29 and 71 years old (mean 50, median 51.5). Nine of the patients had been diagnosed with cancer and 13 had some other medical diagnosis.

4.1.2 Interviews

The location for the 14 face-to-face interviews was selected to be convenient for the patients, and interviews were conducted either in a meeting room at the hospital, at the PhD candidate's workplace, or at the patient's workplace. Eight interviews were conducted by telephone.

A semi-structured interview guide based on literature on implementation, use and non-use of eHealth interventions (Eysenbach, 2005, Goel et al., 2011, Hsiao et al., 2011, Nijland et al., 2011) was developed. Different conceptual models and frameworks (Damschroder et al., 2009, Davis, 1989, Glasgow et al., 1999, May and Finch, 2009, Rogers, 2003) were examined

for their suitability for guiding the study. These models and frameworks focus on predicting use of the technology and on how people and organizations adopt and start using the services, while non-users, who were the focus of this study, are given less attention. In addition, the models mainly focus on health care providers and their organizations, and are sparser in the constructs that reflect the patient's point of view. As no existing theory or framework was found suitable for the aim of this study, an open approach was applied to obtain as much information as possible during the study.

In addition to obtaining background information about the patient's diagnosis and treatment, the interview guide contained four themes:

1. How the patients were introduced to the IPPC, their expectations of the service and what they expected they could use it for.
2. Reasons for non-use.
3. Factors that could have influenced their use of IPPC.
4. Use of telephone, computers and the Internet in their everyday life.

The interviews lasted between 10 and 73 minutes. The face-to face interviews lasted longer (mean 39 minutes, median 33 minutes) than the telephone interviews (mean 29 minutes, median 27 minutes). The interviews were recorded with a digital voice recorder and transcribed verbatim.

4.1.3 Analysis

The transcripts were analyzed using qualitative content analysis, inspired by a deductive directed approach, which is applicable when the analysis is based on findings from previous research (Hsieh and Shannon, 2005). In the first step of the analysis, the transcribed interviews were thoroughly read to gain a comprehensive understanding of the data. Then, initial coding categories were created based on the identification of meaning units in line with research questions in the interview guide. Data from all the interviews were then reviewed for content and coded according to the categories, using the software NVivo version 9 (QSR International, Doncaster, Victoria, Australia). During this process, key concepts (i.e. words, phrases, and paragraphs) were extracted from the text and further grouped into the categories. Data relevant to the research questions that could not be coded into the predefined categories were given new categories. By continuously moving between parts and the whole text, subcategories were formed within the bounds of the initial main predefined categories. Next,

the data were discussed between the PhD candidate and one of the advisors (DG), followed by discussions within the research team. The data were coded into the final list of categories.

4.2 Methods study II

The specific objectives of study II was to examine hospital unit middle managers' perceptions and experiences of barriers, facilitators, management role, responsibility, and action taken in the implementation of Choice into clinical practice.

4.2.1 Study participants

Six nurses and three physicians in management positions, i.e. middle managers, participated in this study. The inclusion criteria were that they had had management responsibility or operational responsibility for planning and/or executing the implementation of Choice in one or more of the five hospital units. All who were asked agreed to participate. The nurse managers were all female with an average of 40 years old, an average of 14 years since graduating from nursing school, and an average of 8 years of management experience. Four of the nurse managers had specialization in nursing or ethics, three had in addition specialization in management, and two had no further education after nursing school. The physician managers were all male with an average of 58 years old, an average of 30 years since graduating from medical school, and an average of 11 years of management experience. All the physicians had a PhD degree in addition to clinical specialization. None of them had management specialization.

4.2.2 Interviews

A semi-structured interview guide was developed from literature on management and implementation of eHealth interventions (Ammenwerth et al., 2006, Lee, 2006, Yukl, 2006). A deliberate decision was made to start with broad and open-ended questions to gain as much information as possible about the middle managers' attitudes towards, and experiences of, the implementation of Choice. The interview guide contained three themes:

1. The implementation process and use of Choice at each unit.
2. Facilitators and barriers for the use of Choice.
3. Management role, responsibilities and action taken during the implementation of Choice.

The interview guide was first tested in a pilot interview with one of the nurse managers. Since the pilot interview captured issues of interest and prompted no changes in the interview guide, data from the pilot were included in the study.

The interviews were conducted either at the middle manager's office or in a meeting room at the hospital, based on the managers' preference. The interviews lasted between 30 and 60 minutes and were recorded with a digital voice recorder and transcribed verbatim.

4.2.3 Analysis

Data analysis in this study was similar to that in study I. Qualitative content analysis, inspired by a deductive directed approach, was used (Hsieh and Shannon, 2005). The steps taken were similar to those in study I, with thorough reading of all data, and creation of initial coding categories according to research questions in the interview guide. Subsequently, data from the interviews were reviewed for content and coded according to the categories, followed by a discussion first between the PhD candidate and one of the advisors (ME) and afterwards within the entire research team. Lastly, the data were coded into the final list of categories. See section 4.1.3 for a detailed description of the analysis process.

4.3 Methods study III

The specific objectives for study III were to identify and compare health care providers' experiences of facilitators and barriers in the implementation of the secure email IPPC into routine practice using the CFIR framework, assess the ability of the different constructs of CFIR to distinguish between high and low implementation success, and compare the study findings with those from other studies that used the CFIR to discriminate between high and low implementation success.

4.3.1 Study participants

Criteria for participation in study III were that the health care providers had answered messages from the patients in the IPPC (described in chapter 3.1). The health care providers were informed when they agreed to answer the patients' IPPC messages that they would also be invited to participate in interviews during the study period. When they were contacted by the PhD candidate about participating in the current interview study, one of the respondents

preferred to receive and answer interview questions in writing, while the others agreed to participate in individual interviews.

The health care providers were ten nurses, six physicians and one nutritionist from five units. The nurses were on average 40 years old, had an average of 16 years nursing practice since graduating from nursing school, and an average of 11 years of experience working with patients within the pertinent diagnostic group. Half of them had a clinical specialization in nursing. The physicians and nutritionist were on average age 50 years old with an average of 23 years since graduating from medical/nutritionist school, and an average of 14 years of experience with the pertinent group of patients. Five respondents among the physicians and the nutritionist had a PhD degree, four of them had clinical specialization and three had both. Seventy-six percent were women.

4.3.2 Interviews

A semi-structured interview guide was developed containing questions based on the five domains of CFIR (Damschroder et al., 2009). The 39 constructs of CFIR supported the research team in defining topics for the interviews, and ensured that all major domains in the framework that influence implementation were addressed. The CFIR domains were operationalized in accordance with the research questions of study III (table 2).

Table 2 Operationalization of CFIR domains for study III

CFIR domains	Operationalization of CFIR domains for study III
1. Intervention characteristics	The secure email IPPC
2. Inner setting	Five units treating patients with cancer or diagnoses within internal medicine
3. Outer setting	The patients who were offered IPPC
4. Characteristics of individuals involved	The nurses, physicians and nutritionist who operated IPPC
5. Process	The process when IPPC was implemented

The interview guide contained questions suited for investigating the respondents' perceptions regarding each of the five domains of CFIR.

The interviews were conducted at either the health care providers' office or at a meeting room at the hospital, based on the respondent's preference. The interviews lasted between 10 and 75 minutes. The interviews were recorded with a digital voice recorder and transcribed verbatim, except for one of the interviews, because the respondent did not allow use of a voice recorder. In that interview the PhD candidate took notes during the interview.

4.3.3 Analysis

The transcripts were analyzed using techniques of qualitative content analysis, inspired by a deductive directed approach (Hsieh and Shannon, 2005). The first step in the analysis was to read all transcripts, notes and written responses to obtain a complete understanding of the data. Next initial coding nodes and sub-nodes were developed based on the domains and constructs of the CFIR framework (Damschroder et al., 2009). Units of analysis such as sentences or longer semantic units were then deductively coded into the nodes and sub-nodes. Next, the coded text was subjected to a rating process, based on the recommended method described by Damschroder and Lowery [2013], the authors of CFIR. The analysis was conducted as a discussion first between the PhD candidate and one of the advisors (ME) and afterwards within the entire research team. In the rating process, a deliberate consensus process was used to assign a rating to each construct obtained from each hospital unit. Constructs were coded either as missing too much data to discern a pattern (Missing), not distinguishing between high and low implementation units (0), or weakly (+1/-1), or strongly (+2/-2) distinguishing between high and low implementation units (table 3).

The ratings reflect the valence (positive or negative influence) and the magnitude or strength of each construct emerging in each hospital unit based on the coded text (Damschroder and Lowery, 2013). When all constructs obtained from all hospital units were rated, results were compared for each construct across hospital units.

Table 3 Criteria used to assign ratings to constructs in study III

Rating	Criteria
–2	Construct found to have a strong negative influence
–1	Construct found to have a weak negative influence
0	Construct found to have neutral influence
0 (mix):	Construct had mixed positive and negative influences, which balanced each other
+1	Construct found to have a weak positive influence
+2	Construct found to have a strong positive influence
Missing	Missing too much data to discern a pattern

4.4 Ethical aspects

All three studies in the dissertation were planned and performed in compliance with the principles outlined in the Declaration of Helsinki (World Medical Association, 2013). All procedures complied with the Norwegian Data Protection Authority, were approved by the Privacy Protection Committee at the hospital (Personvernombudet) (study I and III: 08/4316) (study II: 07/8617) and the Regional Committee for Medical and Health Research Ethics in Norway (study I and III: S-08502d, 2008/14591, 2009-1165).

Written informed consent was obtained from all participants in all three studies. The participants were informed that participation was voluntary and that they could withdraw from the study without giving reasons at any time, without consequences for them in the current treatment and care (study I) or for their working conditions (study II and III). They were given a copy of the consent form to keep. No incentives for participation were offered, except of payment of any travel expenses for the patients (study I).

Protection of data was ensured by exclusion of personal data and other information that could identify the participants from the information gathered. The codebook that coupled the study identity number to the participant was stored separately from the data at a secure server at the

hospital. The interview audiotapes and transcripts were stored separately on the server, so that the de-identified transcripts could not be connected to personal participant information, and also separated from the codebook. During the process of transcription from audio to text, all names of persons and units were de-identified. The signed consent and the forms with demographic information filled out by the participants were stored in separate lockers at the research center.

Data analyses were performed on the transcribed material only. It was made certain that no statements could be traced back to the identity of the participants or the participating units in the papers and dissertation.

Patients can be viewed as being in an especially vulnerable situation. Therefore, some additional precautions were done when enquiring about their participation in study I. When recruited to the study, the patients were first asked by the unit health care providers if they wanted to receive information about the study, thus communicating that even receiving information about the study was voluntary. One of the nurses in each unit identified eligible patients from the list of patients admitted at each unit, because the research center was not allowed access to patient information with the purpose of identifying patients who met the inclusion criteria for the study. When recruited to the subsequent interview study in this dissertation, the patients received a letter with information about the interview study and that the PhD candidate would call them to ask for their participation. If the patients did not answer the telephone when the candidate called, one more call was made. If the patient did not answer, a text message concerning participation was sent in a non-identifiable manner. If the patient did not answer the text message, no further contacts attempts were made, and the patient was perceived as inaccessible.

As part of the study, the patients were asked to fill out questionnaires three times over the study period of six or eight months, depending on unit affiliation. Filling in the questionnaire and participation in interviews can be perceived as a mental burden. For example, participating in the study may have directed the patients' attention to their illness. On the other hand, patients may find it positive to express their own experiences and opinions.

5. METHODOLOGICAL CONSIDERATIONS

In this section, the quality of the methods used in this dissertation is discussed, to allow a better understanding of the dissertation's design, methods, conduct, analysis and findings, and to account for the choices that were made during the research process.

5.1 Combination of results from the implementation of two different eHealth tools

To increase the richness of data, a decision was made to include data from two different implementation processes. The decision to include data from the interviews with managers (study II), which was not originally planned, added richness to the dissertation as the management perspective was not addressed in the same specific manner in the IPPC study. When data from the implementation of two different eHealth tools across contexts obtained from three different stakeholder groups were combined, the data material provided an opportunity to assess commonalities and differences across tools and contexts in the dissertation, that otherwise would not have been possible.

The tools are different in terms of how they are used in clinical practice. IPPC is used over the internet with merely written communication while Choice is used at the point of care for assessing patient symptoms prior to face-to-face communication. They are also different in terms of how many health care providers were involved in each implementation. Choice affected all nurses and physicians. IPPC involved the entire units in offering IPPC to the patients, but only a few specially designated health care providers responded to messages from the patients in IPPC. Furthermore, each stakeholder perspective is only assessed regarding one of the tools in this dissertation. However, both IPPC and Choice were implemented at the same university hospital, which means that the implementations shared some contextual commonalities. The tools also have some similarities in that both are tools for communication between patients and health care providers and both make use of technology to facilitate the communication. The combination of results from two implementation processes offered richness to the understanding of how facilitators and barriers affect the implementations from the perspectives of different key stakeholders. The study made it possible to address aspects of all CFIR domains when the results from the three studies were combined (see chapter 6). The combination of the three stakeholder perspectives also provided a broad picture of facilitators and barriers for implementation of eHealth communication tools across contexts. The findings from the three studies supplement and

support each other, and contribute unique information to the field of implementation of eHealth communication tools.

5.2 The researcher's qualifications and pre-understanding

The researcher is an instrument in qualitative research (Patton, 2015), meaning that the ways in which the study is conducted and the results are interpreted are formed by the researcher's perspective. As the researcher is instrumental in both collecting and analyzing data, it is important to be aware of one's own pre-understanding and qualifications (Patton, 2015). It is therefore necessary to reflect on the personal and professional aspects that may have affected data collection, analysis and interpretation, either negatively or positively (Patton, 2015).

My academic perspective and point of view are from within the field of nursing and management. My pre-understanding throughout the research process is characterized by my managerial experience and my long experience of clinical practice within implementation and change processes at the university hospital where the studies were carried out. Conducting research in one's own professional field in a well-known arena both poses methodological challenges and offers advantages. Knowing the field well entails that the research questions asked can be relevant, nuanced and comprehensive. On the other hand, there is a risk of being an "insider", blind to alternative explanations (Robson, 2002). In this dissertation, my pre-understanding and preconceptions have affected the selection and formulation of the questions, the analysis of data and the interpretations of the results. I dealt with this possible threat by continually having discussions with advisors and fellow students who brought other perspectives to the study during the research process.

5.3 Theoretical framework

The Consolidated Framework for Implementation Research (CFIR) was used to guide the research process in study III, and was also used to compile the findings from each of the three studies in this dissertation to a composite whole. CFIR was useful both to get a comprehensive overview of all aspects that could affect the implementations and creating the interview guide in study III to ensure that all relevant aspects were covered in the interviews. CFIR helped ensure that the results were interpreted and not just summarized, according to methods described by Malterud (Malterud, 2016). However, the use of theory also has some limitations, and some argue that there is no need for implementation theories, but that

common sense are well suited for guiding implementation research (Oxman et al., 2005). For example, there is a potential risk that aspects not covered in CFIR could be overlooked in the dissertation, as different theories provide different lenses through which to analyze research problems (Reeves et al., 2008). To avoid this, the researchers tried to remain open to alternative explanations throughout the entire research process. For example, this dissertation made some suggestions for additional constructs in CFIR that had not been described before (see chapter 7.1.7).

5.4 Recruitment and data collection

Each of the three studies in this dissertation needed some considerations regarding the selection of study participants and how data was collected.

In study I (IPPC – Patient non-users), only three of the 21 patients included were female. The results of the study might have been different if more women had participated. Other studies have reported gender differences in use and perceived usefulness of technology (Irizarry et al., 2015, Newhouse et al., 2015). For example, women might bring a different perspective regarding fundamental aspects such as privacy, confidentiality and security. Furthermore, the initial plan was to conduct face-to-face interviews with all included patients, and one criterion for participation in the interviews was that the patients lived within 180 km (110 miles) of the study hospital or already had an appointment there. In order to reach more participants and ensure saturation, without increasing the time and travel costs too much, a decision was made to collect data from patients living far away by means of individual telephone interviews. There is an assumption that face-to-face interviews are superior to telephone interviews which may stem from a concern that lack of visual cues could lead to data loss or distortion (Novick, 2008). The choice of interview mode may have affected the response rate, and the interview modes might yield different results (Sturges and Hanrahan, 2004). The content obtained from each interview mode has not been compared in this study, but the face-to face interviews lasted longer (mean 39 minutes, median 33 minutes) than the telephone interviews (mean 29 minutes, median 27 minutes). However, when the interview is short, specific and not too personal, as is the case with the interviews in this study, telephone interviews are considered to be an acceptable method of collecting data (Polit and Beck, 2012). Yet, telephones may allow respondents to feel relaxed, be able to disclose sensitive information and remain more anonymous (Novick, 2008). Furthermore, as the quality of telephone interviews in several studies is considered to be comparable to that of face-to-face interviews with no significant

differences (Novick, 2008, Sturges and Hanrahan, 2004), this approach was considered acceptable. Moreover, the study may have been strengthened by inclusion of the views of patients in more remote areas. Fourteen interviews were done in person, eight by telephone.

In study II (Choice – Middle managers), the data obtained were gathered retrospectively, which could have caused recall bias (Hassan, 2006). However, the study was done only a short time after the implementation had started, and several of the nurse and physician managers still felt they were in the middle of the process. Although the sample was small, a strength of the study was that it included all the managers who had played an active role in the implementation of Choice, and all who were asked were willing to participate.

In study III (IPPC – Health care providers) it was not possible to present the exact number of available patients from all five units who were potential participants in the IPPC study. At two units it was not possible to develop a complete reporting routine for patients who were not approached, as there were too many health care providers involved in the identification and first information about IPPC to the patients. However, the difference between the units with high and low implementation success in terms of how many patients were offered information about IPPC was large (approximately 60% versus 15%, respectively) and the difference was also supported by the interviews.

In study III, the initial plan was to conduct face-to-face interviews with all included health care providers. However, one respondent did not allow use of voice recorder during the interview and another preferred to respond in writing. Even if these two respondents did not want to be included in the interview procedure designed for the study, their contributions were considered too crucial for the study to be omitted based on the departure from standard methodology. A strength of the study is that it includes all the health care providers who had played an active role in the implementation of IPPC, and all who were asked were also willing to participate.

There is a risk when conducting interviews that the respondents do not want to say what they really think, for several reasons. They may not want to say something negative that might disappoint the interviewer, or they may be afraid of being recognized. This issue was addressed by describing to the respondents the secure and de-identified way their information was handled.

5.5 Trustworthiness

Trustworthiness is associated with the evaluation of quality in qualitative research (Polit and Beck, 2012) and refers to the degree of confidence qualitative researchers have in their data, assessed using the criteria of credibility, confirmability, dependability and transferability (Lincoln and Guba, 1985, Polit and Beck, 2012). To ensure trustworthiness in this dissertation, detailed descriptions of the methods applied for each of the three studies are reported in the method section, chapter 4.

5.5.1 Credibility

Credibility refers to the confidence in the "truth" of the data, how trustworthy the data analysis and interpretations are, and whether they address the intended focus (Polit and Beck, 2012). Activities to ensure credibility in this dissertation included *prolonged engagement* (Lincoln and Guba, 1985) meaning that the PhD candidate spent sufficient time in the units where the studies were conducted to learn and understand the culture, social setting, and how the implementation of Choice (study II) and IPPC (study I and III) were conducted. Regular meetings regarding the *IPPC*-implementation were held between the PhD candidate and the health care providers involved. Regarding the implementation of *Choice*, the PhD candidate was not a part of the implementation process, but routinely received information from the research center. Furthermore, the PhD candidate's former employment as nurse and manager in the university hospital where the studies were conducted helped the understanding of the culture and social setting.

Contributing to enhance credibility was that the sample size for study I (IPPC - Patient non-users) was considered appropriate. The interviewer got a sense of data saturation, in that new interviews did not yield new information. Adequacy of sample size in qualitative research is relative, not a matter of judging a sample small or large per se, but rather too small or too large for the intended purposes of sampling and for the intended qualitative product (Sandelowski, 1995). Regarding sample size in study II (Choice - Managers) and III (IPPC - Health care providers), all eligible participants were willing to participate. In study II and III a highly varied sample was obtained, by including five units in each study, and also different health care professionals at each unit. Another activity to ensure credibility was that all interviews were audio taped (except for one) and transcribed verbatim, so that all analyses were conducted from written text.

During analysis, the software program NVivo version 9 (QSR International, Doncaster, Victoria, Australia) was used. NVivo is considered a valuable means for advancing the robustness of qualitative research (Bergin, 2011). In this dissertation, the software program helped keep track of the large amounts of data, and made it possible to move between the different coding steps and provide consistent coding without losing track of the process. In this way the confidence in the judgments done in each phase was increased.

5.5.2 Confirmability

Confirmability refers to the degree of neutrality or the extent to which the findings of the study are shaped by the participants themselves and not by researcher bias, motivation, or interest (Lincoln and Guba, 1985). The PhD candidate's affiliation to the research center that had developed the eHealth communication tools IPPC and Choice, in addition to the role as researcher, could represent a risk that a desire for positive results affected how the questions were asked in the interviews and how the data were analyzed and interpreted. *Researcher triangulation* which is the use of different investigators (Lincoln and Guba, 1985) was used to ensure that the participants' responses remained in the foreground and to reduce the potential bias that comes from a single person doing some of the analysis alone (Lincoln and Guba, 1985, Patton, 2015, Polit and Beck, 2012). The research team consisted of four researchers, two of whom were not very close to the process, and helped ensure the necessary impartiality. They contributed in the development of the interview guides, the coding categories and in the analysis and interpretation of the data. All authors of the papers describing each of the three studies were involved in creating the interview guides, and thus also in creating the initial coding categories for each study. Next, the PhD candidate worked closely with one of the advisors, an experienced expert on qualitative research. They analyzed parts of the data separately, discussed their findings, and afterwards discussed the findings within the entire research group until agreement was reached and the categories reflected the subjects under study in a trustworthy way. The discussions provided many useful deliberations, helped uncover a range of possibilities, prevented selective attention to some issues at the expense of others, ensured that the interpretations were not "closed" too soon, thus minimizing the risk that the analysis led to premature conclusions (Sandelowski, 1995).

5.5.3 Dependability and transferability

Dependability, refers to the stability of data over time and conditions (Lincoln and Guba, 1985) and transferability, refers to the extent to which findings can be transferred to other settings and whether the description of the study is comprehensive enough so that others can judge whether transfer can be contemplated as possible (Lincoln and Guba, 1985). These criteria were met in all the studies of this dissertation with thick descriptions of the results. To increase the transparency of the interpretation, categories and subcategories were illustrated with quotations in the presentation of the results in papers.

The study was conducted at a single university hospital, and the results may not be representative for other practice settings. However, the inclusion of several units increases the transferability to other settings.

In study I (IPPC - Patient non-users), five different groups of patients were included to strengthen the transferability of the study, but four of the five groups consisted of severely ill patients who had recently undergone highly specialized life-saving treatment. These patients were thus quite different from, for example, chronically ill patients who represent many of the patients seeking health care.

In study III (IPPC - Health care providers), the inclusion of five units and comparisons across the units, increases the transferability to other settings. There is a limitation to the study in that it compares four high success units to only one low success unit. With only one low success unit, it is difficult to know whether its characteristics can be representative of other low success contexts or whether they are merely idiosyncratic to that one unit. However, the majority of CFIR constructs distinguishing between high and low success units in our study were also shown in other studies indicating that the characteristics for low success units can be present across studies.

6. RESULTS

This dissertation investigated facilitators and barriers affecting the success of implementing two different eHealth patient–provider communication tools into clinical practice from the perspective of patients (study I), middle managers (study II) and health care providers (study III).

In the following sections, the main results from each study are first presented as brief summaries from the papers reporting the studies. Next, the facilitators and barriers for the implementations are presented the way they emerged when the main results were examined using the CFIR framework, with its 39 constructs sorted under the five domains: (1) Intervention characteristics, (2) Outer setting, (3) Inner setting, (4) Characteristics of individuals and (5) Process (Damschroder et al., 2009). The CFIR domains and constructs that were identified in each study are presented.

6.1 Results study I

In study I, the aim was to investigate reasons for non-use by patients who had access to but did not use the secure email IPPC, which allowed them to communicate with health care providers at their treatment unit, without leaving home. The results showed that even if the patients did not use IPPC, they appreciated its availability and the possibility of using it if need arose. Their reported reasons for not using the IPPC fell into three main categories: (1) they felt that they did not need the IPPC and had sufficient access to information elsewhere, (2) they preferred other types of communication such as telephone or face-to-face contact with their health care providers, or (3) they were prevented by IPPC attributes such as login problems.

When the results from study I were examined in light of the CFIR framework facilitators and barriers emerged under the following CFIR domains.

6.1.1 Intervention characteristics

The perceived *relative advantage*, i.e. the advantage of the secure email IPPC versus other solutions (Damschroder et al., 2009), was reported as high, even if the patients in the study had not used the tool. Many of the patients viewed IPPC as a back-up solution that they would have used had they not received sufficient follow-up from their health care providers or if they had had more questions.

The *complexity*, e.g. the difficulty of implementing IPPC (Damschroder et al., 2009) was perceived in various ways among the patient non-users in this study. Some of them reported having a good understanding of how they could use the tool, and were prepared to make use of it when needed. Others were more unsure about what the IPPC was, how the service was organized, and what they could use it for.

The *design quality and packaging*, e.g. how the tool was bundled, presented, and assembled (Damschroder et al., 2009), only was assessed by the patients that had tried to log into the system without succeeding. Some of them said that the login procedure was too cumbersome and some said that they had forgotten how to log into the IPPC. None of the patients expressed concerns about the systems' security level or concerns that unauthorized persons could get access to the information in IPPC. However, some of them said that they did not rely on their questions reaching the correct provider.

6.1.2 Outer setting

The outer setting domain of CFIR contains constructs related to factors from the outer environment that affect the implementations. Patient needs and resources is one of the constructs under this domain, and refers to the extent to which patient needs and resources are known and integral to the organization (Damschroder et al., 2009). Regarding the *patients' needs* in this study, even if the patients had not used IPPC, many of the patients viewed it as a valuable tool for communication with health care providers. They said it was a good service which they were positive to. Some of them said that they liked having the opportunity to contact the hospital if they should feel a need for it, and that they thought it could be helpful to many people. However, some of the patients assumed right from the start, when introduced to the IPPC, that they would not use it, because they did not like this means of communication with their health care providers.

6.1.3 Process

Regarding the *planning and executing of the implementation process*, some of the patients said it would have been more appropriate to introduce the IPPC at an earlier point of time in the disease trajectory, when they had more unanswered questions and worries. Furthermore, the study revealed that IPPC was not always introduced at the most appropriate time during

the hospital stay. Sometimes it had coincided with other demanding activities, which had pushed the information about the IPPC into the background.

6.2 Results study II

In study II, the aim was to examine the perceptions of nurse and physician managers regarding facilitators, barriers, management role, responsibility, and action taken in the implementation of the symptom assessment and communication tool Choice into clinical practice. The results indicated that nurse managers conscientiously supported the implementation, but that workloads prevented them from participating in the process as closely as they wanted. Physician managers reported less contribution to the implementation of Choice.

When the results from study II were examined in light of the CFIR framework facilitators and barriers emerged under the following CFIR domains.

6.2.1 Intervention characteristics

Regarding the *intervention source*, e.g. whether the tools were externally or internally initiated (Damschroder et al., 2009), the initiative for Choice implementation was requested by the nurse management after they had participated in a previous study where they found the tool helpful. Therefore, they requested continued use of Choice.

The physicians had strong opinions regarding the *strength and quality of the evidence* supporting Choice. The interviews indicated that it had been important for the physicians to be assured that Choice was evidence-based before deciding to make use of it.

The *relative advantage* of Choice was reported to be high by most of the middle managers, while some of the physicians described Choice as less useful for their units. However, some of the middle managers viewed Choice as an add-on that was not really needed since they considered that the patients obtained what they needed through regular care.

The *adaptability* of Choice with the other duties in the units had been a challenge and frontline nurses had felt uncertain about how to deal with the new tasks associated with the Choice implementation.

The *complexity* of Choice was associated with different health care professions sharing one common communication tool together with their patients. This entailed new ways of

collaboration between professional groups in addition to new ways of communicating with the patients. Several of the nurse and physician managers said that many of the frontline providers had found it difficult to learn a new way of communicating with the patients based on Choice. Furthermore, the involvement of all nurses and physicians working in the units increased the complexity because of the large number of people who had to be involved, and receive training and follow-up when using Choice.

6.2.2 Outer setting

Most of the middle managers reported Choice as a good offer for the patients and a means to provide care more based on the *patients' needs* and preferences.

6.2.3 Inner setting

Regarding the *structural characteristics* of the units, the flat management structure among the physicians was perceived as a barrier, since physicians were autonomous and difficult to lead. Some nurse managers said it was difficult to achieve good information flow because the units were large and staff turnover was rapid.

The *networks and communication* between the different professional groups in the units were reported to be sub-optimal. An example of this was that the physicians' skepticism for Choice was given the opportunity to unfold in the informal arenas in the units because they did not have any formal channels for praise and criticism.

The *culture* among physicians was described as slow to adopt new things. All the physician managers described how old habits and resistance to novelty could pose barriers to the implementation of Choice. Furthermore, the culture was characterized by physicians holding an influential role in the units and thus influencing the implementation of Choice directly as well as indirectly. For example, some of the frontline physicians' resistance to the use of Choice was reported to be an important barrier to the implementation.

The *implementation climate*, e.g. the units' capacity for change (Damschroder et al., 2009), was illuminated in the interviews. The *tension for change*, e.g. the perceived need for change (Damschroder et al., 2009), was described, but a few of the managers considered that the patients obtained what they needed through regular care. The *compatibility*, e.g. the degree of fit between the new tools and the existing workflows in addition to the units' norms and

values (Damschroder et al., 2009), met positive assessments. All the nurse and physician managers described advantages of Choice, and they had many concrete examples of how Choice had helped them reach their overarching goals of providing high-quality care for the patients, by improving the patient–provider communication and improving the efficiency of care. However, one of the units had suspended their use of Choice at the time of the interviews, because the staff had not managed to integrate Choice into the unit's other activities. The *relative priority*, e.g. to what degree the health care providers followed up the implementation (Damschroder et al., 2009), varied. The middle managers described how both nurses and physicians in their units were slow to start making use of Choice. At all units, they described how other ongoing changes had competed with Choice for attention, and that Choice was not always given the highest priority. In addition, Choice was viewed basically as a nursing tool, with less physician engagement and involvement.

The *readiness for implementation*, e.g. the units' commitment to the implementation of Choice (Damschroder et al., 2009), was illuminated in the interviews. The *management engagement* was high among the nurse managers, but also hindered by their workload. Among the physician managers, the active support varied. The *available resources* in terms of lack of time were recognized as a barrier for the use of Choice at all units. *Access to information and knowledge* in terms of information and training were reported to be satisfactory.

6.2.4 Characteristics of individuals

The *knowledge and beliefs* about Choice, described as the health care providers' personal attitude toward the tool (Damschroder et al., 2009), were perceived in various ways. Many of the nurse and physician managers had positive perceptions of Choice, which acted as a facilitator. However, some of the physicians' resistance to the use of Choice was reported as an important barrier to the implementation.

6.2.5 Process

In *planning* the implementation of Choice, the nurse managers reported being active and involved. The physicians were less involved in the implementation process, as they would deal only with the assessment summary, and not with introducing Choice to patients. The limited involvement of the physicians made them peripheral in the process. When physicians were invited to participate in meetings or discussions, they usually did not attend. They were

offered pre-implementation training in use of Choice, but many of them did not show up as they felt they did not need it.

The *recruitment* of *formally appointed implementation leaders* was done for the implementation of Choice by establishing a well-functioning and active resource group. *Opinion leaders*, e.g. unsupportive physicians affected the implementations in a negative way. In most of the units, the collaboration with the *external change agents*, e.g. the research center, acted as a facilitating factor for the implementation of Choice.

6.3 Results study III

In study III, the three aims of the study were to (1) identify and compare barriers and facilitators influencing the implementation of the secure email IPPC in five hospital units using CFIR, (2) assess the ability of the different constructs of CFIR to distinguish between high and low implementation success, and (3) compare the findings with those from other studies that used the CFIR to discriminate between high and low implementation success. Four units offered IPPC to more than 60% of their eligible patients and were labeled *high implementation units*. The fifth unit, however, did not offer IPPC to more than approximately 15% of their patients and was labeled *low implementation unit*. Twenty-eight CFIR constructs were addressed in the interviews, of which 12 distinguished between high and low implementation units. Most of the distinguishing constructs were related to the inner setting domain of CFIR, indicating that institutional factors were particularly important for successful implementation. Health care providers' belief in the intervention as useful for themselves and their patients as well as the implementation process itself were also important. A comparison of constructs across this and two other studies that also used the CFIR to discriminate between high and low implementation success showed that 24 CFIR constructs distinguished between high and low implementation units in at least one study; 11 constructs distinguished in two studies. However, only two constructs (patient need and resources, and available resources) distinguished consistently between high and low implementation units in all three studies.

6.3.1 Intervention characteristics

The *intervention source* (not a distinguishing CFIR construct) of IPPC was described as externally developed with the research center as initiator. This was viewed as a barrier for the

implementation of IPPC at the low implementation unit. They said that the enthusiasm for IPPC might have been greater if the implementation had been internally initiated.

The *relative advantage* (weakly distinguishing CFIR construct) of IPPC compared with face-to-face and telephone communication was positively described in the interviews. However, they said that IPPC was a supplement and could not be the only means of communication. A disadvantage described by staff at the low implementation unit was the lack of important nonverbal communication in IPPC.

The *complexity* (not a distinguishing CFIR construct) of IPPC was described by all units as not very high. However, the shift from oral to written communication was described as challenging.

The *design quality and packaging* (not a distinguishing CFIR construct) of IPPC was described as good, as it was easy for the health care providers to use. However, there had been some log-in problems related to server issues and a cumbersome log-in procedure.

6.3.2 Outer Setting

Regarding the *patient's needs and resources* (weakly distinguishing CFIR construct), respondents from all high implementation units said that the IPPC tool would benefit the patients. In the low implementation unit, respondents said that the patients at their unit had less need for the secure email IPPC than others because the patients were already closely followed up face-to-face and by telephone, and that the frontline health care providers at the unit regarded it as too burdensome for the patients to participate in the IPPC study.

6.3.3 Inner Setting

The *structural characteristics* (weakly distinguishing CFIR construct) of the units varied with respect to professional autonomy and management presence. At some units the nurse management was peripheral and the frontline health care providers independently collaborated with one another at the unit. At other units, the management had a stronger presence in a hierarchical structure.

Networks and communication (not a distinguishing CFIR construct) were described as well functioning at most units as they had arenas for discussion of individual patients' treatment

and follow-up, except one of the high implementation units where they felt they were working on their own with too few arenas for meetings between the different professional groups.

A conservative *culture* (weakly distinguishing CFIR construct) toward implementation of new interventions was described by all units in that they were slow to introduce new things. Respondents at the low implementation unit also described many individualists and strong personalities among the health care providers, who did not want to be told to do something different. At this unit, they had a view of nursing research as not being proper science and the IPPC study had low status compared with clinical trials performed by physicians at the unit, which hindered some of the unit staff from taking the study seriously.

Implementation climate was discussed in the interviews. *Tension for change* (strongly distinguishing CFIR construct), was reflected in the respondents' view of IPPC as a possible future medium in health care. Respondents at the low implementation unit did not express a need for IPPC, either for themselves or for patients. *Compatibility* (strongly distinguishing CFIR construct) between the health care providers involved and IPPC was expressed by high implementation units as IPPC being well adapted to the hospital's overarching philosophy of being open and accessible to patients. In the low implementation unit, however, respondents said that IPPC had poor fit because the patients had complicated problems, which meant that the health care providers needed to talk to the patients face-to-face anyway. *Relative priority* (strongly distinguishing CFIR construct) for introducing patients to IPPC was described as good at high implementation units. At the low implementation unit, introducing IPPC to patients had low relative priority, as they neglected to inform most of the patients about IPPC.

Readiness for implementation was discussed in the interviews. *Management engagement* (not a distinguishing CFIR construct) was described as strong and involved in the early phases of the implementation of IPPC, with less follow up later during the implementation. Some at the high implementation units even claimed that their manager did not even know about the IPPC, but that the respondents had an independent role and therefore did not miss the manager's involvement. At the low implementation unit, the nurse manager was peripheral, which the respondents described as negative because the unit did not have a manager who led the implementation. *Available resources* (strongly distinguishing CFIR construct) were perceived as sufficient in terms of available time at all high implementation units. At the low implementation unit, respondents were worried about not having enough time for both patient

recruitment and answering patient messages. *Access to information and knowledge* (not a distinguishing CFIR construct) in terms of information and training was expressed as satisfactory by all high implementation units.

6.3.4 Characteristics of individuals

Knowledge and beliefs about IPPC (weakly distinguishing CFIR construct) were described with mainly positive statements about IPPC at the high implementation units. At the low implementation unit, they said that the idea was good, but that IPPC would fit better into other parts of the health care system than their own unit.

6.3.5 Process

The view of the *planning* (strongly distinguishing CFIR construct) of the implementation met mixed opinions in the interviews. At the high implementation units, they said they were satisfied with the planning of the study, but at the low implementation unit they were not satisfied with that only a few persons had participated in the planning, and not everyone in the unit.

The *engagement* of different actors in the implementation of IPPC affected the process in different ways. *Opinion leaders* (not a distinguishing CFIR construct) were talked about only in the low implementation unit and there the opinion leaders had had strong negative views of IPPC, which affected the entire unit. *Formally appointed implementation leaders* (weakly distinguishing CFIR construct) were specially selected by their managers to operate the IPPC system based on their experience, role, and position in the unit. At all units except the low implementation unit, the selected nurses said they felt comfortable with having been chosen to operate the IPPC system. At the low implementation unit, respondents described that the other frontline health care providers in the unit were highly independent and that the formally appointed implementation leaders were put in a difficult position because they did not have the authority to instruct the other nurses and physicians what to do. *External change agents* (not a distinguishing CFIR construct) in this implementation was the research center, and most were satisfied with the follow-up from the center.

7. DISCUSSION

This dissertation is one of the first studies to combine experiences from different stakeholder groups across different settings regarding facilitators and barriers when implementing different eHealth patient–provider communication tools into routine practice. While many studies have investigated the implementation of eHealth tools into clinical practice, most of them have taken the perspective of one of the stakeholder groups, most often the health care providers' perspective (Kirchner et al., 2012, Kreps and Neuhauser, 2010, Kuipers et al., 2014). The diverse perspectives of data collection in this dissertation make it possible to assess commonalities and differences among implementations across eHealth tools, stakeholders and contexts, and add richness to the dissertation that would have been difficult to obtain if the data from each respective study had been viewed in isolation.

Furthermore, this dissertation is one of the first studies to distinguish between facilitators and barriers that are of *particular* importance for the implementation success of eHealth patient–provider communication tools, obtained across two interventions and three stakeholder groups. While there is substantial knowledge about the many factors that possibly *can* affect implementation success, most studies do not distinguish the relative importance of the different factors. For example, several reviews have summarized facilitators and barriers influencing the success of eHealth implementations without judging the importance of the determinants (Broens et al., 2007, Gagnon et al., 2012). Rather, facilitators and barriers are described without being seen in relation to each other. This is one of the first studies to identify which factors are the most promising to distinguish between high and low implementation success, and CFIR is used in this dissertation to help sort out the salient factors.

In the following, the discussion focuses on the main results, along with a discussion of some additional results. The section ends with discussion of the dissertation's contribution for science, implications for clinical practice, recommendations for future research and study limitations.

7.1 Main findings

Consistently across the three studies in this dissertation, independent of stakeholders, contexts and tools, the most important factor affecting the implementations was the health care providers' and managers' personal belief in the eHealth tool as useful for themselves and their

patients. Other factors that emerged across the three studies were related to differing perceptions between patients and health care providers about the patients' needs, that the tools challenged existing patient and health care provider roles, the importance of careful planning of the implementation process as well as management engagement and support from key personnel involved in the implementation. The following sections highlight and discuss the findings in greater detail.

7. 1.1 Compatibility with personal beliefs

The health care providers' personal belief in the new intervention has been identified in many studies as a factor that will affect the acceptance of the intervention and how successful the implementation becomes (Broens et al., 2007, Dopson and Fitzgerald, 2006) and is addressed in the CFIR construct *Knowledge and belief about the intervention* (Damschroder et al., 2009). The implementation of Choice (study II) and the secure email IPPC (study III) into regular hospital care succeeded in four of five units in each study in this dissertation. The most important single determinant affecting the implementation of Choice and IPPC was the health care providers' personal belief in the implemented tool as useful for themselves and their patients. This determinant, when present, acted as a facilitator for the implementation of Choice and IPPC, and when absent as a barrier. The tools' compatibility with personal belief was reflected in the health care providers' and managers' enthusiastic support and shared perception of the importance of the implementation of Choice and IPPC, which is addressed in the CFIR construct *Relative importance* (Damschroder et al., 2009), which was extremely important for the implementation success. This coincides with other studies showing that systems are easier to implement if the users perceive them to have benefits for their practice (Carlfjord et al., 2010, Haverhals et al., 2015, Murray et al., 2011, Randell and Dowding, 2010). If the systems also fit well with the organizational goals (Murray et al., 2011) and existing routines (Carlfjord et al., 2010), and if the health care providers have personal motivation and engagement (Randell and Dowding, 2010), the implementation will more likely be successful. This dissertation indicates that the personal perception of the tool as meaningful and supporting for the patient–provider communication provides an intrinsic motivation which was associated with active participation in the implementation. The perceived fit with the hospital's overarching philosophy of being open and accessible for patients, which is addressed in CFIR's construct *Implementation climate – Compatibility* (Damschroder et al., 2009), also acted as a facilitator. Conversely, the health care providers

who felt no need for the tools – either for themselves in their professional work or for their patients – did not contribute to implementing the tool, which is addressed in the CFIR's construct *Implementation climate – Relative priority* (Damschroder et al., 2009). Compatibility with personal beliefs also appeared to have an important influence on all the other barriers and facilitators for the implementation, in that when the belief in the tools was limited, all efforts to implement the tools met substantial resistance, as others have also suggested (Davy et al., 2015). Implementation of eHealth solutions may have failed in many cases because the importance of usefulness and fit with belief has been underestimated. This suggests that fit with usefulness and belief stands out as the most important factor, and should be particularly addressed.

7.1.2 Perceptions of the patients' needs

What the patients need and want is not always perceived the same way by patients and health care providers (Bäck et al., 2015). Health care provider assumptions that do not reflect the patients' needs can act as a barrier for implementation of new tools, which is addressed in the CFIR construct *Patient needs and resources* (Damschroder et al., 2009). The patients (study I) expressed satisfaction with having the opportunity to send messages to health care providers through IPPC. Interestingly, even if they did not use it, they still liked it. The patients who had used IPPC also expressed satisfaction with the tool (Wibe et al., 2012). This was not in line with the opinions of some of the health care providers and managers, who did not recognize the patients' needs for Choice (study II) and IPPC (study III). They just assumed, without asking the patients, that the patients received what they needed through regular follow-up, and that it was not really necessary to offer them use of IPPC or Choice. This indicates that patient-centered care and patient involvement directly in the care is not yet routine, and will take time to establish, even though the awareness is increasing and patient-centeredness is demanded by the health authorities (Li and Wilson, 2013, Nutting et al., 2010). While political and social trends, which is included in the CFIR construct *External policies and incentives* (Damschroder et al., 2009) are moving towards increased engagement of patients in their own health and health care, the health care system still lags behind and is characterized by a formal hierarchical structure and a centralized form of decision-making (Spehar and Kjekshus, 2012). Although Norwegian law requires that patients be informed and involved in decisions about diagnosis and treatment (Norwegian Parliament, 1999), the decisions often are made by the physicians without patient involvement (Ofstad, 2015). One possible explanation for this is that health care providers are trained to make decisions on

behalf of the patients. A study of decision-making in clinical encounters found that physicians made clinical decisions on behalf of the patients and conveyed the decisions as factual information, not as topics for deliberation, and in a paternalistic, but polite manner (Ofstad et al., 2014). This type of attitude can explain the physicians' perception of decision-making, and assumes that when the decisions are good, the patients get what they want and need.

7.1.3 Patient role expectations

The introduction of eHealth communication tools has been suggested to affect patients' role and expectations (Grimsbo et al., 2012, Heyn et al., 2013). The role dimension is only sparsely covered in CFIR (Damschroder et al., 2009). In this dissertation, although some of the health care providers did not recognize the patients' need for Choice and IPPC, in most of the units the health care providers offered IPPC to the majority of the eligible patients. However, only 22% of the patients made use of the tool (study I). These findings raise the question of whether the secure email IPPC may have challenged the established patient role. The health care system is well founded through long-standing traditions, where patients and health care providers have expectations of how the interaction and communication between patients and health care providers should take place. When the patients are suddenly offered new ways to communicate with health care providers by means of electronic tools, such as in the studies in this dissertation, it may have been an unfamiliar situation to them, and they may not necessarily know how to act in their new role as *ePatients* where the Internet and electronic tools impact the patient–provider communication and relationship (Masters et al., 2010). The patients in study I were already within a patient trajectory, and thus had pre-established ways of communicating with the health care providers – ways they were familiar with. When the patients were offered IPPC in this study, they had already had several encounters with health care providers. They thus had entered the patient role and been introduced to the traditional program, and IPPC might have felt disruptive. The patients did not necessarily know what potential there was in communicating by means of IPPC, as they had never done it before. One may also wonder if factors such as not wanting to bother the health care provider or to challenge a fragile well-functioning interaction may have made the patients reluctant to use IPPC. Furthermore, several patients reported being satisfied with the current follow-up they were offered and did not feel need for a change. They may also not have been encouraged by health care providers to use the new tool, or even encouraged to use the telephone or face-to-face communication, in line with the established routine. Provider

endorsement is reported to affect patients' use of eHealth tools (Berry et al., 2011, Irizarry et al., 2015). Also, the patient can experience the traditional hierarchical relationship as something safe, where the patient is allowed to be a passive recipient of care without having to take responsibility (Sigstad, 2004) and can turn the decision-making over to the hands of others (Harvey et al., 2015). Resistance to change in the patient group may also be related to a sense of being trapped in their patient role. Patient culture as well as professional culture can slow the patient's active role. Cultural perceptions related to the traditional user–helper relationship are likely a factor contributing to resistance to change (Sigstad, 2004). This dissertation highlights that more research is needed regarding how eHealth patient–provider communication tools affect the patient role and the reasons why patients do not use tools they say they like. Factors associated with the tools, the patients, and the contexts need more investigation.

The introduction of new eHealth communication tools to the patients is thus a critical task, important to perform well. Other studies have found that lack of encouragement and training are important barriers to patients' use of email (Dilts et al., 2009), and that many people will not be able to make use of eHealth technologies without at the same time being offered support in how to use the services (Dilts et al., 2009, Gjevjon et al., 2014). However, when successfully introduced and used by the patients, the eHealth tools can act as an option for increased patient engagement, and provide a new possibility for patients to share information with their health care providers (Chen et al., 2013, Wallwiener et al., 2009). In study I, the initiative for sending messages was mainly the patients'. The health care providers had the possibility of initiating messages, but did so to a very small extent. Another study found that to create conditions conducive to their participation, patients needed more than just having the opportunity to take part in decision-making or being provided with information; they needed more active initiatives from health care providers (Eldh et al., 2006). Automatically offering all patients information about IPPC in a standardized introduction is one way to ensure all patients equal opportunities for using the eHealth tool, but may itself not be encouraging enough to make them use it, because so many other factors affect the decision to use it.

This study also demonstrates that non-use is not the same as non-useful, as also found in another study (Borosund et al., 2014). Having the IPPC as an option can provide a sense of reassurance and be of value to patients, even if they choose not to use it, and non-use does not necessarily mean a lack of perceived benefit (Borosund et al., 2014). Use is not a goal in itself, and it is not desirable to create artificial needs. In addition, this study found that some

of the patients would not use email for clinical purposes even if they had access because they did not like this form for communication with their health care providers, confirming the findings in another study (Dilts et al., 2009). It is therefore important to assess individual patients' preferences for use of email prior to enrolling them in an eHealth communication program.

7.1.4 Health care provider role and collaboration expectations

eHealth can be expected to disrupt established roles both between patients and health care providers, and between providers, which was evident in this dissertation, but is not explicitly addressed in CFIR (Damschroder et al., 2009). The changing nature of health care delivery from a provider-centered approach to an increasingly patient-centered approach in which the patient is viewed as a partner in the delivery of health care, has shown to be challenging (Masters et al., 2010). eHealth introductions in clinical practice can facilitate this transition, but impose new role expectations on health care providers (Mair et al., 2012) which may be challenging as health care providers are socialized into their roles. Through education and work they learn how to perform the duties and take the often clearly defined responsibilities affiliated with their professional role. The introduction of IPPC and Choice into their daily activities may have challenged their roles at two levels. First, the involvement of *patients* directly as common users of the eHealth communication tools was new to the health care providers. In this dissertation, the health care providers, in line with the patients, were unfamiliar with patient–provider communication by means of technology. Other researchers have pointed to the direct involvement of patients as increasing the complexity (Ozkaynak et al., 2014). One may wonder if the reason that some health care providers resisted the introduction of IPPC and Choice to their patients may have been because they felt insecure about what the tool was, how to use it, when to use it, how to log in and how to handle the technology. Although computer skills are increasing in the population, eHealth based communication in health care still is new and unfamiliar to the majority of both patients and health care providers (Elbert et al., 2014). Furthermore, the introduction of IPPC and Choice not only implied a new "technological" way to communicate, but also that it was the patients rather than the health care providers who selected topics for communication. Earlier studies of Choice described how Choice gave the patients "a voice", gave each patient an equal opportunity to be heard and to express his or her feelings and needs for help (Borosund et al.,

2014). Implementation should be accompanied by training in communication skills to help clinicians formulate more patient-centered responses (Heyn et al., 2012).

The second level where the implementation of the eHealth communication tools challenged the health care provider role was related to the patterns of communication and interaction between the health care providers involved, which is addressed in the CFIR construct *Networks and communication* (Damschroder et al., 2009). Health care providers are often accustomed to cooperating *within* their professional group, e.g. physicians collaborate with physicians and nurses collaborate with nurses. The working routines in the units in this dissertation were characterized by each professional group solving their relatively clearly defined tasks independent of the other professional groups. Traditionally there have been strong boundaries between professions and with relatively few arenas for meetings between them. IPPC and Choice were designed to encourage collaboration *across* professional groups. The relationships and interplay between the main stakeholders in the units, nurses and physicians, led to a number of role-related challenges when implementing IPPC and Choice. Two different professional groups, at different levels of power, now shared one common communication tool. The implementation of Choice and IPPC disrupted established roles in different ways.

To achieve the full benefit of the point of care symptom assessment tool Choice (study II), the health care providers had to agree among themselves who should follow up each of the patients' reported symptoms, e.g physicians handle medical issues and nurses handle nursing issues. This was a new form of close collaboration that their established interactions did not support, and Choice thus did not fit into the established working routines, which is included in the CFIR construct *Adaptability* (Damschroder et al., 2009). However, during the implementation of Choice, the collaboration changed for the better as they started to allocate who should talk to the patients about specific symptoms, ensuring that all relevant topics were covered. Choice thus led to more collaborative care, despite some resistance from some physicians. The secure email IPPC (study III), on the other hand, did not demand the same close collaboration between nurses and physicians as Choice. IPPC was to a larger extent operated by nurses alone, where the physicians only answered questions from the patients at the nurses' request. The nurses had the main responsibility for operating IPPC, and the physicians agreed that this should be the case. There was a common understanding between physicians and nurses that the nurses had the competence to operate the secure email IPPC and involve physicians only when needed. Also another study reported that redirection emails

to the most appropriate health care providers would improve efficiency and safety for the patients (Popeski et al., 2015).

This dissertation shows that when the collaborative team has not established working routines suited to support the new form for patient–provider communication, it can represent a barrier. The institutions' organizational structures are often perceived as particularly tradition-bound systems. A recent review claims that there is need for greater understanding of the essential adjustments in provider workflow, including potential changes in the roles and responsibilities of the health care team, in order to translate findings into practice (Irizarry et al., 2015) . Collaborative efforts are key to achievements that ensure feasible and innovative practice models and encourage the use of clinical information systems in new ways and for new purposes (Moen and Maeland Knudsen, 2013). The hospital units in this dissertation expressed interest in the new technology, but the existing roles and patterns of communication were not ideal for fulfilling the intentions of the new eHealth communication tools.

The substantial difference between the two eHealth patient–provider communication tools posed different challenges for the implementation process, which is addressed in the CFIR domain *Process* (Damschroder et al., 2009). The secure email IPPC involved a small number of carefully selected persons at each unit, while Choice involved all nurses and physicians at each unit. It was easier to run the implementation process with a few designated individuals (IPPC) than an entire unit (Choice). This dissertation shows that the complexity of the tools not was associated with the technological aspects, but with the degree of involvement and demands for collaboration between different stakeholder groups. This is in line with other studies showing that the greater the demand for direct collaboration between different professional groups, and the more people involved, the more challenging the implementation will become (Brewster et al., 2015, Ozkaynak et al., 2014) along with the greater importance of teamwork and collaboration between professional groups (Haverhals et al., 2015, Ploeg et al., 2007). It is therefore important to consider how patients and professionals learn and integrate new skills into their daily routines, practices and cultures (Harvey et al., 2015) so that these aspects can be properly addressed in the implementation process.

7.1.5 Management engagement

The management at unit level has an important role in implementation (Birken et al., 2013, Ingebrigtsen et al., 2014), which is addressed in the CFIR construct *Leadership engagement* (Damschroder et al., 2009). In the start-up phase for the implementation of IPPC and Choice, the nursing management was positive and supported the implementations. They ensured training and engagement of health care providers to operate Choice (study II) and the secure email IPPC (study III) and decided who should have a designated role in supporting the implementations. Also others have pointed out a positive management attitude as important (Birken et al., 2013, Johansson et al., 2010). Furthermore, in line with another study (Chuang et al., 2011), the support for Choice implementation was related to the fact that the nurse managers felt the innovation fitted their workplace needs and priorities, and thus was in line with the managers' as well as the units' values, which is covered in the CFIR construct *Implementation climate - compatibility*. In the process of implementing Choice (study II), the nurse managers said they did what they could to overcome barriers as they arose, but they were busy, which is in line with findings in other studies (Hofflander et al., 2016, Johansson et al., 2010, Mosson et al., 2013), and had to entrust much of the follow up to others in their team.

Regarding the implementation of the secure email IPPC (study III) the presence of the management in the units was much weaker than for Choice. Nevertheless, the implementation was successful at most units. One possible reason for this was that IPPC was operated at each unit by a few designated nurses who had been carefully selected by their managers based on their other duties in the unit and their positive attitude towards the tool. The nurses took the operation of IPPC seriously, and since they were few in number, it was easier for the research center to provide encouragement, training and follow-up for them. One other possible reason for successful implementation despite management absence might be that many of the units were staffed by nurses who were working independently, which can serve as a substitute for a unit manager (Yukl, 2006). The nurses were not dependent on their managers for directions for operating IPPC, but had intrinsic motivation for operating IPPC. Intrinsic motivation and own belief and perceived advantage of the intervention for the professionals involved and their patients could have played a more crucial role than management engagement. This is consistent with other studies that found that management was not always necessary, if the planning and conducting of the implementation were taken care of by other means (Damschroder et al., 2011, Øvretveit et al., 2012). However, management engagement is

pointed out as important for successful implementation in several other studies (Birken et al., 2013, Bostrom et al., 2013, Kirchner et al., 2012, Marchionni and Ritchie, 2008, Ploeg et al., 2007, Sandstrom et al., 2011, Øvretveit, 2005), and must not be underestimated on the basis of this dissertation.

The physician managers (study II) expressed mixed opinions about Choice as concept for supporting patient–provider communication. Even if several of them expressed positive attitudes, only a few of them took an active approach for motivating or requiring the other physicians to use Choice. They thus might have had a positive attitude and belief in Choice, but not enough to get involved in the other physicians' use of Choice. Physicians in Norway traditionally have an independent role, with high degree of medical autonomy (Spehar and Kjekshus, 2012, Øvretveit, 2005). The tradition of workplace democracy in Norway is strong, which implies a high degree of employee involvement and participation at the local level (Ministry of Labour and Social Affairs, 2010) and that the employees have considerable influence over their own work (Løken et al., 2013). This corresponds to the CFIR construct *Networks and communication* (Damschroder et al., 2009). Physicians are thus used to making decisions affecting themselves and their patients, and changes they do not view as immediately necessary for their practices are likely to be avoided. This was also expressed by one physician manager who said that physicians were too autonomous and difficult to lead. Even if it is a management task to facilitate inter-professional collaboration (Dopson and Fitzgerald, 2006), and getting physicians involved is the most important step for management to take (Øvretveit, 2005), this did not seem to be the tradition at the units involved. Although the nurse managers expressed that they would like to involve the physicians, they may lack legitimacy and opportunity to instruct and influence physicians concerning what to do (Currie et al., 2015).

In line with other studies (Kuipers et al., 2014, Pronovost et al., 2009), only a few of the nurse and physician managers (study II) had formal management education. It is not possible to draw conclusions about whether management education would have changed the managers' engagement or implementation of Choice, but it is possible that it would have strengthened their knowledge about how to support the implementation in a best possible way (Pronovost et al., 2009). Also others have pointed at a need for more implementation competence and support for managers (Hofflander et al., 2016, Mosson et al., 2013, Sandstrom et al., 2011,

Øvretveit, 2010) and that education in research methods for managers can increase the use of Evidence Based Medicine (Johansson et al., 2010).

The management at department level was not engaged in the implementations of Choice and IPPC. The decisions to make use of the tools were made at unit level. The implementations were not a part of the hospital's overall policy and there was no overall strategy demanding that the eHealth communication tools be offered to the patients. A top-down commitment of making use of the tools in care might have impelled the negative health care providers towards a more positive attitude about the tools. Hospitals are hierarchical organizations (Byrkjeflot and Guldbrandsøy, 2013), which is addressed in the CFIR construct *Structural characteristics* (Damschroder et al., 2009), where directives frequently come from the top-level management, and when such instructions are lacking it is easier to ignore implementation efforts one does not fully agree with (Szydlowski and Smith, 2009). In addition, activities that are neither monitored nor reported, as was the case for Choice and IPPC, may be easier to ignore.

Furthermore, there are several studies indicating that governmental support and directives may play an important role in moving forward eHealth based communication between patients and health care providers (Antoun, 2015, Moen et al., 2012), which is covered in the CFIR domain *External policies and incentives* (Damschroder et al., 2009). There was no health authority backing for the implementation of Choice and IPPC and there was no reimbursement for any of the studies in this dissertation. There is no way to find out how financial incentives may have affected the implementation of Choice and IPPC. Others have stated that reimbursement is an important driver for implementation of eHealth patient–provider communication tools (Antoun, 2015, Bishop et al., 2013).

7.1.6 Opinion leaders

Opinion leaders are individuals who have formal or informal influence in their unit, and can affect the other colleagues' attitudes towards the implementation, which is addressed in the CFIR constructs of *Engaging* (Damschroder et al., 2009). In this dissertation, critical and even downright negative opinion leaders among the physicians (Choice implementation - study II) as well as among the nurses (IPPC implementation - study III), acted as substantial barriers for the implementations. Other studies have also found that physicians are opinion leaders who can influence both other physicians and other personnel in how they support or oppose

implementation (Dopson and Fitzgerald, 2006, Øvretveit, 2005) and that the physicians' behavior can influence nurses' use of eHealth (Carpenter and Sherbino, 2010, Lee, 2006). The culture in the units, which is covered in the *Culture* construct in CFIR (Damschroder et al., 2009), was characterized by physicians holding a great deal of power, and having great influence on what had legitimacy. One of the nurses (IPPC implementation - study III) said in the interviews that the study was not a proper study because there was no physician in the lead. This indicates that the readiness to participate in research and to change towards greater patient involvement may be lower when the study is initiated by nurses.

The resistance among some of the physicians created turmoil related to the implementation of Choice (study II), which is covered in the CFIR domain *Knowledge and belief about the intervention* (Damschroder et al., 2009). Efforts were made to include the physicians in the implementation process, but their limited interest resulted in nurses having the primary responsibility. In this way, the nurses relieved the physicians from participating in planning the implementation, which in turn resulted in many of the physicians becoming even more distanced and some lost interest altogether. Choice thus was mainly viewed as a nursing tool, with nurses holding the chief responsibility for its use. This may have contributed to physicians feeling that Choice was relatively incompatible with their professional values and that it did not support them in their communication with the patients. Traditionally physicians have focused on medical treatment and cure, while nurses have focused on helping the patient handle the consequences of disease and treatment. As Choice was designed to support the latter, it may be perceived as more aligned with the nurses' than the physicians' values. This is in line with a study on the implementation of electronic medical records which showed that nurses and physicians have different priorities and needs during the implementation of innovations and that different professions need different features to support their work (Struik et al., 2014). A recent review suggests that physicians might be waiting for robust evidence on service performance, which is covered the CFIR construct *Evidence strength and quality* (Damschroder et al., 2009) and governmental initiatives, which is addressed in the CFIR construct *External policies and incentives* (Damschroder et al., 2009) before they want to make use of email with patients (Antoun, 2015). Age and gender differed between the professional groups as well, as the physicians were mainly men and were older than the nurses.

This dissertation thus illustrates the fine balance between relieving and involving professional groups. One could argue that if the physicians had been more involved from the beginning in ways to use the tool, they could have influenced the use to be more in line with their own needs and values, and thus more useful in their work. On the other hand, they might have wanted to change the use of Choice in a direction not in line with the tool's overarching aim of patient centered care and shared decision-making between patients and health care providers. Others have pointed out the importance of engaging relevant stakeholders early on and throughout the process to minimize need for redesign (Glasgow et al., 2014). People have greater commitment to programs they have helped to create or adapt, and this commitment and ownership may lead to greater enthusiasm in its delivery (Noonan and Emshoff, 2013). Another explanation for the physician resistance to Choice might be the conservative nature of physicians, as reported by some of themselves in study II, where physicians were described as being generally resistant to change, which is addressed in CFIR construct *Culture* (Damschroder et al., 2009).

A possible way to solve the tension between nurses and physicians in the implementation of Choice could have been to strengthen the nurses in their ability to operate Choice on their own, without the physicians' involvement. A review of studies about physician–nurse task shifting (a process of delegation whereby tasks are moved from physicians to nurses) has found that nurse-led care was as good as or even better for the patient outcomes compared to physician-led care (Martinez-Gonzalez et al., 2015). On the other hand, excluding the physicians from using Choice would have been at odds with the society-driven changes towards more team-based patient care. This would manifest the old fragmented profession-centric care patterns that the health care authorities are trying to reform. In addition, previous studies on use of Choice showed that there were areas addressed by the patients that physicians were best suited to follow up, e.g. medication (Heyn et al., 2012), indicating that excluding the physicians could result in poorer care for the patients.

7.1.7 CFIR applicability and usefulness

The Consolidated Framework for Implementation Research (CFIR) was used as theoretical framework in study III and was also used to guide the organizing of findings across the three studies in the dissertation. CFIR provides a comprehensive overview of a rich number of aspects that can affect implementation, and thus was helpful in creating the interview guide to ensure that relevant aspects were covered by the interviews in study III. CFIR was also useful

in organizing the results across the three studies, and was helpful in creating an overview over barriers and facilitators affecting the implementation of eHealth communication tools across contexts and stakeholders.

CFIR is broad and comprehensive, which is a strength, but can also be regarded as a weakness. There is a potential risk of getting lost in the details and missing the big picture of the things that really matter. As a practical implementation framework, study III found that CFIR's constructs were too numerous to be covered through one set of individual interviews and that too many of the constructs have overlapping contents. Some of the constructs are concrete and relatively easy to measure, while others are broad and abstract and more difficult to measure. As others have reported previously (Damschroder and Lowery, 2013, Powell et al., 2014, Williams et al., 2011), it was not possible to investigate all constructs of CFIR through a single study (study III).

Furthermore, all constructs in CFIR have equal weight, and the framework does not distinguish the relative importance of different constructs. The framework thus did not give any guidance about constructs expected to interact with each other or constructs expected to play a more crucial role than others for the success of the implementations described in this dissertation.

A limitation of CFIR that was demonstrated in this study is that the framework seems "institution-centric" in that it places patients under the outer setting domain, thus indicating their peripheral role in the implementation process. While this may be natural for many traditional implementations, it is somewhat counterintuitive for patient-centric interventions. If patients really are to be put in the forefront and regarded as equal partners, they should be given more attention in CFIR. With the increasing emergence of patient-centric models of care, including models for homes and communities (American Academy of Family Physicians, 2008, Gammon et al., 2015, Gee et al., 2015), it may be worthwhile exploring more appropriate ways to conceptualize patients and their roles in all current CFIR domains. For example, patients are given only one single construct, intended to capture both their needs and their resources. For comparison, the health care providers have two whole domains, both the inner setting domain with 12 constructs and characteristics of individuals with five constructs. This tendency to neglect the patient's role applies not only to CFIR. Other researchers have also pointed out the need for greater consideration of the patient role in

implementation theory (Abbott et al., 2014, Chaudoir et al., 2013, Kalkan et al., 2014, Rojas Smith et al., 2014).

Another limitation of CFIR that was demonstrated in this study its limited coverage of the role dimension. This dissertation demonstrated how the implementation of new eHealth patient–provider communication tools can affect the established roles of the persons involved – patients as well as health care providers. The study indicates that the implemented tools' compatibility (or lack thereof) with existing roles can have great influence on implementation success. It also shows that aspects of an implementation that go against the grain of established patients' and health care providers' roles and encourage new communication patterns between those involved, can act as barriers if not explicitly addressed. Also others have pointed out that roles are given little attention in the published literature about barriers and facilitators to eHealth implementation (Mair et al., 2012) and are missing in the CFIR framework (Richardson et al., 2012). The dissertation therefore suggests that the role dimension of persons involved in the implementation is included in the framework.

CFIR is used in an increasing number of studies (Balas et al., 2013, Gilmer et al., 2013, Ilott et al., 2013, Kalkan et al., 2014, Lash et al., 2011, Ramsey et al., 2014, Richardson et al., 2012, Robins et al., 2013, Rojas Smith et al., 2014, Sanchez et al., 2014) but without any consensus on how the framework should be used. The different use patterns of CFIR across studies can delay knowledge cumulation and theory refinement. It would therefore be helpful if clearer recommendations for use were provided. It is also recommended to further clarify and refine the CFIR constructs so they overlap less and are easier to measure. Finally, adding practical guidelines for implementation based on CFIR would make the framework more user-friendly not only for researchers, but also for the health care providers who conduct implementations in clinical practice.

7.2 Contribution to science

This dissertation contributes to science in several ways: It is one of the first studies to investigate and combine experiences from three different stakeholder groups regarding facilitators and barriers when implementing eHealth patient–provider communication tools into routine practice across different contexts and different tools.

Study I offers insights into reasons for non-use gained from patients who had access to the secure email IPPC without using it. Such knowledge is crucial for implementation of IPPCs to

the health care service and can help timing, targeting, and tailoring of the IPPCs to different patient groups. *Study II* offers insights into the middle management perspective of perceived facilitators and barriers, their own role, responsibility, and action taken in the implementation of the symptom assessment and communication tool Choice into clinical practice. This study adds knowledge about the perspective of managers, who are most often in charge of the practical implementation. *Study III* contributes to the understanding of how health care providers perceive facilitators and barriers when implementing the secure email IPPC into routine health care, and how facilitators and barriers can act differently in different contexts. This dissertation also makes suggestions concerning how the Consolidated Framework for Implementation Research (CFIR) could be improved as theoretical framework for implementation studies.

When the perspectives of patients (study I), middle managers (study II) and health care providers (study III) were combined, new aspects emerged regarding which facilitators and barriers exerted the most prominent influence in the implementation of the two eHealth communication tools into clinical practice across eHealth tools, stakeholders and contexts. This is one of the first few studies to identify which CFIR constructs are the most helpful to distinguish between high and low implementation success across contexts and interventions. First, the health care providers' and managers' personal belief in the eHealth tool was a core factor in all the implementations, and seemed to be a premise for the implementation success. Second, a shared understanding between patients and health care providers regarding the patients' needs was an important factor affecting the implementation. Third, when the implemented eHealth communication tool challenged the established roles of patients as well as health care providers, the implementation becomes more challenging. Finally, this dissertation showed the management's importance and that engagement of appropriate health care providers was an important facilitator for implementation.

This dissertation also describes the experience of using CFIR as a theoretical framework for the study. CFIR was useful for guiding study III, and for framing the results section and discussion section for the dissertation. However, the dissertation also points at some weaknesses of the CFIR framework that have not been reported before. First, the dissertation recommends a greater consideration of the presence of the *patients* in the CFIR framework, as the patients are currently placed under the outer setting domain, indicating their peripheral role in the implementation process. This dissertation also gave insight into the importance of

how the implementation of new tools can affect the established *roles* of the persons involved. The dissertation showed that when the tools being implemented required people to behave in new ways that challenged their role and cooperation, the implementation turned out to be more challenging. This dissertation therefore suggests that the intervention's compliance with existing *role* is given more explixit consideration in the CFIR framework.

Findings from this dissertation can contribute to the refinement of CFIR toward a more succinct and parsimonious framework.

7.3 Implications for clinical practice

The findings from this dissertation have multiple implications for clinical practice, as they show that eHealth patient–provider communication tools can be successfully implemented into regular care, and can be valuable means of offering care based on the patients' needs and preferences. However, it also shows that implementation of eHealth patient–provider communication tools into clinical practice can be challenging, and that many factors can act as facilitators and barriers for successful implementation. This dissertation provides detailed insight into a wide variety of facilitators and barriers that can have impact, and which facilitators and barriers one should be especially aware of when implementing eHealth patient–provider communication tools into clinical practice. When introducing new eHealth communication tools, it is important not only to focus on technical aspects of operating the tools, but also create an understanding of the tools' possible benefits for health care providers, organizations and their patients. This suggests that the tool's fit with the intended users' perception of usefulness and their personal values should be addressed first, before addressing other aspects of the implementation. It is also important to give the health care providers adequate education and training in team work and patient-centered care and to adapt the tools to existing roles and working routines. Cultural difference between nurses and physicians cannot be overlooked as nurses and physicians have different priorities and needs during the implementation of innovations and different professions need different features to support their work. Furthermore, this dissertation shows that the management engagement and involvement of key personnel were important facilitators for implementation. Lastly, it showed that the implementation was easier when a few specifically designated individuals were involved, than when the entire unit and all its health care providers were involved.

eHealth communication tools often have multiple user groups. This dissertation shows that it is crucial to gain knowledge of all the user groups' perspectives, and that the interests of all user groups must be handled in parallel if the implementation is to succeed. The three different stakeholder groups in this dissertation brought forth diverse perspectives, all of which are important to take into account when developing and implementing eHealth tools to be used by different stakeholders in ordinary clinical practice. Knowledge about the most important facilitators and barriers can help developers, implementers and managers to design implementation processes by drawing their attention to the most relevant issues. By identifying and addressing the potential barriers beforehand, the implementation could be tailored to meet and overcome obstacles to a successful implementation outcome.

Nurse and physician managers need skills in how to plan and conduct the process, whom to involve, what implementation strategies to use, how to address and meet barriers, and how to make use of facilitators. In addition, they need skills in how they can use their own management position to support and conduct the implementation processes. Implementation knowledge and implementation skills should be a part of the role description, and implementation management should be a part of management education for nurse and physician managers.

Finally, to ensure equal opportunities to use eHealth patient–provider communication tools, all patients should automatically be given standardized information about tools such as Choice and IPPC, appropriate follow-up and encouragement for use of the tools.

7.4 Recommendations for future research

Based on the work in this dissertation, areas of research can be suggested. As no standard research methods are yet available for identifying potential facilitators and barriers (Grimshaw et al., 2012), more research is needed regarding which data collection methods (e.g. interviews, focus groups, surveys, observation or others) are most promising to identify potential facilitators and barriers.

This dissertation demonstrated that the implementation of eHealth communication tools met different challenges in different contexts, thus showing the importance of examining facilitators and barriers for eHealth implementation in *several* contexts. Repeated studies in settings other than university hospitals, for example primary health care, would provide

insights into the degree of context importance. The inclusion of other types of eHealth patient–provider communication tools would also provide insight into the specific tools' importance, or if the facilitators and barriers reported in this study are also relevant in the implementation of other eHealth communication tools.

Regarding the findings from study I, there is need for more knowledge about how to reach the patients in need of an IPPC and to determine appropriate timing in the disease trajectory for introducing the service, i.e. when the patients are receptive to information about how to use the tool and for what purposes.

This and other studies have shown the importance of identifying and addressing potential barriers before starting an implementation process. There is also growing awareness of the importance of using implementation strategies. Competence in how to tailor the implementation of an intervention to the context, facilitators and barriers, can improve implementation outcome (Baker et al., 2015). However, there is minimal understanding of the strategies used to promote utilization of evidence (Bucknall and Rycroft-Malone, 2010). To be able to develop effective implementation strategies, i.e methods used to enhance the adoption, implementation, and sustainability of a clinical program or practice (Proctor et al., 2013), there is need for more knowledge about the facilitators and barriers that the implementation might encounter (Baker et al., 2015). In parallel, based on the facilitators and barriers identified in this dissertation, implementation strategies should be developed to meet the known facilitators and barriers and tested in new studies.

Next step recommendations for CFIR research are to continue comparing units with high and low implementation success and to start distinguish the relative importance of the different constructs. In addition, longitudinal studies could provide insights into how an implementation process evolves over time and which factors are of special importance during the different phases of an implementation.

8. CONCLUSIONS

This dissertation is one of the first studies to combine experiences from several stakeholder groups regarding the facilitators and barriers when implementing different eHealth patient–provider communication tools into routine practice. Furthermore, it is one of the first studies to identify which facilitators and barriers are *especially* important for successful implementation of eHealth patient–provider communication tools.

As eHealth communication tools have multiple user groups, it is important to gain knowledge of all the user groups' perspectives. The three stakeholder groups in this dissertation brought forth different perspectives, all of which can be important to take into account when developing and implementing eHealth tools to be used by different stakeholders in ordinary clinical practice.

Across the two interventions and three stakeholder groups in this dissertation, the most important factor affecting the implementations was the health care providers' and managers' personal belief in the eHealth tool as useful for themselves and their patients. Also the differing perceptions among patients and health care providers of the patients' needs affected the implementations. The existing roles of both patients and health care providers were challenged by the implementation of the eHealth patient–provider communication tools. Finally, good planning of the implementation process, the management's attitude and approval of the implementation at all levels were important facilitators.

The CFIR was useful as a theoretical framework for guiding study III, and for framing the result and discussion sections for the dissertation. However, the dissertation also points at some previously unreported weaknesses of the CFIR framework. First, greater consideration of the *patients* in the CFIR framework is suggested, as the patients are now placed under the outer setting domain, indicating their peripheral role in the implementation process. This dissertation also brought new insights into the importance of how the implementation of new tools can affect established *roles*. It is therefore suggested that the roles of persons involved in the implementation are given greater consideration in the framework. Findings from this dissertation can contribute to the refinement of CFIR to become a more succinct and parsimonious framework for planning and evaluation of eHealth implementation studies.

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Appendix study I

Forespørsel om deltakelse i forskningsprosjektet
Elektronisk spørsmål- og svartjeneste

Bakgrunn og hensikt
Dette er en forespørsel til deg om å delta i et forskningsprosjekt for å teste en Internettbasert spørsmål- og svartjeneste (e-post i et sikkert system). Tilbudet er utviklet for å kunne gi raskt svar på noen av de spørsmål og bekymringer man kan ha under sykdom og behandling. Spørsmål- og svartjenesten gir mulighet til å stille spørsmål til sykepleier, lege, sosionom ved det sykehuset man behandles ved eller rådgiver hos Helseøkonomiforvaltningen (HELFO), uten fysisk å måtte oppsøke behandlingsapparatet. Vi ønsker å undersøke hvordan denne tjenesten blir benyttet.

Studien utgår fra Oslo Universitetssykehus HF, Radiumhospitalet og Rikshospitalet. Du forespørres om å delta i studien fordi du er pasient ved sykehuset.

Hva innebærer studien?
Deltagelse i studien går over 8 måneder og innebærer at du kan benytte deg av Spørsmål og svartjenesten så mye du ønsker i denne perioden. Som bruker av tjenesten logger du deg på med BankID slik du logger deg på din nettbank. Dette vil du få nærmere forklaring på. All informasjon som utveksles er beskyttet gjennom strenge datatekniske sikkerhetstiltak. Informasjon som utveksles vil bli kryptert og liggende i et sikkert system ved Oslo Universitetssykehus HF.

Vil vi be deg fylle ut et spørreskjema ved oppstart som inneholder spørsmål om bakgrunnsopplysninger og hvordan du har det i forbindelse med sykdom og behandling. I tillegg vil du motta spørreskjema etter 8 måneder som omhandler hvor nyttig og brukervennlig du opplever denne tjenesten. Du vil bli bedt om å returnere disse i en vedlagt ferdig frankert konvolutt.

Et mindre utvalg av pasienter vil bli bedt om å delta i en diskusjonsgruppe sammen med andre pasienter eller individuelt intervju, og det kan være at du er blant dem som vil bli spurt. Diskusjonsgruppen, som vil vare ca 2 timer, vil blant annet dreie seg om hvorvidt spørsmål- og svartjenesten har møtt dine behov, samt din opplevelse av programmets nytte og brukervennlighet. Et individuelt intervju kan ta mellom en halv og en time. Om du ikke ønsker å delta i en slik diskusjonsgruppe eller individuelt intervju kan du likevel være med i studien.

I tillegg til data som samles inn gjennom spørreskjema ber vi om din tillatelse til å innhente følgende:

- Data for hvordan du benytter tjenestene (hva som benyttes, hvor ofte, hvor lenge, innhold i meldingene).
- Enkelte opplysninger om sykdom og behandling fra din journal ved sykehuset.

Om du ikke ønsker å delta i denne studien, vil du motta vanlig behandlingstilbud ved den avdelingen du behandles ved.

Mulige fordeler og ulemper
Studien medfører ingen kostnader for deg og det er ingen risiko forbundet med studien. Gjennom din deltakelse vil du bidra til viktig kunnskap om hvordan en online spørsmål- og svartjeneste blir benyttet for kommunikasjon med helsepersonell.

Fordeler for deg vil være at du får mulighet til å benytte denne tjenesten etter og mellom sykehusopphold. Du kan stille spørsmål via sikker e-post og få råd og veiledning fra sykepleier, og ved behov fra lege og sosionom ved sykehuset eller rådgiver ved HELFO. De som besvarer meldingene fra

deg har spesialkunnskap om din sykdom og behandling. Rådgivere ved HELFO vil få videreformidlet aktuelle spørsmål i anonymisert form fra sykepleier som betjener spørsmål- og svartjenesten. Å kunne stille spørsmål og få svar fra fagpersoner uansett hvor du oppholder deg, kan kanskje hjelpe deg å håndtere sykdommen og eventuelle komplikasjoner bedre når du er hjemme.

Det er få ulemper og ubehag knyttet til deltakelse i studien. Kanskje kan noen oppleve det som slitsomt å svare på spørreskjemaer. Diskusjonsgruppen vil bli avholdt med pauser, slik at deltakerne ikke skal bli slitne.

Hva skjer med informasjonen om deg?
Informasjonen som registreres om deg skal kun brukes slik som beskrevet i hensikten med studien. Alle opplysningene vil bli behandlet uten navn og fødselsnummer eller andre direkte gjenkjennende opplysninger. En kode (studie-ID) knytter deg til dine opplysninger gjennom en navneliste. Navnelisten er atskilt fra alle opplysninger vi samler om studiedeltakerne. Det er kun autorisert personell knyttet til prosjektet som har adgang til navnelisten og som kan finne tilbake til deg. Hvis det kommer frem noe i korrespondansen i spørsmål- og svartjenesten som er viktig for din behandling ved sykehuset, vil dette bli dokumentert i pasientjournalen.
All informasjon om deg vil slettes etter at studien er avsluttet, senest 31.12.2025. Det vil ikke være mulig å identifisere deg i resultatene av studien når disse publiseres. Studien er anbefalt av Regional Etisk Komité (REK) Sør-Øst, Protokollutvalget og Personvernombudet ved Oslo Universitetssykehus HF, Rikshospitalet.

Frivillig deltakelse
Det er frivillig å delta i studien. Du kan når som helst og uten å oppgi noen grunn trekke ditt samtykke til å delta i studien. Dette vil ikke få konsekvenser for din videre behandling. Dersom du ønsker å delta, undertegner du samtykkeerklæringen på siste side. Om du nå sier ja til å delta, kan du senere trekke deg fra studien uten at det påvirker din øvrige behandling. Du kan i så fall også be om at de opplysninger vi allerede har fått fra deg blir slettet.

Dersom du senere ønsker å trekke deg eller har spørsmål til studien, kan du kontakte prosjektleder Cornelia Ruland på tlf 23 07 54 60 eller stipendiat Cecilie Varsi på tlf 23 07 54 52.

Kapittel A- utdypende forklaring av hva studien innebærer

Bakgrunnsinformasjon om studien:
Mennesker med alvorlig sykdom kan oppleve mange problemer og bekymringer. Når de er hjemme mellom eller etter behandling er det ofte begrenset tilgang til profesjonell hjelp. Internettbaserte tjenester har vist seg å være nyttige i forhold til å støtte pasienter til å mestre daglige utfordringer og behov. Derfor vil vi undersøke i hvordan en spørsmål– og svartjeneste blir benyttet av de pasientene som har den tilgjengelig. Hvis denne studien viser at det er nyttig for deltakerne, vil det i framtiden være aktuelt å utvikle tilsvarende tjenester som kanskje kan bli en del av det ordinære tjenestetilbudet til pasienter med alvorlig sykdom.

Kriterier for å delta i studien er at du er over 18 år, behersker norsk skriftlig og muntlig, har tilgang til internett og bruker nettbank med bankID som påloggingsnøkkel.

Kapittel B - Personvern, økonomi og forsikring

Personvern
Data som vil bli registrert om deg den tiden du deltar i studien er:

- opplysninger innhentet gjennom spørreskjema
- kommunikasjon med helsepersonell i spørsmål- og svartjenesten
- bruk av spørsmål- og svartjenesten (fra systemlogg)
- opplysninger om nåværende sykdom og behandling (fra pasientjournalen)

Kun navngitte medlemmer av forskningsteamet vil der ha tilgang til dataene. Opplysningene vil ikke være tilgjengelige for personell som kommuniserer med pasientene i spørsmål- og svartjenesten. Alle medlemmene av forskningsteamet har taushetsplikt.
Oslo Universitetssykehus HF ved administrerende direktør, er databehandlings-ansvarlig.

Rett til innsyn og sletting av opplysninger om deg
Hvis du sier ja til å delta i studien, har du rett til å få innsyn i hvilke opplysninger som er registrert om deg. Du har videre rett til å få korrigert eventuelle feil i de opplysningene vi har registrert. Dersom du trekker deg fra studien, kan du kreve å få slettet innsamlede opplysninger, med mindre opplysningene allerede er inngått i analyser eller brukt i vitenskapelige publikasjoner.

Økonomi og Norges forskningsråds rolle
Studien er finansiert gjennom forskningsmidler fra Norges forskningsråd, og bekostes også av Oslo Universitetssykehus HF. Det er ingen interessekonflikter å melde.

Forsikring
Du er forsikret på samme måte som ved ordinære opphold/konsultasjoner ved sykehuset.

Informasjon om utfallet av studien
Som deltaker i studien har du rett til å få informasjon om utfallet/resultatet av studien.

Oslo universitetssykehus

SoS 2009

Reg. Nr: | | | |

Initialer: | | | |

Samtykke til deltakelse i studien

"Elektronisk spørsmål og svartjeneste"

For pasient:

Jeg er villig til å delta i studien:

_____

(navn i blokkbokstaver)

_____

(dato og signatur)

For prosjektmedarbeider:

Jeg bekrefter å ha gitt informasjon om studien:

_____

(dato, signatur, rolle i studien)

Intervjuguide for pasienter som ikke har benyttet SoS

Hensikt: Få kunnskap om hvorfor ca 75% av pasientene som hadde tilgang til SoS ikke benyttet tjenesten.

Gjennomføring av intervjuet:

Innledning: Starte med litt småprat. Deretter komme inn på temaet og si noe sånn som dette: "Nå har vi gjennomført et forskningsprosjekt der mange pasienter har hatt mulighet til å stille spørsmål og få svar fra helsepersonell gjennom en sikker portal, en elektronisk Spørsmål- og Svartjeneste. Ikke alle pasientene som har hatt tilgang til SoS har benyttet seg av tjenesten. Dette ønsker vi å finne mer ut av, for å forstå hvorfor tjenesten ikke har blitt brukt av alle, og hvor pasienter i stedet har fått svar på sine spørsmål, dersom de hadde noen."
Forsikre at pasienten oppfatter hva intervjuet dreier seg om, og fortsatt ønsker å delta.

Starte lydbåndet nå.

Spørsmål:

1. Fortelle om sykdomsforløpet [Dette er for å få de til å tenke på sykdommen, behandlingen og oppfølgingen samt at intervjuer får et inntrykk av hva pasienten har gått igjennom, hvor syk han/hun har vært, hvor bekymret, hvem er støttende i nærmiljøet osv].

2. Introduksjon av studien, hva trodde du det var, hvilke forventninger hadde du, sa navnet "Spørsmål- og Svartjenesten" deg noe?

3. Hadde tilgang til SoS, men benyttet ikke tjenesten.
   Mulige forklaringer [til hjelp for intervjuer] :
   a. Fikk ikke tilstrekkelig informasjon om hva SoS kunne benyttes til
   b. Feil tidspunkt i behandlingsforløpet
   c. Hadde ingen spørsmål
   d. Ville ikke være til bry, ville ikke klage
   e. Synes mine spørsmål var dumme/pinlige
   f. Ble så tett fulgt opp at spørsmål kunne tas i konsultasjoner
   g. Ønsker ikke å være syk
   h. Påloggingsproblemer
   i. Stoler ikke på sikkerhet/konfidensialitet ved SoS
   j. Vanskelig å bruke
   k. Likte ikke utformingen av SoS
   l. Visste ikke hvem som svarte på meldingene
   m. Foretrekker å ringe
   n. Liker ikke å bruke data
   o. Fikk informasjon andre steder
      i. Internett
      ii. Skriftlig informasjon
      iii. Helsepersonell

iv. Andre pasienter
v. Annet

p. Hadde ingen bruksanvisning
q. Fikk ingen oppfordring fra helsepersonellet om å bruke SoS

4. Bruk av data og internett i det daglige; privat, på jobb [For å få et inntrykk av hvor erfaren databruker pasienten er, og hans innstillinger til bruk av data].
   Tanker om bruk av elektroniske løsninger i kontakt med helsevesenet. Benytter pasienten noen slike nå, f.eks. timebestilling hos fastlege etc.

Avslutning og oppsummering.

Appendix study II

FORESPØRSEL TIL HELSEPERSONELL OM DELTAKELSE I INTERVJU FOR EVALUERING AV CHOICE

Du blir herved forespurt om å delta i et intervju hvor hensikten er å få tilbakemelding på hvorvidt vi har nådd de målene vi satte oss med Choice, eller om det er områder vi kan forbedre både mht. selve verktøyet og implementeringen. Vi ønsker å få kunnskap om brukernes erfaringer med Choice.

Evalueringen av Choice inngår som en del av et større prosjekt; CONNECT (Care Online: Novel Networks to Enhance Communication and Treatment), om å utvikle og teste en tilleggsmodul til elektronisk pasientjournal (EPJ) for kommunikasjon og informasjonsutveksling mellom pasient og helsepersonell.

Hensikten med CONNECT er å:

1. Utvikle og teste CONNECT, en tilleggsmodul til EPJ for kommunikasjon og informasjonsutveksling mellom pasient og helsepersonell.
2. Utforske krav og utfordringer knyttet til bruk av felles elektronisk pasientjournal gjennom mobile terminaler (for eksempel mobiltelefoner).
3. Kartlegge hvilke behov pasienter og helsepersonell har for dokumentasjon, informasjon og felles data for å understøtte pasientmedvirkning, behandling av sykdom og gi kontinuitet i sykepleie.
4. Kartlegge om standardiserte terminologier for helse kan benyttes i pasientens journal. Utvikle verktøyer som kan oversette mellom pasientvennlig språk og termer benyttet av helsepersonell.

Opplysninger som fremkommer i intervjuet vil benyttes i videre utvikling av Choice og CONNECT, samt frambringe kunnskap om hvordan elektroniske verktøy best kan innføres i praksis.

Intervjuet vil vare inntil en time og blir tatt opp på lydbånd. Utfylte skjema og lydbåndopptak vil bli oppbevart i et låst arkivskap ved Senter for pasientmedvirkning og sykepleieforskning. Innspillene dine vil bli behandlet konfidensielt. Alle data vil bli avidentifisert, og ingen svar vil kunne tilbakeføres til deg som person når resultater skal presenteres. Alle data vil bli behandlet i samsvar med gjeldende lovverk.

Selv om du sier ja til å delta, kan du trekke deg når du måtte ønske det, uten å oppgi noen grunn, og uten at det vil ha noen konsekvenser for deg. Dine data vil da bli slettet.

Vi regner med at prosjektet i sin helhet vil være avsluttet etter 2015. Alle data vil være slettet senest 10 år etter dette, dvs. før 31.12.2025. Du har rett til innsyn i hva som er registrert av opplysninger om deg og til å kreve at eventuelle feil rettes.

Om du har spørsmål om deltakelse eller selve studien kan du ringe prosjektleder Professor Cornelia M. Ruland ved Senter for pasientmedvirkning og sykepleieforskning og på telefon 23 07 54 60.

Samtykkeskjema

Ta vare på første side av dette samtykkeskjemaet.

Jeg samtykker i å delta i intervju som beskrevet ovenfor. Jeg er informert om at min deltakelse er frivillig. Selv om jeg sier ja til å delta i dag, kan jeg trekke meg når jeg måtte ønske det, og uten at det vil ha konsekvenser for meg.

Dato:_____

_____
Navn: (blokkbokstaver):

_____
Signatur

Individuelle intervjuer med ledere i sykepleie- og legetjenesten 2008

Åpning *Ikke båndopptaker*	• **Presentasjon av intervjuer.** • **Hensikten med intervjuet.** Nå har vi prøvd ut CHOICE siden januar 2007. Hensikten med utvikle, teste og implementere CHOICE er å oppnå bedre symptomlindring og livskvalitet ved å bedre pasientmedvirkning og kommunikasjon i forhold opplevelse av symptomer og plager. Det er viktig for oss å få en tilbakemelding på om vi har nådd de målene vi satte oss, eller om det er områder vi kan forbedre både mht. CHOICE som kartleggingsverktøy og selve implementeringsprosessen. Vi er derfor interessert i hvilke ledelsesutfordringer du har sett ved innføring av Choice. Vi ønsker å få kunnskap om ledernes erfaringer med innføring av elektroniske verktøyer, både for å evaluere innføringen av Choice og også for å bruke det i det videre arbeidet med CONNECT. Forskningsspørsmål: Hva (er) opplever lederne for sykepleiere og leger som sin rolle ved innføring av Choice? Hvilke fordeler, ulemper og barrierer ser lederne ved innføring av verktøyer som Choice og CONNECT? • **Om å ta samtalen opp på bånd – sikring av konfidensialitet.** Det er behov for en lydbåndopptaker for å få med alt du sier. Selv om jeg noterer underveis, vil det alltid være med en form for filter/forforståelse, og det kan være viktige nyanser jeg ikke får frem. I rapporteringer vil det ikke være mulig å spore bestemte personer tilbake til individuelle utsagn. • **Samtykkeerklæring.** Ta den tiden som er nødvendig for å få samtykkeerklæring signert. • **Demografiske spørsmål.** Fylle ut skjemaet.
Introduksjon	1. Nå har dere brukt Choice i litt over ett år ved din enhet/avdeling. Hvordan brukes Choice i hverdagen av sykepleiere, hjelpepleiere, leger, sekretærer?
Nøkkel-spørsmål: **Om Choice**	2. Hva er fordeler med å bruke Choice i din avdeling? Ulemper? Barrierer? (For pasienten, pasientmedvirkning, sykepleieren, legene, avdelingen, tverrfaglig samarbeid, kunnskapsutvikling, forskning, pleieplanlegging, kvalitet, effektivitet, annet?) 3. Hvilke resultater ser du ved bruk av Choice? Kan Choice påvirke kvalitet av behandling og sykepleie? Evt på hvilken måte?

	Kan Choice påvirke effektivitet av behandling og sykepleie? Evt på hvilken måte? Kan Choice påvirke tverrfaglig samarbeid? Evt på hvilken måte? Kan Choice påvirke kunnskapsutvikling? Evt på hvilken måte? 4. Hva kan du som leder gjøre for å fremme dette?
Om implementering	5. Har de ansatte i hovedsak vært positive eller negative til bruk av Choice? Har dette endret seg i løpet av det første året? 6. Hva ser du som ledelsesutfordringer for å lykkes med bruk av Choice i klinisk praksis? Hvilke barrierer ser du? Hva kan du som leder gjøre for å overvinne disse? 7. Hva kan en leder gjøre for at implementeringen av Choice i klinisk praksis kan bli så vellykket som mulig? Hvilke konkrete tiltak har du gjort? 8. Hvordan var opplæringen i bruk av Choice i forkant av innføringen? Hvilke opplæringsbehov dukket opp underveis? (kommunikasjon om vanskelige temaer, følelser, seksualitet) Har Choice avdekket behov for kunnskapsoppdatering blant de ansatte? 9. Hva mener du er de ulike yrkesgruppenes ansvar for at implementeringen blir vellykket? (Sykepleiere, leger, ledere, SPS) Kan andre ha ulikt syn på dette enn deg? 10. Pågikk det andre endringsprosesser i avdelingen samtidig som Choice ble implementert som kan ha påvirket prosessen? 11. Hva mener du skal til for at Choice kan bli en varig integrert del av klinisk praksis? 12. Hvordan kan f.eks nye medarbeidere læres opp i bruk av Choice? Er dagens opplæringen effektiv? Kan den forbedres? 13. Hva trenger din avdeling hjelp til fra SPS for å overta totalansvar for Choice? 14. Hva kunne du tenkt deg å gjort annerledes dersom Choice skulle implementeres nå? - Før implementering? - I oppstartfasen? - Underveis i prosessen?

Om Choice som ledelses-verktøy	15. Hvordan kan du bruke data fra Choice i jobben din som leder? Hvordan kan dataene presenteres slik at de er nyttige for deg? Hvilke rapporter ønsker du deg som støtte i din lederrolle?
Hva kan vi lære av prosessen? **Hvordan samarbeide om videre forskning?**	16. Hvis systemet skal videreutvikles med nye funksjonaliteter i Connect, hva skal til for å få til en vellykket implementering? Hva kan vi lære av prosessen som har vært? - Hvordan ønsker du å være involvert i forskningsprosjektet? - Hvordan ønsker du at sykepleiere/leger i din avdeling skal involveres? - Hvordan ønsker du å samarbeide med SPS? - Hvilken hjelp eller støtte kan SPS gi? - Hva motiverer deg til å delta i forskningsprosjektet? - Hva tror du motiverer sykepleiere/leger? - Tempo på innføring av nye systemer?
Avslutning	Har vi fått med alt eller mangler vi noe? Er det noe vi ikke har vært inne på som er viktig å få frem. NB! Tåle taushet!! Takk for oppmøtet!

Appendix study III

FORESPØRSEL TIL HELSEPERSONELL OM DELTAKELSE I STUDIE

Evaluering av en online spørsmål- og svartjeneste mellom pasient og helsepersonell som en del av klinisk praksis

Dette er en forespørsel til deg om å delta i en studie som utgår fra Rikshospitalet, Oslo Universitetssykehus HF, for å evaluere nytten av en online spørsmål- og svartjeneste mellom pasienter og helsepersonell som prøves ut i klinisk praksis. Vi vil også undersøke hva som skal til for lykkes med implementeringen av en slik tjeneste og om dette medfører nye måter å jobbe på.

Dersom du samtykker til deltakelse kan du bli bedt om å delta i diskusjonsgrupper og/eller individuelle intervjuer for å gi tilbakemelding på hvordan tjenesten har fungert i praksis og hvilke effekter den har hatt. Diskusjonsgruppene vil ta ca to timer, mens intervju varer ca en time. Du kan også bli bedt om å fylle ut noen spørreskjemaer.

Det vil bli gjort lydopptak av diskusjonsgruppe og intervju for å få med alt som blir sagt. Lydopptak og avskrift fra opptak lagres på en sikker server for lagring av forskningsdata ved Rikshospitalet, Oslo Universitetssykehus HF. Utfylte spørreskjema vil bli oppbevart i et låst arkivskap ved Senter for pasientmedvirkning og sykepleieforskning. Alle opplysninger som samles inn får en tallkode og er ikke knyttet til navn. Data vil bli avidentifisert, og ingen svar vil kunne tilbakeføres til deg som person når resultater skal presenteres. Rikshospitalet, Oslo Universitetssykehus HF, vil behandle opplysningene i samsvar med gjeldende lovverk.

Deltakelse i studien medfører ingen kostnader for deg og du får ingen betaling for å delta. Det er ingen risiko forbundet med denne studien for deg. Resultater fra studien kan bidra til et mer pasientvennlig helsevesen ved at helsevesenet får redskap som kan medvirke til at pasienter får det bedre når de er hjemme, sikre pasienter individuell oppfølging, informasjon og støtte. Kunnskap som fremkommer i studien vil gi økt forståelse av selve verktøyet, samt hva som skjer i en organisasjon når nye elektroniske verktøy implementeres.

Deltakelse i studien er frivillig. Selv om du nå sier ja til å delta i studien, kan du trekke deg fra studien når du måtte ønske det, uten å oppgi noen grunn, og uten at det vil ha noen konsekvenser for deg. Du kan i så fall også be om at de opplysninger vi allerede har fått fra deg, blir slettet med mindre opplysningene allerede er inngått i analyser eller brukt i vitenskapelige publikasjoner.

Vi regner med at studien i sin helhet vil være avsluttet i 2015. Alle data vil være slettet senest 10 år etter dette, dvs. før 31.12.2025. Du har rett til innsyn i hva som er registrert av opplysninger om deg og til å kreve at eventuelle feil rettes.

Hvis du har spørsmål om deltakelse eller om selve studien kan du kontakte prosjektleder, professor Cornelia M. Ruland ved Senter for sykepleieforskning og pasientmedvirkning på telefon 23 07 54 60 eller e-mail: cornelia.ruland@rr-research.no eller stipendiat / prosjektadministrator Cecilie Varsi på telefon 23075452 eller e-mail: cecilie.varsi@rr-research.no.

Om du ønsker å delta i studien ber vi deg signere nedenfor på skjema for informert samtykke.

Samtykke til deltakelse i studien

" Evaluering av en online spørsmål- og svartjeneste mellom pasient og helsepersonell som en del av klinisk praksis"

Jeg er villig til å delta i studien:

----------(navn i blokkbokstaver)

(Signert av prosjektdeltaker, dato)

Jeg bekrefter å ha gitt informasjon om studien

(Signert, rolle i studien, dato)

Intervjuguide SoS-studien - Helsepersonell

INNLEDNING - Ikke båndopptaker

Hensikten med intervjuet:
I forbindelse med SoS-studien ønsker vi å få kunnskap om forhold som kan ha betydning for innføring av SoS og lignende systemer. Vi ønsker å få høre hvordan dere har opplevt å ta i bruk SoS, hvordan har det fungert i praksis, hva du synes om selve tjenesten og hva den har gitt av effekter. Vi ønsker å få lærdom som kan benyttes ved innføring av lignende systemer andre steder.

Mål:
Få rike beskrivelser av helsepersonells erfaringer og opplevelse med implementering og betjening av SoS-tjenesten.

Om å ta samtalen opp på bånd – sikring av konfidensialitet:
Vi trenger en lydbåndopptaker for å få med alt du sier. I senere rapporteringer vil det ikke være mulig å spore bestemte personer tilbake til individuelle utsagn. Materialet vil tas vare på i avidentifisert form til prosjektet er avsluttet, senest i 2025. Kun medarbeidere i prosjektet vil ha tilgang til materialet.
Dette intervjuet har ikke til hensikt å kontrollere eller teste den enkelte. Ingen svar er feil eller riktige. Vi er opptatte av din forståelse og oppfatning. Ikke vær redd for å være ærlig.

STARTE BÅNDOPPTAKEREN NÅ.

Om bruk av SoS
- Antall meldinger besvart (dersom få, hvorfor)
- Antall ganger logget på, hvor ofte logget på
- Enkelhet i bruk
- Lett/vanskelig å formulere meldinger
- Tidsbruk
- Ressursbruk
- Overskudd
- Støtte og backup
- Tilgjengelighet i det daglige
- Gjennomførbarhet i ordinær praksis
- Ressursbehov, ressurskrevende
- Opprettholdelse over tid
- Endringer ved full-skala
- Kost-nytte
- SoS
    - Enkelhet/kompleksitet
    - Tekniske problemer
    - Kvalitet
    - Fornuftig oppbygging
    - Sikkerhet og konfidensialitet

- Tydelig hensikt med SoS
- Tydelig mål med studien
- Integrering
    - Arbeidsflyt
    - Sykehusets visjon
    - Verdier
    - Forstyrrelse av den ”egentlige” jobben
    - Prioritering
- Rolleendring
- Status/Respekt
- Middel til å få høyere lønn
- Kollektivt ansvar
- Tverrfaglig samarbeid
- Kvalitet på behandling og pleie
- Kommunikasjon mellom pasient og helsepersonell
- Fordeler
- Entusiasme hos deg og i avdelingen
- Meningsfull
- Nytte
- Risiko
- Ulemper
- Motivasjon ved forskning vs ordinær drift
- Hvem tar ansvar
- Hva sier de andre i avdelingen
- Overraskelser

Inkludering av pasienter
- Aktuelle pasienter tilbudt SoS
- Hvem ikke og hvorfor
- Pasientens behov for SoS
- Ulemper
- Nytte
- Egnet for hvilke grupper
- Tilbakemeldinger fra pasienter
- Lite brukt, hvorfor

Ledelsesforankring
- Engasjert, informert, uttalelser
- Deltakelse i diskusjoner
- Aksept på tidsbruk
- Oppnå sykehusets/avdelingens mål

Oppstart
- Initiativtaker og beslutning om SoS
- Fylle et behov
- Når i prosessen kom dere med
- Forberedelser

- Plan
- Press/forventning fra kollegaer/ledelse/andre
- Avsatt ressurser (tid, penger, opplæring, oppfølging, sted å sitte etc)
- Påvirket av sentrale føringer/politiske direktiver
- Tilpasninger
- Mottakelighet
- Utvelgelse av helsepersonell
- Din rolle
    - Påvirke verktøyet
    - Påvirke implementeringen

Opplæring
- Enkelhet i bruk
- Opplæringsbehov
- Hvilken opplæring
- Brukerveiledning
- Help-Desk
- Kompetansekrav

Samarbeid
- SPS
- De andre i prosjektet internt/eksternt
- Hjelp fra SPS med å underlette arbeid
- Statusoppdateringer underveis
- Tid og rom for refleksjon

Organisering
- Sykehuset
    - Hierarkiske struktur
    - Antall ansatte
- Avdelingen
    - Antall ansatte
    - Yrkesgrupper
    - Definerte roller og oppgaver
    - Samarbeid
    - Spesialisering
    - Organisering av ledelsen
    - Teamarbeid vs individuelt arbeid
    - Tydelig misjon og mål
    - Formelle møter
    - Informasjon
    - Samarbeid med andre (forskning, kvalitetsforbedring, ferdighetstrening, utveksling)
        - Individ-/gruppenivå
        - Formelt/uformelt
    - Nettverk/forum i sykehuset
    - Mottak av nye ting

- Tilbakemeldinger
- Samhold
- Læringsmiljø
- Håndtering av feil
- Trygghet
- Kvalitetsforbedrende tiltak
- Tid og rom for refleksjon og evaluering
- Proaktiv
- Kultur
- Arbeidsmiljø
- Endringer og prosjekter

Avslutning og oppsummering