IMPLEMENTATION AND USE OF WEB-BASED NATIONAL GUIDELINES IN CHILD HEALTHCARE

Johanna Tell

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Abstract

In Sweden, child healthcare (CHC) is an important health promotion setting, providing universal and targeted interventions. High demands on child healthcare and the competences of CHC nurses, highlight the importance of access to supportive web-based guidelines in everyday work. The implementation of web-based guidelines is affected by various factors and can be challenging. The Swedish Rikshandboken is national guidelines for CHC that are in the process of being implemented. The overall aim of this thesis was to investigate the CHC provided in Sweden before the implementation of the national CHC programme, and the implementation and usage of web-based national guidelines for CHC. Study I aimed to investigate whether the Swedish CHC programme was equal and which methods for health surveillance the county councils offered. A web-survey distributed to CHC coordinators was used, and the data were analyzed with descriptive statistics. Study II aimed to investigate how nurses in CHC use Rikshandboken and factors affecting its use. A web survey was used and analysed using descriptive and analytical statistics. Study III aimed to investigate CHC coordinators’ experiences of being a facilitator in the implementation of a new national CHC programme in the form of a web-based guide. Focus group interviews via Skype for Business were conducted and analyzed using qualitative content analysis. Study IV aimed to examine CHC nurses’ use and ways of understanding the national web-based guidelines, Rikshandboken. A mixed method with sequential explanatory design in two phases was used; a web-survey with descriptive statistics followed by telephone interviews with phenomenographic analysis. Study V aimed to investigate the usage of the web-based national guidelines, Rikshandboken. The data were collected from Google Analytics, and analyzed using descriptive statistics. The results of the studies show that Rikshandboken is widely used and that its usage has increased. CHC nurses are generally satisfied with the website and emphasizes the importance of national guidelines for CHC. Factors needed to be developed to improve Rikshandboken were suggested as well as prerequisites that are needed in the local context to use Rikshandboken fully. It must be reliable, useful and relevant why the end users need to be involved in the development. With the right conditions, Rikshandboken could be a resource for learning and a tool in everyday work for CHC nurses. The result also shows that the CHC is provided unequally, and that the CHC programme is challenging to implement in the local context. The CHC coordinators’ task is to facilitate the implementation of
the web-based national guidelines; however, this responsibility is complex. Changing the content, structure and access to *Rikshandboken* is not sufficient, in the local context, prerequisites for the use of these web-based national guidelines must exist, and only then can *Rikshandboken* be a contributing determinant to an equal CHC.
This is dedicated to all CHC nurses and coordinators fighting for children’s right to equal, equitable and high-quality CHC in their everyday work.
List of publications


## Abbreviation List

CHC- Child Health Care  
CPG- Clinical Practice Guidelines  
ICT- Information and Communication Technology  
HL- Health literacy  
HP- Health Promotion  
FG- Focus group  
GA- Google Analytics  
GRADE- The Grading of Recommendations Assessment, Development and Evaluation  
MCHCU- Main Child Health Care Unit  
NBHW- National Board of Health and Welfare  
RHB- Rikshandboken i Barnhälsovård [The Swedish national guide for child healthcare].  
UCD- User-centered design  
UE- User Engagement  
UX- User Experiences  
WHO- World Health Organization
# Table of Contents

Introduction .................................................................................................................. 1  
Thesis outline ................................................................................................................ 2  
Background .................................................................................................................... 3  
  Research context ......................................................................................................... 3  
    Child healthcare ....................................................................................................... 3  
    National guidelines for child healthcare ................................................................ 7  
    Rikshandboken for Child Healthcare ..................................................................... 8  
Conceptual framework ................................................................................................. 9  
  Health promotion ....................................................................................................... 9  
  ICT-based guidelines in healthcare ........................................................................... 13  
  Implementation and technical innovations in healthcare ......................................... 14  
Rationale of the thesis ................................................................................................. 17  
Research aim ............................................................................................................... 19  
Methodology ................................................................................................................. 21  
  Study I ....................................................................................................................... 23  
  Study II ..................................................................................................................... 23  
  Study III .................................................................................................................... 24  
  Study IV .................................................................................................................... 25  
  Study V ..................................................................................................................... 28  
Ethical considerations ................................................................................................. 30  
Results ........................................................................................................................... 33  
  Study I ....................................................................................................................... 33  
  Study II ..................................................................................................................... 34  
  Study III .................................................................................................................... 35  
  Study IV .................................................................................................................... 36  
  Study V ..................................................................................................................... 38  
Discussion ...................................................................................................................... 41  
  Methodological considerations ................................................................................. 41  
    Validity .................................................................................................................... 41  
    Trustworthiness .................................................................................................... 42  
  Result discussion ...................................................................................................... 45  
    Access to and use of web-based national guidelines ............................................. 45  
    Web-based national guidelines and technical innovations in nursing practice 46  
    The implementation of web-based national guidelines in the local context ... 48  
Conclusions .................................................................................................................... 51  
  Contribution to research and practice .................................................................... 51  
  Further research ....................................................................................................... 52  
Summary in Swedish .................................................................................................... 55  
Acknowledgements in Swedish .................................................................................... 59  
References ..................................................................................................................... 61  
Appendix ....................................................................................................................... 74
Introduction

This thesis is carried out in the research field People, Health and Technology with Applied Health Technology (AHT), as a recurrent research element. AHT is an interdisciplinary research area in the interface between health and technology in which research in engineering science, caring and nursing sciences, and health science is combined. This research subject area focuses on how new technologies can affect health and promote a good life, as well as support and develop healthcare and nursing (Blekinge Institute of Technology, 2016; Olander and Nilsson, 2009). The International Network of Agencies for Health Technology Assessment Glossary (2018) defines health technology as “an intervention developed to prevent, diagnose or treat medical conditions; promote health; provide rehabilitation; or organize healthcare delivery. The intervention can be a test, medicine, vaccine, procedure, program or system”. In this thesis, AHT is studied in the context of implementation and use of web-based national guidelines in the child health care (CHC) context.

In 2006, the Swedish National IT strategy for Health and Social Care (Ministry of Health and Social Affairs, 2006) declared the need for information and communication technology (ICT) to be implemented in healthcare organisations to provide safe and accessible care. Even if ICT is integrated in nursing practice in various ways, nurses feels ambivalent towards its use (Fagerström et.al., 2017) and there are challenges in the implementation of technological innovations in healthcare (Grol, 2013; Jun et al., 2016; Kardakis et al., 2018; Rogers, 2003; Ross et al., 2016). In light of rapid health technology developments, the Swedish society of nursing (2012) underlines the importance of, research on various aspects of ICT in healthcare. These include how ICT is perceived by users, how it can contribute to learning and competence development, as well as the nursing aspects of its design and implementation. The Web is a form of ICT that is often used for guidelines in healthcare, and web-based national guidelines is the term used in this thesis.

The five studies in this thesis comprise a survey on the CHC that is provided in county councils/regions in Sweden before the implementation of a new national programme, two studies on nurses´ use and understanding of web-based guidelines for CHC, one study on CHC coordinators´ role as facilitators of the implementation of web-based national guidelines, and one study on the use of web-based guidelines for CHC using a web analytic tool.
Thesis outline

This thesis is a framework synthesis for five studies, containing seven chapters. Chapter one (Introduction) is an introduction to the research field and the studies that were conducted. Chapter two (Background) presents the context and conceptual framework of the study, as well as the need for research on the implementation and use of web-based national guidelines. Chapter three (Research aims) contains the overall aim of this thesis as well as the individual aims with the five studies. Chapter four (Methodology) describes the methodology, approach, and design of the study, followed by the data collection methods and analysis used in each of the five studies. This chapter also includes ethical considerations. Chapter five (Results) presents a summary of each of the five studies and a synthesis of the findings. Chapter six (Discussion) is divided in two sections; the first part discusses methodological considerations and the second part outlines the main outcomes of the studies. Chapter seven (Conclusions) presents the conclusions, contribution to research and practice, and suggestion for further research.
Background

In this chapter the research context and conceptual frameworks are presented; CHC, web-based national guidelines, Rikshandboken for child healthcare (RHB), health promotion (HP), implementation and technical innovation.

Research context

Child healthcare

CHC, in any form, is available in most countries, although its level and coverage vary (Wood and Blair, 2014). CHC is an important health promotion (HP) setting. In Sweden, CHC is offered free of charge to all children aged 0-5 years, and the participation rate is estimated to be almost 100% (National Board of Health and Welfare [NBHW], 2014). CHC aims to contribute to children’s physical, psychological, and social health, by promoting their health and development, preventing illness, detecting emerging problems early, and intervening when needed to optimise development.

The Swedish Association of Local Authorities and Regions (2017), which reports on the health of children’ and adolescents in Sweden, describes generally good health among children, particularly when international comparisons are made. However, the association also reports that there are increasing levels of psychological health problems and unequally distributed health, which are also seen in Köhler’s (2017) studies focusing on the vulnerability of children. According to Köhler et al. (2014, 2016) vulnerable children have special needs but participate less in CHC. The authors also found insufficient documentation in CHC health records and few reports submitted to social services. The need for CHC professionals to improve their knowledge about the social determinants of health, including circumstances within the family, living conditions and the structure in the society, is emphasised (Köhler, 2017). By providing support that is in proportion to the degree of vulnerability of families, the social gradient related to health can be reduced (Marmot, 2010). Through universal and targeted interventions CHC plays an important role by balancing the differences in social health and promoting a good and sustainable health development (Government Bill 2017/2018:249).
In 2008, the Swedish NBHW, which is a government agency, rescinded its national instruction for CHC, consequently, CHC was left without national guidelines. The Swedish local governments are autonomous and are free to make local decisions and set priorities for healthcare (Wettergren et al., 2016). This entails each county council/regional board specifying its aims, requirements, tasks, and obligations in relation to CHC, thereby, complying more or less with the earlier guidelines. These regional differences in CHC could risk children’s rights to an attainable standard of health and access to healthcare (Magnusson et al. 2011; Wallby, 2012). However, in 2014, the NBHW published new guidance for CHC (NBHW, 2014). This guidance was developed in collaboration with representatives from the main CHC units (MCHCU) in county councils/regions, with the aim of contributing to equal CHC and evidence-based practice. In the new guidance, experience and current knowledge are combined with CHC regulations, to support the development of a CHC programme (NBHW, 2014). Based on this guidance, knowledge reviews, and consensus discussions, a new national CHC programme was developed and agreed upon by the MCHCUs as guidelines for CHC in Sweden.

Current knowledge about the determinants affecting children’s health and development permeates the national CHC programme (RHB, 2018). This is shown in person centered care, adapting the content of each health visit to the specific family’s situation and needs, which might be change over time. The CHC programme embraces universal interventions, which is an important basis for CHC, as well as targeted interventions that enable equitable CHC. The CHC programme is illustrated in RHB by a table with three integrated parts [Figure 1]. The first universal part (I) includes interventions that are offered to all children and are intended to promote health and development and prevent diseases, injuries, and physical, psychological, and social problems. These interventions includes having dialogue with the child and his or her parents, being responsive to the child’s health and development and the family’s observations and concerns, identifying and valuing the determinants which protect the child’s health and those that put it at risk, asking questions about the child’s health and development, conducting observations and targeted investigations, monitoring the child’s health and development over time and providing health-related guidance that is relevant to the child’s age and the family’s needs (RHB, 2018). One strength with CHC is that the professionals have regular contact with children and families over time (Oberklaid, 2011).
The second part (II) includes additional interventions related to all children when these are needed, and it is intended to strengthen the determinants that promote health, to do so early, and to prevent negative development of the child’s physical, psychological, and social health. These interventions include additional assessments that aim to increase the knowledge and understanding of the child’s situation and tailor interventions. These could include additional health guidance, follow-ups, parental support, counselling, and house calls. The third part (III) includes additional interventions when these are needed from or in collaboration with other healthcare givers, social service workers, or other actors. Thus, the CHC programme is not divided into three separate programmes with clear boundaries; rather, it is one programme with integrated parts that forms a trinity, including interventions to be used to varying degrees during shorter or longer period (RHB, 2018).

Figure 1. The three integrated parts of the national CHC programme, illustrating the child’s movements between various interventions. Illustrator www.ritbolaget.se. With permissions developed from Rikshandboken (RHB).

Each county council/region runs an MCHCU, that has at least a chief medical officer and a CHC coordinator. On behalf of the county council/regional management, the MCHCU’s responsibility is to improve local CHC through education and support, monitor children’s health, follow up on interventions, and
conduct evaluations (NBHW, 2014). The MCHCU’s have no personnel nor operational responsibility and have no mandate to make decisions about resources. As there is no national implementation plan for the new CHC programme, it is up to each MCHCU to tailor the implementation based on its local county council/region context. The managers at CHC centres have a responsibility to ensure that CHC targets are met. The team at the CHC-centre consists of CHC nurses, who organise and lead the work, and physicians. Referrals to other experts on the team such as psychologists, speech therapists and dieticians are made when needed (NBHW, 2014).

The nurse in child healthcare

CHC nurses´ are the primary care providers for the child and his or her family and are specialists in either primary healthcare or paediatric care (NBHW, 2014). According to the Swedish Society of Nursing (2010), specialist education is required for nurses to work independently, in keeping with evidence-based practice, in complex and changing care situations. Safe and high-quality healthcare requires nurses to have the requisite competence to practise the profession. International research (Aiken et al., 2017; Laurant et.al., 2018) shows a direct correlation between nurses´ competences and patients´ health and well-being. In relation to this thesis, web-based national guidelines could support and contribute to the strengthening of these competences; however, CHC nurses also need sufficient competence in informatics to enable them to use web-based guidelines.

CHC nurses need, among other skills, good knowledge about children´s health, development, rights, and living conditions, health promotion and prevention, paediatrics, health literacy, public health, and determinants for health. They should have knowledge about the national CHC programme and current methods (NBHW, 2014), The National Network of Child-Healthcare Coordinators in Sweden, 2017). The CHC nurses´ have a responsibility for their own professional practice and continuing professional learning (International Council of Nurses, 2012). This includes analysis of the strengths and weaknesses of their own competence, as well as improvement and deepening of this competence based on research and a reflective approach. CHC nurses should also have the pedagogical competence to lead tutorials at the group and individual levels and provide education to patients, relatives, students, and colleagues (Swedish Society of Nursing, 2017b). These high demands on CHC nurses regarding their competences highlights the importance of access to supportive and useful guidelines in everyday work. CHC- nurses need to
keep abreast of new knowledge, be able to work in accordance with current guidelines and have access to timely information (Swedish Society of Nursing, 2012, 2017b). CHC should be built on the best available evidence, proven experience, the preferences and values of the person concerned; evidence-based practice (NBHW, 2014; Mackey and Bassendowski, 2017).

**National guidelines for child healthcare**

Clinical practice guidelines (CPGs) aim to reduce variability and to decrease the gap between research and current practice, translating research and expert opinions into recommendations for the everyday work of professionals (Committee on Clinical Practice Guidelines, 1992; Gundersen, 2000). In Sweden, the NBHW has the responsibility to develop *National guidelines for healthcare*; which are decision support based on evidence, that consists recommendations for the prevention, diagnosis, and treatment of diseases (NBHW, 2014). Evidence is ranked using a formal method to categorise its quality and strength of the recommendations in the CPG, which is the GRADE system (GRADE Working Group, 2004) that is also considered applicable to public health research (Public Health Agency of Sweden, 2012). However, there are challenges; universal interventions in the field of public health are often complex and context depended and compared to most medical interventions, it takes time to provide evidence of positive health outcomes (NBHW, 2014; Public Health Agency of Sweden, 2012). The Public Health Agency of Sweden (2012) also underscore that it is not always interventions which has been the subject of most high-quality studies which are the best for public health. The NBHW (2014) points out that major aspects of CHC promotive and preventive interventions have not been the subject of research. This has made it difficult to design CPG that rests on a stable evidence base. Conversely, numerous years of experiences have shown the value of CHC and despite the lack of evidence, it is essential to develop and implement CHC programmes based on the best available knowledge and to follow knowledge development (NBHW, 2014). The NBHW guidance for CHC (2014) is built on knowledge reviews, expert opinions, and professional’s knowledge and experience. The guidance gives overall descriptions, and frameworks for CHC and the web-based RHB provides concrete methodological support and contains the Swedish national CHC programme. In this thesis RHB and all of its contents are defined as national guidelines for CHC.
Rikshandboken for Child Healthcare

The web-based RHB aims to contribute to equal, equitable, and high quality CHC by providing quality-assured guidelines to the CHC professionals in all Swedish county councils/regions. This is expected to reduce the need to develop local guidelines and routines and entails effective use of resources (RHB, 2017). RHB was established as an initiative of the Swedish Paediatric Society in 2005, entailed knowledge- and methodological support for CHC personnel, and the earlier national CHC programme. Initially, RHB was a password-protected website that was exclusively for professionals and was available via a previous website for parents. Since 2012, RHB has been produced by Inera AB, which is owned by the Swedish Association of Local Authorities and Regions and is in charge of coordinating and developing digital services for citizens, professionals and decision-makers. Since then, RHB has been an open-access website and has been smartphone compatible via responsive design (RHB, 2017). Responsive design implies that the website can be adjusted to and is compatible with various kinds of technical devices (Peng and Zhou, 2015). The editors at RHB are supported by an editorial board consisting of representatives from the MCHCUs. The editorial board communicates opinions, requests, and needs from the CHC users to the editors and invite authors and reviewers from different areas of specialisation: paediatricians, CHC nurses, psychologists, speech therapists, dieticians, physiotherapist and others (RHB, 2017).

Since 2015, the new national CHC programme is a part of the updated unit RHB also containing knowledge and methodological guidance adapted to the CHC programme. The homepage www.rikshandboken-bhv.se [Figure 2] is designed to provide an overview of the content on the RHB. There are clickable tabs to web pages with knowledge and methodologic guidance for working at CHC, with the CHC programme and meetings with children and parents. These webpages include links to regional documents and websites in different county council/regions, and links to government websites. On the homepage there are also clickable tabs to news in CHC and on RHB, to research and projects, and to a CHC newsletter. The newsletter is also distributed to subscribers with information about the latest updates and new research periodically. RHB also include links to 1177.se, another website produced by Inera AB, that offers general health guidance to citizens. CHC nurses recommend parents to use 1177.se when they search for health information related to children on the Internet. In this thesis the concept RHB is used including the whole unit RHB with all its part, inclusive the new national CHC programme.
Figure 2. The homepage for RHB www.rikshandboken-bhv.se with an overview of the content e.g. the CHC programme and vaccinations which could be clicked on to get in-depth information.

Conceptual framework

Health promotion

HP is a central concept of this thesis, as it is a cornerstone in nursing practice, as well as in CHC policies, content and interventions. HP is based on a holistic and positive view of health, with underlying assumptions about health as a human right and a resource for everyday life (WHO, 1998). The concept of HP is defined by WHO as “The process of enabling people to increase control over and improve their health. It involves the population as a whole in the context of their everyday lives, rather than focusing on people at risk for specific diseases and is directed toward action on the determinants or causes of health” (WHO, 1998). WHO underlines that HP is a comprehensive process with focus on resources for health and factors in concert with a salutogenic approach (Antonovsky, 1996; Mittelmark and Bull, 2013). The holistic approach implies an awareness of the link between determinants of health; social and economic conditions, the physical environment, and its impact on individual and public health and wellbeing (Wold and Mittelmark, 2018). Figure 3 illustrates these determinants of health, which are factors that affect health in a positive or negative way. These determinants and their
interaction are important to reflect on for CHC interventions and thereby for the content needed in national guidelines.

**Figure 3.** Determinants of health. Developed from Dahlgren and Whitehead, 2017. Source: City of Malmö, 2018.

Health literacy (HL) is defined as a key element in HP and more and more as an important health determinant for equity in health (WHO, 2016b). HL is an evolving concept and the definition has been developed from a narrow individual concept focusing on individuals understanding of health information to a more comprehensive concept (Sörensen et al., 2012). According to WHO (2016a) HL is described as individuals competences and capacity to access, understand and apply health information so it promotes their own health but also health in a population. During the last years more focus on “HL-friendly settings” and more attention to the capacity of professionals and health institutions to support access to information has been considered (Rudd, et. al., 2012; Rudd, 2015). These considerations address the important task RHB has to support the CHC nurse's skills
in strengthening children and parents HL, as well as providing educational material and methodological support for conducting health dialogues.

The framework for HP is based on seven principles: holistic, participatory, empowerment, equitable, sustainable, inter sectoral and multi-strategy (Rootman, 2001). These principles are cornerstones of CHC and according to Nutbeam et al. (2010) they can be used as a framework to understand challenges and strengths related to implementation and technical innovation. Participatory implies that all concerned should be involved in the planning, implementation and evaluation stages (Rootman, 2001). The WHO (1998) states that participation is essential to sustaining HP action. In this thesis this concept is centrally related to CHC personnel and their possibilities of participating and being involved in the development and implementation of web-based guidelines for CHC. Empowerment is defined as enabling individuals and communities to assume power over the personal, socioeconomic, and environmental determinants affecting their health (Rootman, 2001). In this thesis individual empowerment is related to the CHC nurses’ and coordinators’ competences and their confidence in their own abilities in relation to the use of the web-based guidelines and to apply them in every day work. Community empowerment is related to the task of promoting children’s and their parents’ confidence in their abilities to make decisions and have influence and control over the determinants of health. Equitable concern for equal and social justice which are basic principle of CHC (NBHW, 2014). Equal CHC relates to the interventions that are provided to all children and their parents and equitable CHC refers to the additional interventions that are provided to the children and parents who need more support to achieve equal health (Wallby, 2012). In this thesis equal and equitable is reflected on related to the use and implementation of web-based national guidelines for CHC. Sustainability refers to the use of resources and development in ways that do not jeopardize the health of future generations (WHO,1998). In HP, sustainability also implies creating conditions for maintenance of interventions and sustainable programs (Whitelaw et al., 2011) an important aspect to consider in the implementation of RHB. Intersectoral collaboration among agencies from relevant sectors is necessary if a holistic approach to children’s health is to be adopted especially when additional interventions are needed. Multi-strategy entails the use and combination of a variety of approaches and interventions according to a holistic approach and health determinants (Rootman, 2001; Wold and Mittelmark, 2018). In regard to the implementation of national web-based guidelines in the local context, a variety of interventions need
to be identified based on the local circumstances (Jansson et al., 2011; Weiss et al., 2016).

A settings approach to health promotion states that people’s everyday settings; the places or social contexts in which they live and act, affect their health (Mittelmark, 2014; WHO, 1998) As such, CHC centers can be seen as such an HP setting for children and their parents who are taking part of CHC interventions, as well as for the CHC nurses who are working at these centers. According to Dooris (2009) a settings approach is characterized by a socio-ecological HP approach with a holistic vision of health and well-being determined by a complex interaction of environmental, organisational and personal factors within the contexts where people work and live their lives.

The overarching aim of Swedish public health is to create societal prerequisites for good health on equal terms for the entire population and end the avoidable health gaps within a generation (Government Bill. 2017/18:249). One objective domain highlights a health-promoting healthcare that should work health promoting and preventing with a systematic equality focus and based on patient needs and opportunities. With this reorientation towards a more health-oriented healthcare the government emphasises a health promotion approach and stronger proactive efforts in promoting health and preventing diseases. These approaches have different roots; promotion as a positive health approach and disease prevention as a biomedical approach (WHO, 1998). In healthcare practice as in CHC, promotion and prevention complement each other in CHC interventions and in CHC personnel everyday work. As an example, CHC-nurses are working with health promoting dialogues to strengthen parental empowerment and HL about vaccination parallel with vaccinations. Due to the aim on health promoting health care, a health promotion approach can be seen as an umbrella for all work within CHC.

The first objective domain in the Government bill (2017/18:249) is on conditions of early life that promote good and equal health. An explanation to the choice of objective domain is that children’s physical, psychological, social, and cognitive development and health are established during the first years of life. The intensity and cost of interventions to reduce problems increase with age during childhood and adulthood (Heckman, 2000; Hertzman, 1999). The government bill (2017/18:249) stresses the need for interventions that are focused on equal maternal healthcare and CHC, high-quality preschool, and a child’s right to reach an equal health (ibid.). To meet the high expectations of the Swedish government, the
county councils/regions and CHC professionals need to fulfil sufficient prerequisites to achieve the task of providing equal, equitable, and high quality CHC in accordance with CHC aims (NBHW, 2014).

**ICT-based guidelines in healthcare**

An integrative literature review in the Swedish context (Fagerström et al., 2017) suggests that ICT in nursing practice can contribute to nurses’ abilities and capacities to deliver good, safe and high-quality care. ICT refers to technologies that facilitate the capture, storage, processing and exchange of information and communication via electronic means (Gagnon et al., 2009). A wide range of ICTs are used to support and provide healthcare. These might be management systems, communication systems, information systems, and computerised decision support systems that are valuable in nursing practice in various way (De Angelis et al., 2016; Mair et al., 2007; Rouleau et al., 2017). Computerised decision support systems are accessible from various devices such as computers or smartphones, and they support professionals’ decisions-making for assisting them with clinical guidelines in practice (Mair et al., 2007).

ICT has the potential to improve the accessibility of national guidelines (De Angelis et al., 2016; Jun et al., 2016; Neuhaus et al., 2015) even if the effectiveness is not entirely clear (Neuhaus et al., 2015). “Web-based” guidelines is the term that is used in this thesis to describe RHB. Traditional printed guidelines are resource intensive and quickly become outdated while web-based ones have the potential to improve accessibility and credibility because they can be continuously reviewed, updated, and widely disseminated (De Angelis et al., 2016; Jun et al., 2016; Neuhaus et al., 2015). ICT may also facilitate CHC nurses learning, continuing development, and growth (Fagerström et al., 2017). This also supports their pedagogical tasks in learning situations with children and their parents, students, and colleagues (Mackey and Bassendowski, 2017). At the same time the integrative review by Fagerström et al., (2017) indicates that ICT in nursing practice takes on a complex role that influences nurses’ working conditions, professional identity, continuing professional development and relationship with patients. Other studies (Clarke et al., 2013; Oleary and Mhaolrunaigh, 2012;) show that nurses tend to rely heavily on their own experiences or ask their colleagues for advice, rather than performing individual Internet searches for information.
Implementation and technical innovations in healthcare

RHB is not new but may be perceived as new by individual CHC nurses who have not previously encountered the website. Even the new CHC-programme are in process to be implemented in county councils/regions, which entail that it is not only an ICT system that should be implemented, but also its content. In innovation research, implementation refers to the efforts that are made after a decision is taken about the introduction of an innovation (Rogers, 2003). An innovation is an object, idea or practice that users perceive as new (Cresswell and Sheikh, 2013.) The introduction of new guidelines and the implementation of changes in healthcare are described as challenging, and the intended results are often not achieved (Grol, 2013; Kardakis et al., 2018). The implementation of ICT and guidelines in healthcare is influenced by various factors (Jun et al., 2016; Rogers, 2003; Ross et al., 2016). When looking from an organisational perspective, key components of the successful adoption of ICT in healthcare are management engagement and support, structural and electronic resources, a supportive culture and an environment with implementation facilitators (Jun et al., 2016; Ross et al., 2016.). From an end-user perspective content, easy access, design and usability are crucial factors in the acceptance and use of ICT (Jun et al., 2016; Ross et al., 2016).

According to a literature review by Luna et al. (2015), a user-centred design (UCD) can increase the adoption and use of ICT in healthcare as well as patient safety and the user satisfaction. UCD implies to a design of ICT focusing on the end-users needs and interest (ibid.) and incorporating UCD in the development of decision support systems can improve usability compared with traditional design (Luna et al. 2017). Usability is a common concept in the research field of human – computer interaction. The term usability is defined by the International Organization of Standardization (ISO) (2018) as the “extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use”. In this thesis usability is related to the degree of ease with which the CHC nurses can use RHB, the extent to which the content meets their needs and how satisfied they are with the web-based national guidelines. Web-based guidelines must coincide with professional consensus and needs and should be seen by all as relevant (Rogers, 2003).

Mahmud (2013) discuss the importance of integrating the seven HP principles (Rootman 2001) in the development of ICT for healthcare. Lack of knowledge about the sociocultural context in healthcare and understanding of determinants for
health may result in ICT system that are not adapted to the end-users or their context (Mahmud, 2013). Review studies (Jun et al., 2016; Ross et al., 2016) show that end users’ involvement in development and a strong bottom-up approach reduce the discrepancies between system functionality and ease of use. A systematic review by Zhu and Thomassen (2018) demonstrates the importance of user-driven innovation and technology-use in public health that is understanding users’ needs and involving them at different stages of the innovation process. In CHC it is nurses and CHC-coordinators who have the greatest competence in nursing practice and CHC, why it is essential to examine their use and experiences of the web-based RHB.

User experiences (UX), relate to humans’ use of an interactive product or system; in this thesis, this refers to web-based RHB, and the emerging perceptions, responses, and activities that come through its use (Hassenzahl, 2010; International Organization of Standardization, 2010). Consideration of the UX is necessary in the design of RHB to ensure that the web-based guidelines are useful for its end users (Hassenzahl, 2010). User engagement (UE) is described as the quality of the UX that highlights the positive aspects of the interactions. UE is based on observations that users not only use technology but also engage with it because they invest time, attention and feelings in its use (Lalmas et al., 2014; Lehmann et al., 2012). According to O´Brian et al. (2018) UE is an abstract, and dynamic construct that is situated in a given context, which makes it challenging to define, design for and evaluate. The measurement of UE can be divided in to three methods; self-reported engagement, cognitive engagement and online behaviour metrics (Lalmas et al., 2014; Lehmann et al. 2012). All three methods have their advantages and disadvantages and can contribute to different aspects of studies. Online behaviour metrics create an opportunity to collect data from a large number of users and determine their depth of engagement with a website without reliance on user subjectivity. The users’ depth of engagement with a website can be measured based on popularity, activity, and loyalty. Popularity is reflected in a high number of visits, activity in how much time users spend on the website, and loyalty in how frequently users return to it (Lehmann et al. 2012). In this thesis, online behaviour metrics were used to gather knowledge about the quality of the UX of the web-based RHB.

Diffusion of innovation (Rogers 2003) is one of the most influential theories used to study HP, and knowledge diffusion and implementation of an object, for example guidelines and technical innovations. The theory is valuable in analysing how and
why populations respond to the introduction of new ideas (Nielsen, 2015; Nutbeam et al., 2010). According to Rogers (2003), individuals such as CHC nurses can be at different stages in relation to an innovation process. In the context of RHB, the innovation-decision process starts with knowledge of its existence. In the next stage, the “persuasion” stage, the CHC nurses must be convinced of the value of RHB. This leads to the decision to use it, which creates the foundation for the implementation stage, during which the CHC nurses have to find a use for RHB in their everyday work in order for it to be accepted. Depending on the success or otherwise of the innovation process, the CHC nurses will then decide whether to use it fully or abandon it altogether (ibid). According to Rogers (2003), CHC nurses’ decisions about whether to adopt RHB can be influenced by a number of factors. One consideration is the degree to which RHB is perceived to be better regarding content, usability, and design than the local guidelines or earlier CHC programme, which are available on internal websites or in print, and which RHB is supposed to supersede. Another influencing factor is whether or not the CHC nurses find that RHB fulfils their requirements for national web-based guidelines. According to Rogers (2003) other factors include existing values, past experiences and the ease of use of the website. The question of whether there are given opportunities to experiment with RHB on a limited basis and the matter of whether the result of it for example, the provision of equal, equitable and high quality CHC are visible to others are also factors that influences its adoption.

Differences in the rate of adoption cannot be explained solely by individuals’ behaviour (Rogers, 2003). The diffusion of innovation takes place in a social system and is influenced by the structure of this system. The functions and availability of RHB are communicated through a number of channels: word of mouth between individuals in a social system (Rogers, 2003), MCHCUs, newsletters from RHB, CHC centres and county councils/regions. The implementation of national guidelines for CHC in the local context may be challenging (Jansson and Tillgren, 2010; Weiss et al., 2016) which is why successful implementation is crucial and the role of the facilitator is important (Rydcroft-Malone, 2004; Weiss et al., 2016). In the innovation and implementation processes facilitators are important actors who support individuals, teams and organisations (Rogers, 2003; Rydcroft-Malone, 2004) According to Rogers (2003) opinion leaders, CHC coordinators in this context, claim informal leadership, have a unique position in their systems’ communication structures and are able to influence other individuals’ attitudes towards RHB. They are change agents, who act as a bridge between technical experts and their clients,
work proactively to create demand for RHB, thereby reducing barriers, supporting adoption decisions and persuading individuals to be adopters (Rogers, 2003).

Thus, web-based guidelines are often not implemented effectively. It is valuable to study CHC nurses’ experiences, perceptions and needs, but it is also important to examine the CHC-coordinator’s role as a facilitator, to deepen knowledge of how web-based guidelines can be a useful source of support in CHC, as well as the factors affecting the implementation process.

**Rationale of the thesis**

Children have the right to good health on equal terms. CHC is an important HP setting that provides universal and targeted interventions and plays a valuable role in balancing differences in health, promoting health, preventing illness, and detecting emerging problems early. CHC work is complex and requires high professional competence and continuing learning for the provision of safe healthcare and health promoting nursing of a high quality. These high demands on CHC nurses highlight the importance of access to supportive and useful guidelines in everyday work and their role in securing equal and high-quality CHC. The national guidelines aim to reduce variability in healthcare and contribute to evidence-based practice, and the web has the potential to improve accessibility-, and credibility by keeping the guidelines updated and ensuring that they are widely disseminated. The national web-based guidelines for CHC, RHB, consist of knowledge- and methodological guidance, and a national CHC programme is in the process of being implemented with the aim of contributing to equal, equitable, and high-quality CHC. The importance of web-based national guidelines should not be ignored; however, their implementation is challenging. Implementation and innovations are affected by various factors related to ICT-solutions, the context in which they should be used, and individual characteristics. In summary, its essential to investigate the CHC that is provided in county councils/regions before the implementation of the new national CHC programme and to follow the usage and implementation of the web-based RHB. The knowledge that is gathered could be useful and valuable in the further development and implementation of web-based national guidelines in healthcare contexts and as a basis for process evaluation.
Research aim

The overall aim of this thesis was to investigate the CHC provided in Sweden before the implementation of the new national CHC-programme, and the implementation and usage of national web-based guidelines for CHC. To achieve this aim, five studies were conducted with the following individual aims.

- The aim of Study I was to investigate whether the Swedish CHC programme was equal and which methods of health surveillance the county councils offered in early CHC.
- The aim of Study II was to investigate how nurses in CHC use the web-based guidelines for CHC and the factors affecting their use.
- The aim of Study III was to investigate CHC coordinators’ experiences of being facilitators of the implementation of a new national CHC programme in the form of a web-based guideline.
- The aim of Study IV was to examine CHC nurses’ uses and ways of understanding the web-based national guidelines for CHC, RHB.
- The aim of Study V was to investigate the usage of the web-based national guidelines for CHC, RHB, using a web analytic tool.
Methodology

In this chapter the methodology of the thesis is presented; study designs, material, sample, methods, analysis and ethical considerations [Table 1].

The Swedish CHC, the web-based RHB for CHC, CHC nurses and CHC coordinators were the study context and study populations of the five studies in this thesis. To achieve the overall aim of this research five studies were conducted, and each one had a specific aim. Various designs were chosen for the different studies: quantitative and qualitative methodology, as well as mixed methods. Descriptive and analytic statistics, qualitative content analysis, and phenomenographic analysis were used to analyse the research data.

The first study was conducted from 2010 to 2011 and was used as a baseline at the beginning of the process to develop a new national CHC programme in Sweden, and to investigate the CHC that was being provided in different county councils/regions at that time. The second study was conducted two years later when it was decided that the new national CHC programme should be integrated to the web-based RHB. Therefore, there was a need to investigate the use of RHB by CHC professionals. The third study was conducted from 2014 to 2015, before and during the introduction of the new CHC programme, published on RHB. To acquire a deeper understanding of the role of facilitator’s in the implementation process, their experiences were examined. The fourth study, which was conducted in 2017, investigated the CHC nurses’ use of RHB and ways of understanding the web-based guidelines when the CHC programme was an integral part of RHB for two years. The fifth study was conducted in 2018 and aimed to investigate the usage of RHB using a web analytic tool, to acquire complementary knowledge about the usage of the web-based guidelines for CHC.
Table 1. Overview of the five studies included in the thesis.

<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Aim</th>
<th>Study population</th>
<th>Materials and methods</th>
<th>Data analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>2010-2011</td>
<td>To investigate whether the Swedish CHC programme was equal and which methods of health surveillance the county councils offered in early CHC</td>
<td>Total: 36 CHC-Coordinators</td>
<td>Web survey</td>
<td>Quantitative analysis; descriptive statistic</td>
</tr>
<tr>
<td>II</td>
<td>2013-2015</td>
<td>To investigate how nurses in CHC use the web-based guidelines for CHC and the factors affecting their use</td>
<td>Total: 1309 CHC-nurses</td>
<td>Web survey</td>
<td>Quantitative analysis; descriptive statistic, Chi-square test, Cramer V, Logistic regression</td>
</tr>
<tr>
<td>III</td>
<td>2014-2016</td>
<td>To investigate CHC coordinators’ experiences of being facilitators for the implementation of a new national CHC programme in the form of a web-based national guide</td>
<td>Total: 14+ 14 CHC-coordinators</td>
<td>Focus groups on Skype for business</td>
<td>Qualitative content analysis</td>
</tr>
<tr>
<td>IV</td>
<td>2016-2017</td>
<td>To examine CHC nurses’ uses and ways of understanding the web-based national guidelines for CHC, RHB</td>
<td>Total 46+ 15 CHC-nurses</td>
<td>Mixed methods; web survey and telephone interviews</td>
<td>Mixed analysis; descriptive statistic, phenomenographic analysis</td>
</tr>
<tr>
<td>V</td>
<td>2018</td>
<td>To investigate the usage of the web-based national guidelines for CHC, RHB, using a web analytic tool</td>
<td>All visitors at RHB in one year</td>
<td>Data from Google Analytics</td>
<td>Quantitative analysis; descriptive statistic</td>
</tr>
</tbody>
</table>
Study I

Study I was a comprehensive survey (Björk, 2010) that was conducted from 2010 to 2011. An e-mail containing a questionnaire, an information letter and an invitation to participate was sent to all 36 CHC coordinators at the MCHCUs in all 21 county councils/regions in Sweden. Each CHC coordinator had responsibility for a defined geographical area, which could be a whole or a part of a county council/region. In the information letter the CHC coordinators were asked to answer the questionnaire together with their chief medical officers. The response rate was 100% after two reminders. The questionnaire contained 57 questions with both structured response and open-ended options; for the latter the respondents could leave comments or clarifications (Trost and Hultåker, 2016). Several items were based on a relevant selection of questions used in a survey administrated in 2000 about the CHC surveillance program (Kornfält, 2000). The questionnaire included questions about CHC organisation, vaccinations, health monitoring, screening, parental support, collaboration with different actors and electronic CHC records. The statistical processing of the results was performed in Microsoft Excel using descriptive statistics with proportion analysis and cross tabs (Björk, 2010). Descriptive statistics (Polit and Beck, 2016) were used to observe, describe, document and obtain an overall picture of the CHC that was provided in the Swedish county councils/regions.

Study II

Study II was a comprehensive web-survey that was conducted in 2013. The difficulty with comprehensive surveys is that they can be extensive and costly (Björk, 2010). The use of e-mail and web-surveys made it possible to conduct the research in a cost-effective manner (Trost and Hultåker, 2016). An e-mail containing an invitation to participate and a link to the questionnaire was sent to all 2376 CHC nurses working at CHC centres in Sweden. The response rate was 55% after four reminders. A non-response analysis (ibid.) was conducted via telephone interviews with 20 randomly selected nurses. The web questionnaire (Trost and Hultåker, 2016), was developed using the online survey tool Textalk Web Survey. Each questionnaire was coded with a specific identification number. The questionnaire contained 28 questions with structured response options, including single- and multiple choice, as well as scale questions (Trost and Hultåker, 2016). In seven questions, an opportunity to add comments was provided. The questionnaire consisted of three parts: background variables and questions about the
respondents´ computer and Internet use, questions about the acquisition of knowledge and methodological guidance, and questions about the use of RHB and the factors that respondents felt were relevant to the use of web-based national guidelines for CHC. Questions about the accessibility of RHB, as well as the web-site´s content, usability, and design, were included. To strengthen the validity and reliability of the survey, several questions were taken from or based on a relevant selection of the questions used in the Swedish version of the WIP Common Questions used in the World Internet Project (2017). A pilot test of the questionnaire was conducted, and this led to minor changes being made prior to distributing it to the study participant.

In the analysis the nurses were clustered into the following six healthcare regions in Sweden: Northern, Southern, Southeastern, Western, Stockholm/Gotland and Uppsala/Örebro. The data analysis was performed using SPSS 22.0. The statistical processing of the results was performed using descriptive and analytical methods (Björk, 2010). The descriptive variables were analysed using proportion analysis and cross tabs. A Chi2 test was used to determine whether the relationships that emerged in the cross tabs were statistically significant. Backward logistic regression was conducted to determine whether the independent variables influenced the frequency of RHB use by CHC nurses (ibid.).

**Study III**

Study III was a comprehensive survey, using online focus group (FG) interviews (Tuttas, 2014) with CHC coordinators in Swedish county councils/regions. FG were chosen to obtain a broad sense of how the subject was perceived by a group of people with a common background in terms of their experiences (Orvik et al. 2013). Two series of four FGs each were conducted, one year apart. The first four FGs were conducted in 2014 before the introduction of the new CHC programme and the last four in 2015 when the implementation process had progressed.

An e-mail with an invitation to participate was sent to all 36 CHC coordinators in all 21 county councils/regions in Sweden. County councils/regions with more than one CHC coordinator were asked to choose one of them to attend. In total, 18 of 36 CHC coordinators from 15 county councils agreed to participate. Fourteen respondents participated in each series of FGs. Ten of these respondents participated in both series. In 2014, four respondents participated in the first FG, two in the second, five in the third, and three in the fourth. In 2015, three
respondents participated in the first FG, five in the second, three in the third and three in the fourth. The FG were conducted online synchronously (Tuttas, 2014) via Microsoft Lync/Skype for Business. The participants and the moderator could see and hear each other using microphones, speakers, and webcam. A semi-structured interview guide (Polit and Beck, 2016) was used; it contained open-ended questions about RHB, the implementation of the CHC programme, and the roles of the participants as facilitators of the implementation process. The FGs, which lasted one hour, were led by the researcher while an observer took notes. The interviews were audiotaped and transcribed verbatim.

Qualitative content analysis (Graneheim and Lundman, 2004) with manifest and latent analysis was used. The manifest content described what the text said while the latent content described the underlying meaning in the text. Both manifest and latent content deal with interpretation and vary in depth and level of abstraction (ibid.). The transcript was read several times to create an overall picture of its content. The text was then divided into meaning units based on content and context. Thereafter, these units were condensed, coded, and grouped into categories with subcategories expressing the manifest content of the text. The codes, categories, and subcategories were discussed among the authors during this process. In the latent analysis, the underlying meaning, obtained through condensed meaning units, codes, and categories was formulated into a theme (Graneheim and Lundman, 2004).

**Study IV**

To achieve the aim of Study IV, a mixed methodology (Creswell and Plano Clark, 2011) was chosen, as the combination of two methods could provide a better understanding than the use of a singular method could. A mixed-methods study with an explanatory sequential design in two phases was conducted following four procedural steps (ibid.). When using an explanatory design, the researcher begins by conducting a quantitative phase and then follows up on specific results using a qualitative phase to explain the initial result in more depth for the purpose of complementarity (Creswell and Plano Clark, 2011). A web-survey (Trost and Hultåker, 2016) was conducted in the first phase and was analysed using descriptive statistics to obtain an overall picture of CHC nurses´ uses and experiences of RHB. In phase two, which was based on the results in phase one, a guide was constructed for telephone interviews, which were analysed using a phenomenographic approach (Marton and Booth, 1997). As the first step, an
A web questionnaire (Trost and Hultåker, 2016), which was created using the online survey tool Textalk Web Survey was used. The questionnaire contained 16 questions with structured response options, including single- and, multiple-choice, as well as scale questions (Trost and Hultåker, 2016). It consisted of five parts, which addressed the: sociodemographic and clinical characteristics of CHC nurses, their use of and access to RHB, their experiences of support and usability, and the areas in which RHB needed to be developed or improved. Several questions in the questionnaire were based on a website usability measurement instrument (Bangor et al., 2008) which strengthened its construct validity. The pilot test identified weaknesses and provided critical reflections, which required minor changes to the questionnaire to strengthen its validity. Each questionnaire was coded with an identification number. The web-survey was analysed in Microsoft Excel and Textalk Web Survey using descriptive statistics with proportion analysis and cross tabs (Björk, 2010).
Semi-structured interviews with open-ended questions were chosen to gain insight into CHC nurses’ varied ways of understanding RHB. This is a common data collection method in sequential explanatory design and in phenomenographic research (Creswell and Plano Clark, 2011; Marton and Booth, 1997). In the web survey the respondents provided their contact details and permission to be invited to a follow-up telephone interview, in which 16 CHC nurses participated. All the invited nurses provided consent to participate. They represented a variety of county councils/regions, had different background variables, and could thereby contribute to a rich and varied picture of the experiences and understandings of RHB. Unfortunately, one of the interviews had to be excluded from the study due to a technical error that occurred while it was being recorded. In the second step, the web survey results were used to create a semi-structured interview guide (Polit and Beck, 2016), which included open-ended questions about the CHC nurses’ perceptions of the use of RHB in everyday work, RHB as a web-based guide, requests for support, opportunities to influence RHB, and suggested improvements. A pilot test of the interview guide and the technological equipment led to minor changes. In the third step the telephone interviews were carried out, and the duration was between 16 and 40 minutes, with a median of 26 minutes. These interviews, which took place two months after the web survey was conducted, were audio-taped transcribed verbatim.

Phenomenographic analysis (Marton and Booth, 1997) was chosen for phase two, as the focus was to describe variations in the ways in which the CHC nurses perceive and understand RHB. Phenomenography is based on the assumption that a phenomenon can be understood by a group of people in a limited number of ways and that each way expresses the relationship between the subject and the phenomenon (ibid.). The analysis was carried out according to the procedure by Larsson and Knutsson-Holmström (2013). Each interview transcript was read and reread to get an overall impression of the data. Preliminary descriptions of each respondent’s ways of perceiving and understanding RHB were marked and summarised. Thereafter, the preliminary descriptions provided by all the respondents were compiled, reread and compared to identify the similarities and differences between them. Similar statements were grouped into preliminary descriptive categories after comparison to establish the borders between them. To strengthen the credibility and transparency of the results, an overview [Table 2] of the phenomenographic analysis, with regard to categories, statements, and participating CHC nurses, as well as direct quotes from the interviews was presented. Finally, five descriptive categories emerged; these constituted an
outcome space (Larsson and Knutsson-Holmström, 2013), which depicts the
categories and the internal relationship between them.

Table 2. Overview of phenomenographic analysis with regard to categories,
statements and participating CHC nurses (n=15).

<table>
<thead>
<tr>
<th>Categories of descriptions and perceptions</th>
<th>No. of statement</th>
<th>Participants ID Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>A tool that must be useful and relevant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Content that meets user needs</td>
<td>11</td>
<td>1, 3, 6, 10, 13–15</td>
</tr>
<tr>
<td>• Obtain the users views</td>
<td>10</td>
<td>1-2, 5, 7-8, 10, 13-15</td>
</tr>
<tr>
<td>• Develop and use of the possibilities with ICT</td>
<td>38</td>
<td>2-3, 5-15</td>
</tr>
<tr>
<td>A resource that must be reliable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Feel confident</td>
<td>9</td>
<td>1, 4, 6, 9, 11,13, 15</td>
</tr>
<tr>
<td>• Keep updated with current recommendations</td>
<td>16</td>
<td>1, 3, 8–11, 14–15</td>
</tr>
<tr>
<td>A resource for learning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Own learning</td>
<td>34</td>
<td>2, 4-5, 7-8, 10-15</td>
</tr>
<tr>
<td>• Supporting others learning</td>
<td>32</td>
<td>1–2, 4, 6, 9, 11, 13</td>
</tr>
<tr>
<td>• Learning together</td>
<td>8</td>
<td>3, 6–14</td>
</tr>
<tr>
<td>A tool in everyday work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Practice of use</td>
<td>28</td>
<td>2, 4-5, 7-8, 10-15</td>
</tr>
<tr>
<td>• Changes of use</td>
<td>9</td>
<td>1–2, 4, 6, 9, 11, 13</td>
</tr>
<tr>
<td>• Time aspects</td>
<td>15</td>
<td>3, 6–14</td>
</tr>
<tr>
<td>Contributing determinant to an equal CHC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• National equivalence</td>
<td>15</td>
<td>1, 3, 7-11,13-15</td>
</tr>
<tr>
<td>• Regional differences</td>
<td>9</td>
<td>3, 5, 8-9, 14-15</td>
</tr>
</tbody>
</table>

Study V

A cross-sectional design was chosen for this case study to describe the status of the phenomenon that is the usage of RHB at a fixed point in time. A case study can be a useful method of exploring a phenomenon that has not been rigorously researched, obtaining descriptive data, and creating opportunities to examine usage trends over time (Polit and Beck, 2016). The author of this thesis obtained administrative permissions to access Google Analytics (GA) at RHB to study the website usage data. The data about RHB usage were obtained from GA’s statistical reports on audience-, acquisition- and behaviour (Support.google.com, 2018;
Crutzen et al., 2013; Song et al., 2018) for one year (August 1, 2017 to July 31, 2018). Custom statistic reports provide a combination of dimensions and metrics which are not included in the standard reports. The audience report data that were collected about the visitors comprised; the number of visitors to RHB, the new and returning visitors, their locations on an aggregated level, technical devices used, session rates, number of page views, average session durations and bounce rates. Bounce rate refers to the percentage of visitors who leave the website after viewing only one page (Support.google.com, 2018). A low bounce rate suggests that users are engaging with the service (Song et al., 2018). The acquisition report data that were collected about how visitors access RHB showed whether this was from search engines, referrals from other websites, direction from browsers, emails, or social media. From the behaviour report data, information was collected on occurrences during a session on RHB that is the most visited web pages, time spent on each page view, and entrances and exits (Support.google.com, 2018). Entrances refer to the number of times that a specific web page serves as an entrance to RHB and exits refers to the number of times a specific web page is the last one that is viewed by the visitors on RHB (Song et al. 2018). These standard reports included data about the total group of visitors on RHB during the investigated year. Smaller groups of users may have behaviors that differs from the average; thus, the segmented data of defined user groups were collected by creating custom reports. Earlier studies (Study II and Study IV) of CHC nurses’ use of RHB revealed their high, medium, and low frequency use of the web-based guidelines. Therefore, the total group of users was divided into the same three frequency use groups in this study. These divisions contributed valuable insights into whether and how the usage pattern of high frequency users differ from those of, for example low frequency users and vice versa.

The usage data for RHB were analysed using the audience-, acquisition-, behaviour- and custom reports from GA (Support.google.com, 2018). The data from the statistical reports were exported to Excel format and analysed using descriptive statistics. The number of visitors and sessions per day, usage hours during the days of the week, technical devices, and data about the most viewed web-pages, were listed and compared per month over the investigated year. The total number of page views, average time per session, average number of page views per session, and bounce rate were the metrics that were used to measure the UEs of the different user groups (Lehmann et al. 2012; Support.google.com, 2018).
Ethical considerations

The studies in this thesis were performed in accordance with the rules of the Ethical Review of Research Involving Humans in Sweden (SFS, 2003:460). According to this law, no approval from an ethical review board is needed if personally sensitive data are not used nor, if the research does not entail physical encroachment nor an obvious risk of harm or other physical or psychological effect on subjects (Swedish research council, 2017). Therefore, no applications were made for any of the studies. Ethical considerations have to be taken into account, and an ethical self-evaluation was conducted for all five studies. An advisory statement was obtained from the Ethical Review Committee of the Southeast regarding Study II (D.nr. EPK 160-2013), Study III (D.nr. EPK 226-2014), regarding both phases in Study IV (D.nr. EPK 442–2017, D.nr. EPK 451–2017) and Study V (D.nr. EPK 479- 2018). This led to minor clarifications in the information letters that were sent to the respondents.

All the participants in Study II, III and IV received information about the study via letter, which guaranteed confidentiality and indicated that participation was voluntary and could be terminated at any time. Before the FG interviews for Study III began, the information was repeated, and the CHC coordinators were asked to provide consent. The participants in the FG were asked to treat the group discussion as confidential. The use of FGs on Lync/Skype for Business as a research method could cause concern among respondents for technical reasons. To reduce the risk of technical failures, a pilot test was conducted, and the technology was also tested with each participant before the FG interviews were carried out. Before both phases of Study IV informed consent was obtained for each phase separately. Before the interview started, the information was repeated, and the participants was asked to provide for their consent. The questionnaires and the interview guides used in the studies, did not include questions of sensitive nor emotional nature; consequently, any potential harm to the participant was considered low. To guarantee the confidentiality, no identifiable details about the respondents were provided when report the study result. For Study V, approval to monitor the use of RHB with GA was obtained from RHB, Inera AB. All data were presented at the aggregated level. Additionally, IP- addresses cannot be tracked via GA; thus, the participants cannot be identified.

Preunderstanding refers to the researcher’s previous knowledge about a specific phenomenon (Nyström and Dahlberg, 2001). The author of this thesis has 14 years
of experiences as a CHC nurse and 13 years of experience as a CHC coordinator on an MCHCU in the Blekinge County Council. The work of a CHC coordinator includes involvement in the implementation of the national CHC programme, as well as in the editorial board at RHB. This pre-understanding was both a strength and a challenge during the research process. The strength was that the researcher was well acquainted with the study context and study population. However, throughout the entire research process, the pre-understanding was critically considered during regular discussions with the research group to minimise the risk of interpreting of the data in a biased way.
Results

In this chapter, summaries of the main results of the five studies are presented, followed by a synthesis of the findings.

Study I

Although Swedish CHC is often described as universal and equivalent, the results showed a disparity in the ranges, methods, and follow-ups of the interventions provided in different county councils/regions of the country [Table 3]. On December 31, 2009, 639 710 children were registered in CHC in Sweden. The CHC nurses met the families several times at CHC centres and via house calls during the children’s early years. All county councils/regions provided house calls for newborns. In four geographic areas, house calls were also offered at the age of eight months. Parental support was offered both individually and in groups. The number of medical examinations that a physician offered in the universal CHC programme ranged from three to five during the child’s first six years of life.

Screening against postpartum depression was offered in varying degrees and in higher degree to Swedish-speaking mothers than those who did not speak Swedish. The visual acuity test was provided to all children at the age of four, however, the criteria for referral to an ophthalmologist varied. Screening for hearing with otoacoustic emissions (OAEs) was conducted among newborns throughout the country; however, the number of auditory examinations among children of higher age ranged from zero to two. Language screening was offered to all children at either two and a half or three years old. Two screening methods were considered evidence-based in Sweden and were used in 67% of the MCHCU areas. The other areas either used these methods in modified form or utilized other methods. Approximately half of the respondents indicated that they had introduced electronic records in CHC; the others used paper records.
Table 3. CHC interventions in different MCHCU areas.

<table>
<thead>
<tr>
<th>Intervention</th>
<th>MCHCU n (total 36)</th>
<th>MCHCU %</th>
</tr>
</thead>
<tbody>
<tr>
<td>House call newborns</td>
<td>36</td>
<td>100</td>
</tr>
<tr>
<td>House call 8 m</td>
<td>4</td>
<td>11.1</td>
</tr>
<tr>
<td>House call adoption families</td>
<td>32</td>
<td>88.8</td>
</tr>
<tr>
<td>Medical examination 4–8 w</td>
<td>36</td>
<td>100</td>
</tr>
<tr>
<td>Medical examination 5–6 m</td>
<td>36</td>
<td>100</td>
</tr>
<tr>
<td>Medical examination 10–12 m</td>
<td>33</td>
<td>91.6</td>
</tr>
<tr>
<td>Medical examination 18 m</td>
<td>21</td>
<td>58.3</td>
</tr>
<tr>
<td>Medical examination 5–5,5 y</td>
<td>8</td>
<td>22.2</td>
</tr>
<tr>
<td>OAE</td>
<td>36</td>
<td>100</td>
</tr>
<tr>
<td>Play audiometry 4 y</td>
<td>23</td>
<td>63.8</td>
</tr>
<tr>
<td>Play audiometry 5 y</td>
<td>1</td>
<td>2.7</td>
</tr>
<tr>
<td>Visual acuity test 4 y</td>
<td>36</td>
<td>100</td>
</tr>
<tr>
<td>Visual acuity test 5 y</td>
<td>9</td>
<td>25.0</td>
</tr>
<tr>
<td>Language screening 2,5 y</td>
<td>15</td>
<td>41.6</td>
</tr>
<tr>
<td>Language screening 3 y</td>
<td>23</td>
<td>63.8</td>
</tr>
<tr>
<td>Language screening 4 y</td>
<td>18</td>
<td>50.0</td>
</tr>
</tbody>
</table>

Study II

The questionnaire was answered by 1309 respondents, and the results showed that RHB was widely used by CHC nurses in Sweden, but that regional differences and the nurses’ number of years in the profession affected its use. The analysis showed a higher odds ratio for low-frequency usage if the CHC nurses belonged to the Southern, Northern, or Stockholm/Gotland health region. The respondents with the least amount of experience as CHC nurses used RHB most frequently; the frequency decreased with increasing time in the profession [Table 4]. Almost all CHC nurses had access to a computer with an Internet connection both at their CHC centres, and at their homes, and they used the Internet almost daily at work and for leisure purposes. Only a small number of the nurses had access to smartphones at work. A web-based national guide for CHC and a national CHC programme were considered important. Almost all nurses were satisfied with RHB’s usability, accessibility, and design and trusted the content, which they considered to be of a high quality. However, they were less satisfied with the possibility of finding the information that they were looking for on the website. Working time required to use RHB, support from the MCHCU’s and the website’s design, were important factors influencing their use of RHB.
Table 4. Factors related to low-frequency usage of RHB by CHC nurses.

<table>
<thead>
<tr>
<th>Variables</th>
<th>OR</th>
<th>95 % CI. for OR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>South-eastern healthcare region</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>Southern healthcare region</td>
<td>1638</td>
<td>1107</td>
</tr>
<tr>
<td>Western Healthcare region</td>
<td>1522</td>
<td>933</td>
</tr>
<tr>
<td>Stockholm/Gotland</td>
<td>2133</td>
<td>1363</td>
</tr>
<tr>
<td>Uppsala/Örebro</td>
<td>1153</td>
<td>772</td>
</tr>
<tr>
<td>Northern healthcare region</td>
<td>1810</td>
<td>1125</td>
</tr>
<tr>
<td>Age group 21–40 y</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>Age group 41–50 y</td>
<td>966</td>
<td>697</td>
</tr>
<tr>
<td>Age group 51–60 y</td>
<td>823</td>
<td>596</td>
</tr>
<tr>
<td>Age group 61–70 y</td>
<td>1451</td>
<td>879</td>
</tr>
<tr>
<td>&lt;5 y in the profession</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>6–15 y in the profession</td>
<td>1905</td>
<td>1437</td>
</tr>
<tr>
<td>16-&gt;20 y in the profession</td>
<td>2364</td>
<td>1606</td>
</tr>
</tbody>
</table>

Abbreviations: CI, Confidence interval; OR, odds ratio.
OR value indicates risk to belong to the group who used RHB less than once a month.

Study III

The facilitation of the national guidelines in the local context, was shown to be a complex task that requires advocacy and mediation [Table 5]. Favourable preconditions in the local context such as a smaller county council, positive attitudes among CHC personnel and management, primary care statements, the withdrawal of local guidelines and a previous CHC programme similar to the new one made the implementation of the national guidelines easier. Lack of resources was a central barrier and the CHC-coordinators attempted to identify flexible solutions depending on local circumstances. Having the task to implement the national CHC programme but having no mandate to make decisions regarding the resources that was needed aroused frustration in the facilitators, as in their experience, CHC, was not prioritised to the same degree as disease-oriented efforts and were contested by managers. The CHC coordinators also needed to handle own doubts about how weight universal efforts against targeted activities in the CHC programme and ambivalence about shutting down their own local guidelines in favour for RHB. Seeing RHB as a valuable resource that they felt confidence and pride in and having strong convictions regarding children’s rights to equal and equitable CHC were strong incentives for facilitate RHB use and the implementation of the CHC programme.
Table 5. Overview theme, categories and subcategories.

<table>
<thead>
<tr>
<th>Theme</th>
<th>Categories</th>
<th>Sub-categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Being a facilitator- a complex role</td>
<td>Adapt to a local context</td>
<td>- Favorable preconditions are essential</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Flexibility to circumstances</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Advocating and mediating</td>
</tr>
<tr>
<td></td>
<td>Transition challenges</td>
<td>- Lacking a mandate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Handling own doubts</td>
</tr>
<tr>
<td></td>
<td>Led by strong incentives</td>
<td>- ICT - a valuable resource</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Confidence and pride</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Equal and equitable CHC</td>
</tr>
</tbody>
</table>

**Study IV**

RHB was used in varying degrees; most of the CHC nurses visited the website several times per week to several times per day, while a few used it once a month or less frequently. Desktops were the most commonly used technological device; three quarters of the CHC nurses had no access to smartphones via their employers. Nearly half of the CHC nurses considered themselves as having a need to access RHB via smartphones at work, as well as an allocated amount of time at work in which they could use RHB. Most of the respondents liked, were generally satisfied with, and trusted the content of RHB [Table 6].
Table 6. CHC nurses’ satisfaction with the usability, content and design of RHB.

<table>
<thead>
<tr>
<th>Satisfaction with usability, content, and design</th>
<th>Agree completely or largely (n= 46), % (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHB almost always contains the information that is needed</td>
<td>67 (31)</td>
</tr>
<tr>
<td>Technical assistance is necessary to use RHB</td>
<td>11 (5)</td>
</tr>
<tr>
<td>RHB is likeable</td>
<td>83 (38)</td>
</tr>
<tr>
<td>There are aspects on RHB that are not consistent</td>
<td>13 (6)</td>
</tr>
<tr>
<td>RHB design make the content easy to access</td>
<td>65 (30)</td>
</tr>
<tr>
<td>It is difficult to find the required information</td>
<td>26 (12)</td>
</tr>
<tr>
<td>Trust that the information on RHB is correct</td>
<td>93 (43)</td>
</tr>
<tr>
<td>The layout is difficult to overlook</td>
<td>24 (11)</td>
</tr>
<tr>
<td>The information is pedagogical and easy to interpret</td>
<td>78 (36)</td>
</tr>
<tr>
<td>RHB should be more interactive (i.e. should include movies, animations, pop-ups, audio, and/or music, for example)</td>
<td>44 (20)</td>
</tr>
<tr>
<td>Overall, satisfied with RHB</td>
<td>70 (32)</td>
</tr>
</tbody>
</table>

In the phenomenographic analysis five different ways of understanding RHB were identified among the CHC nurses: as a tool that must be useful and relevant, as a resource that must be reliable, as a resource for learning, as a tool in everyday work, and as a contributing determinant to an equal CHC [Figure 6]. The CHC nurses’ variations of understanding RHB are presented in the outcome space in how they are related to each other; prerequisites that is needed for using RHB, how it is used in learning and in everyday work in a local context, and as a contributing determinant in a national context. All descriptive categories interact with each other and together they give variations of understanding RHB as a unit. To be reliable, useful, and relevant to CHC nurses in their context, RHB must be kept updated and must involve the end users in the development process. The results also showed that differences still existed in Swedish CHC. Just over half of the respondents stated that the national CHC programme had been fully implemented in their county councils/regions; however, their collective way of understanding RHB as a determinant to equal CHC, revealed an intention to reduce these differences.
Study V

During the investigated year, RHB had 777,488 visitors, resulting in 1,235,168 sessions and 2,899,498 page views. Each day, there was an average of 3,386 sessions on RHB. January was the most popular month for visits, while July had the lowest percentage of visits. The use of RHB has increased over the last six years and the web-based guidelines for CHC were used in all county councils/regions. Approximately three quarters of the visitors were new and most of the sessions were via smartphones. The usage patterns and metrics for UEs differed between the user groups. High-frequency, and desktop users spent more time on RHB, visited more pages, and had lower bounce rates than medium-frequency, low-frequency and smartphone users [Table 7].

Figure 5. The outcome space; Ways of understanding RHB among CHC nurses.
Table 7. Total number of sessions, total number of page views, number of pages per session and average time per session of different user groups from August 1, 2017 to July 31, 2018.

<table>
<thead>
<tr>
<th></th>
<th>High- frequency user group n 42 579</th>
<th>Medium- frequency user group n 124 665</th>
<th>Low- frequency user group n 610 244</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total n of sessions</td>
<td>346 933</td>
<td>277 889</td>
<td>610 346</td>
</tr>
<tr>
<td>Total n of page views</td>
<td>1 406 720</td>
<td>559 602</td>
<td>933 176</td>
</tr>
<tr>
<td>N of pages/session</td>
<td>3.16</td>
<td>2.14</td>
<td>1.75</td>
</tr>
<tr>
<td>Average session duration (hours)</td>
<td>00:03:11</td>
<td>00:01:40</td>
<td>00:01:32</td>
</tr>
<tr>
<td>Bounce rate %</td>
<td>50</td>
<td>66</td>
<td>75</td>
</tr>
</tbody>
</table>

The group of high- frequency users was the smallest and accessed RHB via desktop to the highest degree, mostly between Monday and Friday from 07:00 to 17:00. The low- frequency user group was the biggest and accessed RHB via smartphones to the highest degree. Almost half of this group’s sessions occurred on weekdays between 18:00-06:00. This user group also visited RHB on weekends to higher degree than the high- frequency user group. The “top 10” table-list [Table 8] of popular web pages, appeared fairly consistent during the year, with the exceptions of some topics that were more relevant to the seasons such as “children and the sun” during the summer months. The national CHC programme was the most popular web page. In regard to the “top 10”-list, the differences found between the user groups were that the high- frequency user group visited more overall web pages for CHC such as the national CHC-program while the low- frequency user group visited web pages with more specific topics, such as rashes and dots-infections.
**Table 8.** The 10 most visited web pages, number of page views, average time spent on the web page, entrances, exits and bounce rates during the investigated year.

<table>
<thead>
<tr>
<th>Web pages</th>
<th>Page views</th>
<th>Average time</th>
<th>Entrance n (%)</th>
<th>Exit (%)</th>
<th>Bounce rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHB home page</td>
<td>281 355</td>
<td>00:00:45</td>
<td>231 940 (18.7)</td>
<td>27.8</td>
<td>28.2</td>
</tr>
<tr>
<td>The national CHC programme (category)</td>
<td>141 562</td>
<td>00:00:39</td>
<td>42 588 (3.4)</td>
<td>22.1</td>
<td>56.4</td>
</tr>
<tr>
<td>Vaccinations (category)</td>
<td>65 073</td>
<td>00:00:22</td>
<td>10 769 (0.8)</td>
<td>6.3</td>
<td>10.4</td>
</tr>
<tr>
<td>Infant formulas (texts)</td>
<td>48 081</td>
<td>00:03:51</td>
<td>41 017 (3.3)</td>
<td>83.2</td>
<td>86.6</td>
</tr>
<tr>
<td>Rashes and dots infections (texts)</td>
<td>47 908</td>
<td>00:01:21</td>
<td>36 684 (2.9)</td>
<td>64.5</td>
<td>67.3</td>
</tr>
<tr>
<td>Paediatrics (category)</td>
<td>46 209</td>
<td>00:00:37</td>
<td>4 953 (0.4)</td>
<td>10.9</td>
<td>21.3</td>
</tr>
<tr>
<td>Eye disorders (texts)</td>
<td>37 066</td>
<td>00:04:05</td>
<td>33 247 (2.6)</td>
<td>89.6</td>
<td>91.9</td>
</tr>
<tr>
<td>Vaccination schedule (texts)</td>
<td>36 955</td>
<td>00:03:33</td>
<td>16 268 (1.3)</td>
<td>64.6</td>
<td>75.9</td>
</tr>
<tr>
<td>Overview- the national CHC programme (texts)</td>
<td>34 487</td>
<td>00:04:45</td>
<td>29 096 (2.3)</td>
<td>84.3</td>
<td>92.8</td>
</tr>
<tr>
<td>Newborns (category)</td>
<td>32 456</td>
<td>00:00:35</td>
<td>3 403 (0.2)</td>
<td>10.1</td>
<td>25.9</td>
</tr>
</tbody>
</table>

a Only some of the most viewed web pages are included in the table, which is why the numbers do not add up to 100%.

The results of the studies in this thesis show that RHB is widely used and that its usage has increased. The CHC nurses use RHB for knowledge- and methodological support, are generally satisfied with the website, and consider it important with national guidelines for CHC. Factors that need to be considered in regard to the developed or improvement of RHB are suggested, as well as what needs to be done or provided in the local context to enable the full use of the web-based guidelines. RHB must be reliable, useful, and relevant, and the end users need to be involved in its development. With the right conditions, RHB could be a resource of learning and a tool that is used in everyday work, and a contributing determinant to equal CHC. The results also show that Swedish CHC is unequal and that the implementation of the national CHC programme in the local context is challenging. The CHC coordinators are tasked with being the facilitators of the implementation and use of the web-based national guidelines; however, the execution of this role is complex and requires both advocacy and mediation.
Discussion

Methodological considerations

In this thesis, studies with quantitative-, qualitative- and mixed-methodologies were conducted, and each had its own way to ensuring the quality of the research. In the studies using quantitative data (Studies I, II and V) weaknesses and strengths were assessed through external and internal validity. In the study using qualitative data (Study III), trustworthiness was assessed using the concepts of credibility, dependability, confirmability, and transferability. In the mixed-method study (Study IV), validity, credibility, and transferability were assessed (Polit and Beck, 2016).

Validity

Validity (Polit and Beck, 2016) refers to the degree to which the study scientifically answers the questions that is intended to answer. External validity refers to the ability to generalise the study results to other settings or populations. Internal validity refers to the validity of the conclusions that are drawn (ibid.). A common threat to validity is selection bias, which refers to the risk that the study population is not representative of the intended population (Björk, 2010). In Study I, all the CHC coordinators from the county councils/regions in Sweden were invited and the participation rate was 100% which is a strength of the study. In Study II, all 2 376 CHC nurses working at CHC centres in Sweden were invited. The response rate was 55% which is considered acceptable for a web survey, according to Polit and Beck (2016). As such, it can be assumed that a sufficient number of responses were received to paint a reliable picture of Swedish CHC nurses’ use of RHB. External loss affects the validity of a study and raises questions about how the CHC nurses who did not respond utilise RHB. One potential area of bias is that the CHC nurses who did not respond to a web- survey might not use computers and the Internet as much as their colleagues and are also non-users of RHB. However, there was no indication in the dropout analysis of a skewed distribution, thereby supporting the reliability of the results. One weakness of Study IV was that the nurses gave prior consent to be invited and, therefore did not constitute a randomised sample. In addition, the questionnaire was answered by a sample that was too small to enable conclusions from the statistical analyses or the generalisation of the results. One strength was that the respondents also participated in Study I, and were involved in the implementation of the web-based guidelines for CHC; therefore, they were able to contribute their knowledge-based UX.
The questionnaires used in Studies I, II and IV, were not psychometrically tested—that is no theory was used in the development of the measuring tool (Polit and Beck, 2016). Several questions in Study I were based on a relevant selection used in a survey of the CHC surveillance programme in 2000 (Kornfält, 2000). To strengthen the validity and reliability of the survey in Study II, several questions were based on a relevant selection of the questions used in the Swedish version of the WIP Common Questions (World Internet Project, 2017). Several of the questions in Study IV were the same as those used in Study II, thereby allowing for comparisons. Face validity refers to the degree to which the questionnaire measure what it purports to measure (Polit and Beck, 2016). The face validity of the questionnaires was pilot-tested by CHC-nurses and CHC-coordinators before Studies II and IV were conducted, and this led to minor changes. In Study I, the opportunity to add comments was provided in the questionnaire, and the comments confirmed the multi-choice responses which was an added strength of the study.

In Study V, the website was the research object and the usage pattern over a one-year period was investigated. GA provided aggregated usage data based on all visitors to RHB; however, it was impossible to determine whether they were from the target group that is the professionals in CHC, or other consumers, such as parents. The aggregated data limited the possibility of conducting statistical analyses. According to Clark et al., (2014) it is impossible to draw conclusions about the unique number of visitors, as well as the number of returning visitors. Cookies, which are used to recognise unique browsers, can be cleared, and a visitor can return to the website using a new device or a different browser, thereby resulting in him or her being counted as a new visitor. This could mean, for example, that a visitor accesses RHB via his or her workplace desktop computer during the day and then returns to the site via a private mobile phone in the evening. Therefore, the internal validity is limited when it comes to drawing conclusions about the UEs based on the conceptions of users, sessions and bounce rate (ibid.). The data from GA are not precise; rather they are merely an indication. By monitoring and analysing the data trends and web-site usage, comparisons could be made between different periods of time.

Trustworthiness

The concept of trustworthiness is used to ensure the quality of Studies III and IV. It refers to the degree of confidence in the qualitative data. The assessments include
credibility, dependability, conformability, and transferability (Lincoln and Guba, 1985; Polit and Beck, 2016).

Credibility, refers to confidence in the truth and interpretations of the data (ibid.), including appropriate methods, participant selection and transparency, which enables the readers to follow the procedure (Graneheim and Lundman 2004). Credibility was achieved in the studies by carefully preparing each study, as well the selection of the study population and the methods that were expected to best achieve the study aims. FGs were chosen in Study III to obtain a broad sense of how the subject was perceived among a group of people with a common background of experience (Orvik et al. 2013). As the CHC coordinators were working in different county councils/regions in Sweden, the use of online FGs made it possible to conduct the study, via Lync/Skype for Business (Tuttas, 2014). The discussions in the FGs were rich and vivid, indicating that this method was appropriate. However, a limitation with online FGs was the technical issues that emerged. Three CHC coordinators declined to participate because of the technical conditions necessary to use Lync/Skype for Business were lacking in their county councils/regions. Although the technological equipment was pretested, a few problems occurred with web cameras, microphones, speakers, and access when the FGs began. These are significant challenges that need to be accounted for when planning online FGs. When these issues were solved, the FGs were conducted without problems, and because a sufficient amount of time had been dedicated, the actual interviews were not affected. Compared to traditional FGs, the online format has been shown to have a more “informal” character, which allows participants to be more open (Stewart, 2017). This could contribute to a richer discussion and could encourage participants to be more open and intimate than expected; which is an ethical issue to be aware of when conducting FGs online (ibid.). Study IV was conducted as a mixed method study. According to Creswell and Plano Clark (2011) a combination of two methods can provide a better understanding than the use of one, thereby, strengthening a study and minimising the number of weaknesses. The result from phase one, that is, the web-survey, were used to create a semi-structured interview guide for phase two, that is, the telephone interviews with 15 CHC nurses who participated in phase one and provided their consent to be invited to phase two. According to Larsson and Knutsson-Holmström (2013), 20 participants is a sufficient number to enable the identification of different perceptions of phenomena in a phenomenographic analysis. Thus, one strength is that the CHC nurses represented all county councils/healthcare regions, had used RHB since at least 2013, and had worked during the implementation of the new national CHC
programme, thereby enabling them to offer a broad range of experiences. To strengthen the transparency and the reader’s perception of the credibility of Studies III and IV, the research process is carefully described.

Dependability refers to the reliability of the data over time and conditions, and a high dependability implies that the findings would be the same if the study were replicated (Polit and Beck, 2016). To enhance dependability the study design and analysis were discussed by the research team, the study aims were kept in mind during the process and careful attention was paid to the systematic analysis of the data. Returning to and re-reading the transcripts and categories after a few days during the analysis phase strengthen the dependability of the research.

Conformability refers to the objectivity of the data and the interpretations; it is the degree to which the results are derived from the participants and study context, and not from research bias (Lincoln and Guba, 1985; Polit and Beck, 2016). To avoid investigator bias and one-sided interpretation, every step in the study was discussed and reviewed in the research group. The telephone interviews and the FG discussions were recorded and, transcribed verbatim, and an observer from the research team attended the FG and took notes. Each category presented in Studies III and IV have citations to increase the transparency and help readers to judge the trustworthiness of the results (Graneheim and Lundman, 2004; Lincoln and Guba, 1985).

Transferability refers to the ability to transfer the findings to other settings and groups (Lincoln and Guba, 1985; Polit and Beck, 2016) and can be judged by the reader only (Graneheim and Lundman, 2004). It is not claimed that the findings in Studies III and IV can be applied to CHC coordinators or CHC nurses in general; however, the experiences of being a facilitator in a group of CHC coordinators, as well as in the variations in the ways of understanding RHB in a group of CHC nurses are useful sources of information. As CHC nurses in Sweden have about the same specialist training and working contexts, these facts might increase the transferability of the findings to similar contexts, which also can be applied to the CHC coordinators.
Result discussion

Access to and use of web-based national guidelines

RHB is broadly used and its usage increased throughout the years in which these studies were conducted, although there were differences in usage at both the regional and individual levels. RHB is the internet resource that was most utilised by the CHC nurses in when seeking to acquire knowledge and methodological guidance. They also emphasised the importance of national guidelines for CHC. They are generally convinced of its value, and they have left the persuasion stage in the innovation process (Roger 2003) and have decided to use RHB.

The CHC nurses almost always used RHB via their desktops at the CHC centres; only a few had access to smartphones at work. These results differ from studies showing that the most common method of accessing the Internet in Sweden was via smartphones (The Internet Foundation in Sweden, 2018) and that the use of smartphones in healthcare has generally increased and, provides a mobile, easily accessible and effective method of delivering evidence practice recommendations (Moore and Jayewardene, 2014). Access to RHB via smartphone or tablet could enable CHC nurses to use the national guidelines during house calls. The value of house calls in the provision of support to the families of newborns has been emphasised (SOU 2017:47) and the number of house calls in CHC is expected to increase, which is why the importance of accessing national guidelines via smartphones and tablets has been actualised. Access to electronic resources, a supportive environment, management engagement, and support are key components of the successful implementation of web-based guidelines (Cresswell and Sheik, 2013, Ingebrigtsen et al, 2014). Even if national decisions and policies, such as the Swedish National Strategy for e-Health (2010), state that there is a need for healthcare personnel to have access to well-functioning electronic decision support system, and RHB is mobile compatible, preconditions must exist in the local context to make a difference to the CHC nurses in their everyday work.

A comparison between the user groups showed a higher degree of UE in the high-frequency group than in the other user groups, as well as a higher degree among the group of desktop users compared to smartphone users. The bounce rate was 50% for the high-frequency user group, compared to 75% for the low-frequency user group. A higher bounce rate among smartphone users compared with desktop users was also found in a study by Vogel et al. (2016). The “top 10 list” of the most
visited RHB web pages showed a higher bounce rate from “text web pages”, which could be interpreted as disengagement; however, even though the users found exactly what they were looking for on that specific page, they were still counted as bouncers (Clark et al., 2014). The three web pages on the “top 10 list” with the highest bounce rates—an overview of the national CHC programme, eye disorders, and infant formulas—were also the pages on which users stayed the longest, which may indicate that the visitors read the contents of these pages. According to Clark et al. (2014), these issues raise the question of whether a bounce rate of 70%–80%, as is often seen, is as negative as it initially appears. The RHB home page had the highest entrance rate each month, indicating that the majority of the visitors began their sessions on this page. This shows the importance of a home page that gives a good impression and encourages the user to engage with more pages (Crutzen et al., 2013).

**Web-based national guidelines and technical innovations in nursing practice**

The CHC nurses emphasised that the content on RHB must cover the complexity of CHC, including the situations that arise in their everyday work, as well as the rare situations; this describes a holistic, salutogenic approach that is connected to the determinants of health (Mittelmark and Bull, 2013; WHO, 1998). HP is an essential aspect of nursing (Swedish Society of Nursing, 2018), and CHC is an important HP setting, which requires web-based national guidelines that are built on HP principles (Rootman, 2001). Thus, RHB could contribute to HP in the workplace by strengthening the CHC nurses, empowering them in terms of their competences, and involving them in the development of the web-based guidelines to enhance the latter’s sustainability. Participation, which is one of the HP principles, means that all concerned should be involved (WHO, 1998), and consistent with the result of previous studies (Jun et al., 2016; Rogers, 2003). Thus, nurses must play an active role in the development and implementation of web-based guidelines to enable their successful adoption in order to be a relevant support in nurses’ everyday work.

CHC nurses turn largely to RHB to acquire knowledge and methodological guidance, including access to new research that is relevant to CHC, as well as references to further reading, all of which are important components of CHC nurses’ use of RHB. The nurses also expressed that RHB must be reliable and updated with the latest recommendations for CHC. Earlier studies on information retrieval show that
nurses tend to rely on their experience or to ask colleagues rather than conducting their own Internet searches (Clarke et al., 2013; O’Leary and Mhaolrunaigh, 2012). At the same time, a literature review by Clarke et al. (2013) shows that nurses are concerned that their colleagues’ recommendations may not be evidence based. This thesis shows that a positive attitude exists among CHC nurses when it comes to seeking evidence for their work. The CHC nurses with the most years in the profession tended to rely on their own experience and used RHB more seldom than their less experienced colleagues. However, when seeking information on the Internet, even those in the experienced group preferred RHB to other websites. It was found that even if experienced nurses do not need knowledge and methodological support to the same degree as novices, they still need and want to use the national web-based guidelines to obtain information about unusual issues, updates, and new research, as well as to engage in continuing learning. Regardless of the number of years spent in the profession, nurses need to keep up to date with new knowledge and must work in accordance with current guidelines (International Council of nurses, 2012; Swedish Society of Nursing, 2017). RHB seems to be a tool that enables experienced CHC nurses to meet these requirements. Guidelines can make research-based evidence more accessible to nurses (O’Leary and Mhaolrunaigh, 2012). This places high demands on the RHB editors, editorial board, and authors to improve and update the website continually whenever new knowledge emerges, thus enabling CHC nurses to trust the content.

This thesis revealed RHB as a resource for different forms of learning: own learning, common learning, and others’ learning. ICT has been shown to support nurses’ continuing learning and professional development (Fagerström et al., 2016). It creates opportunities for flexible, efficient learning in healthcare and offers a time-saving and cost-effective alternative method of education (Soper, 2017; Voitilainen et al., 2017). As a common learning resource, RHB provides opportunities for discussion and reflection between colleagues regarding news about and content pertaining to the web-based national guidelines. RHB as a resource in others’ learning is essential to the CHC nurses’ task of strengthening the learning and empowerment of children and their parents (Rootman, 2001), in addition to their HL (Sörensen et al., 2012). The CHC nurses suggested that access to pedagogical materials, instructional videos, discussion forums, and e-learning are important factors in improving RHB. These suggestions revealed nurses’ expectations of RHB in regard to their own learning, their common learning, and their pedagogical role in health promoting nursing practice. To meet the needs and requests of CHC
nurses in their continuing learning and pedagogical tasks, this role of RHB needs to be reflected in the further development of RHB.

The implementation of web-based national guidelines in the local context

Although RHB was widely used among the CHC nurses, the implementation of the new national CHC programme, which is an essential part of RHB content, was shown to be more challenging in some county councils/regions. Rogers (2003) classifies the adopters of an innovation according to the time it takes for the adoption to occur. The adopters are classified as: innovators, early adopters, early majority, late majority, and laggards. Innovators are the 2%–3% who are quickest to adopt innovations, while laggards are the slowest 10%–20%, whom are the most conservative. According to Nutbeam et al. (2010), however, there are limitations in this theory related to the concept of laggards, which may lead to victim blaming. He stresses that it may not be solely resistance to change or conservative attitudes that prevent laggards from adopting an innovation (e.g., a new national CHC programme); rather, it may also be a result of a lack of resources and/or other structural barriers. This thesis confirms this position. The implementation of HP and the new CHC programme is challenging, and the facilitator role is complex.

As facilitators, and thus intermediary actors, CHC coordinators played a key role in the implementation of the web-based national guidelines (Rogers, 2003; Rydcroft-Malone, 2004). They had the necessary knowledge of the local context and were able to take local-level interests into account. Therefore, they could make adjustments to the local circumstances (Jansson and Tillgren, 2010; Nygårdh et al., 2016) and carry out tailored interventions (Bernhardsson et al., 2014; Fischer et al., 2016). These capabilities are shown to have positive effects on the implementation and use of guidelines (Bernhardsson et al., 2014). The role of the facilitators differed between the various county councils/regions, as the extent to which they found the possibilities of facilitating and influencing decisions challenging depended on their location.

Advocacy and mediation were common and important aspects of the facilitator’s role in implementing the national programme in the local context, which comprises the core HP activities (Saan and Wise, 2011). The use of a multi-strategy with a combination of interventions, such as the development of policies, organisational changes, education, and communication, is needed to make implementation sustainable (Rootman, 2001). In the facilitators’ experience, disease-oriented efforts were prioritised over HP when resources were allocated in county
councils/regions, which is also evident in the results of other studies (Jansson et al., 2011; Jansson and Tillgren, 2010; Kardakis et al., 2018; Weiss et al., 2016). The lack of support from managers who have personnel and operational responsibilities was also an obstacle, as support from leaders is crucial to the success of implementation (Jun et al., 2016). Without support from the managers and the NBHW, the MCHCUs stood alone in their facilitator role, facing the risk of attempting to achieve “mission impossible” in regard to the implementation of the national CHC guidelines. The WHO (1986) suggests both top-down “decision” and bottom-up “process” perspectives when making action plans. Community empowerment—that is, enabling the community to assume power over the personal, socioeconomic, and environmental determinants affecting health—must be a common responsibility in the local context.

CHC in Sweden was shown to be unequal when the first study was conducted in 2011, and this continued to be the case in 2017. The studies also show motivation and efforts among the CHC nurses and coordinators to achieve national equality and equivalence in CHC. To ensure equal CHC opportunities, enable children to achieve health, and reduce the differences in their health are the cornerstones of CHC and HP (NBHW, 2014; Wold and Mittelmark, 2018). These common value principles were important incentives in facilitating the implementation. Some CHC coordinators felt ambivalent towards parts of the new CHC programme and especially on how to balance universal with targeted interventions and shut down their local guidelines in favour of RHB. This was a dilemma in the county councils/regions, as the MCHCUs were important facilitators of the implementation of the web-based national guidelines. According to Wallby (2012), varied interventions are needed to achieve equitable CHC, but they must not be at the expense of universal efforts. Wallby also stresses the importance of clear national guidelines to ensure universal and targeted CHC interventions (ibid.). In regard to the development of RHB, it is critical to consider how to achieve professional consensus and needs and how RHB can best contribute to equal and equitable CHC (Wallby, 2012).

Nevertheless, the amount of time that is needed for the adoption of the national guidelines varies between individuals and regions, as evidenced in Studies II and IV. Even if ICT is integrated into nursing practice, nurses feel ambivalent towards its use (Fagerström et al., 2016). In a study by Nilsson et al. (2016), three social challenges (i.e., barriers) were revealed in regard to the implementation of electronic information systems in the nursing context. The first, power, relates to
the change in the existing hierarchy and alienation. The second is professional identity, in which nurses’ call, and being experts in nursing but novices when it comes to information systems leads to identity problems. The third social challenge, encounter, is characterised by poor introductions to electronic information systems, and nurses’ preconceptions are based on their previous negative experiences with such systems (ibid.). According to Rogers (2003), norms, the roles of opinion leaders and change agents, types of innovation decisions, and communication structures all have an impact on diffusion of an innovation.

According to Rogers (2003), the differences in the rates of adoption of RHB in different healthcare regions cannot be explained solely by individuals’ behaviour. This highlights the importance of facing the challenges in county councils/regions, removing the barriers, and facilitating the use of RHB to help empower CHC nurses in regard to the use of web-based guidelines
Conclusions

With the high demands on CHC nurses’ competences and their responsibilities to provide equal, equitable, and high-quality CHC, it is essential that web-based national guidelines fulfil these requirements. CHC professionals consider RHB an important tool in their everyday work, as it is a resource for learning and a contributing determinant to equal CHC. To be reliable, useful, and relevant, RHB must be kept updated with new research and current recommendations and develop the possibilities with ICT to promote continuing professional learning and HP. Participation and a strong bottom-up approach are important in making RHB relevant to whom it is intended to serve, and its content must support health-promoting meetings with children and parents. RHB is widely used in all county council and regions, its use has increased, and the CHC programme is the most visited web page on the website. These tendencies suggest a positive direction towards the RHB aim to contribute to equal, equitable, and high-quality CHC.

However, this thesis also shows that despite government documents emphasising the use of ICT in healthcare and equal, equitable, health-promoting healthcare and despite the web-based national guidelines, it is difficult to completely fulfil these requests in the local context. Local priorities, resources, attitudes, and the lack of a mandate to make decisions affect the implementation and use of the web-based national guidelines. Changing the content and structure of RHB, as well as access to it, is not sufficient. In the local context, prerequisites to using the web-based national guidelines must exist; it is only then that RHB can be a contributing determinant to equal CHC.

Contribution to research and practice

Research in Applied Health Technology focuses on how new technologies can affect health and promote a good life, as well as support and develop healthcare and nursing (BTH, 2016, Olander and Nilsson, 2009). This thesis contributes with a HP approach in research on use and implementation of ICT in healthcare in form of web-based national guidelines for CHC.

The studies do not confirm the results of earlier research indicating that the implementation of ICT in healthcare is delayed and that nurses ask colleagues for information or rely on their own experiences rather than performing individual Internet searches for information. Rather, this thesis shows that ICT in the form of web-based national guidelines is on the way to be successfully implemented in
Swedish CHC and is seen by CHC nurses as playing an essential role in health-promoting nursing and in their continuing learning. The research confirms earlier studies showing the challenges of implementing HP as a new national CHC programme in the local context, as well as the important role of facilitators in the implementation process.

The knowledge generated from the studies in this thesis can be used to develop and improve RHB, as well as to design other web-based national guidelines with the purpose to making them useful and relevant to the end users. The studies also contribute valuable knowledge regarding the challenges and the factors facilitating the use and implementation of web-based national guidelines in CHC, which could be useful in other healthcare contexts. Finally, this thesis calls for joint national and local responsibility, as well as HP actions that will achieve an equal child health in Sweden.

*Knowing is not enough; We must apply. Wishing is not enough; We must do.*

Goethe

**Further research**

The implementation of the national CHC programme is still in progress, and the aim of achieving equal and equitable CHC has still not been achieved. Therefore, further research with new investigations on the CHC provided in Sweden as well as research on the implementation and use of the web-based national guidelines are essential. The importance of a participatory approach in development of web-based national guidelines has been highlighted in this thesis. Further research on participatory methodology could contribute to the use of a more user-driven design for web-based guidelines. This thesis also revealed nurses’ expectations of RHB as a resource for learning and point out the importance of gathering more in-depth knowledge regarding the design of web-based national guidelines used to support learning. Nurses are the primary caregivers in CHC, and they have the task to strengthen HL of children and their parents, as well as empowering them. It is suggested that further research should be conducted on how HP principles could be integrated into the design and content of RHB to support health-promoting nursing, and health promoting setting for CHC nurses as well as for children and
their parents. In this thesis, Skype for Business was used to conduct FGs; this was necessary to conduct the study in a cost-effective manner, as the participants were located in dispersed geographic areas. It is suggested that more studies should be conducted with the aim of increasing knowledge of how ICT, such as the use of online FGs, can be used to support research.
Summary in Swedish

I Sverige har barn rätt till en god och jämlik hälsa samt tillgång till en jämlik och rättvis barnhälsovård (BHV) av hög kvalitet. BHV är en hälsofrämjande arena där insatser erbjuds kostnadsfritt och når, näst intill alla barn upp till sex år. Verksamheten erbjuder universella och riktade insatser och har en betydelsefull roll i att balansera skillnader i barns hälsa genom att främja hälsa, förebygga ohälsa och tidigt upptäcka hälsoproblem. År 2008 upphävde Socialstyrelsen de nationella riktlinjer som fanns för BHV, vilket resulterade i att ansvaret för att formulera mål, krav och uppdrag för verksamheten förflyttades till varje enskilt landsting/region.


Det övergripande syftet med denna avhandling var att undersöka vilken BHV som erbjöds i Sverige före implementeringen av det nya nationella BHV-programmet, samt implementering och användning av webbaserade nationella riktlinjer för BHV. För att nå det övergripande syftet med avhandlingen genomfördes fem studier.
Studie I syftade till att undersöka huruvida BHV-programmet i Sverige var jämlikt och vilka metoder för hälsoövervakning som erbjöds i de olika landstingen/regionerna. Studie II syftade till att undersöka hur BHV-sjuksköterskan använde RHB och faktorer som påverkade användandet. Studie III syftade till att undersöka BHV-samordnares erfarenheter av att vara facilitatorer i implementeringen av ett nytt nationellt BHV-program i den webbaserade RHB. Studie IV syftade till att undersöka BHV-sjuksköterskors användning av de nationella riktlinjerna, RHB, samt variationer av uppfattningar av de nationella riktlinjerna. Studie V syftade till att undersöka användningen av de webbaserade nationella riktlinjerna, RHB, med hjälp av webbanalys.


Den första studien visade att delar av BHV som erbjöds i landsting/regioner var universella och likvärdiga, men studien visade även att det fanns skillnader i omfattning, metoder och uppföljning av interventioner (Studie I). Betydelsen av ett nationellt BHV-program och gemensamma riktlinjer betonades av BHV-sjuksköterskor (Studie II och IV) och BHV-samordnare (Studie III) för att nå en jämlig BHV (Studie III och IV). Användningen av RHB ökade under tiden för studierna som ingår i denna avhandling (Studie II och V). RHB var brett använd (Studie II och V), men användandet varierade mellan landsting/regioner och påverkades av BHV-sjuksköterskoras erfarenhet i yrket (Studie II och IV). Som en novis användes RHB ofta i vardagsarbetet, medan en mer erfaren BHV-sjuksköterska använde den mer sällan, framförallt vid ovanliga situationer och för att läsa om uppdateringar och ny forskning (Studie IV). Olika användarnamn och användarengagemang återfanns hos olika grupper av RHB-användare. Hög-frekvent användare besökte också fler sidor och stannade längre på RHB än lågfrekvent användare. Denna grupp använde också datorn för att nå RHB i störst utsträckning (Studie V). BHV-sjuksköterskors avsaknad av smartphone och läsplatta i arbetet inom BHV framkom (Study II och IV). Utöver tillgång till tekniska enheter, ansågs stöd från BHV-samordnare och chefer som betydelsefullt för att BHV-sjuksköterskor skulle använda RHB (Study II).
RHB sågs som en resurs som måste vara tillförlitlig och hålla BHV-sjuksköterskorna uppdaterade med senaste rekommendationerna baserade på evidens och beprövad erfarenhet. RHB måste vara användbar och relevant med ett innehåll som möter BHV-sjuksköterskornas behov, varför de också önskade delaktighet i utvecklingen av RHB (Studie IV). De flesta BHV-sjuksköterskor var nöjda med RHBs användbarhet, innehåll och design och litade på dess innehåll (Studie II och IV). Det framkom missnöje med sökfunktionen, att strukturen var svår att överblicka och svårighet med att hitta efterfrågad information. RHB sågs som en resurs för olika former av lärande. Det fanns önskemål om att använda och utveckla de möjligheter som informations- och kommunikationsteknologi (IKT) kan tillföra och förbättra RHB liksom göra den mer interaktiv (Studie II, III och IV). Synen på RHB som en enhet innehållande det nationella BHV-programmet, kunskaps- och metodstöd samt länkar till regionala och myndigheters hemsidor, framkom i fokusgrupperna med BHV-samordnare (Studie III) liksom i BHV-sjuksköterskors olika uppfattningar av de webbaserade nationella riktlinjerna (Studie IV).

De centrala BHV-enheterna i landsting/regioner ansågs som viktiga resurser för kunskap- och metodstöd för BHV-sjuksköterskorna (Studie II). De centrala BHV-enheterna sågs också vara ett stöd för att använda RHB och en länk för dialog med RHBs redaktion (Studie IV). BHV-samordnarna såg RHB som en resurs i sin roll att utbilda personal inom BHV (Studie III). BHV-samordnarna hade en komplex facilitator-roll i implementeringen och användningen av de webbaserade nationella riktlinjerna i sina respektive landsting/regioner. Starka incitament, lokala omständigheter och prioriteringar samt möjligheter att påverka beslut, färgade deras uppdrag (Studie III). Avhandlingens studier visar att även om RHB användes i hög utsträckning, var det nationella BHV-programmet fortfarande inte helt infört i Sveriges landsting/regioner år 2017 (Studie IV). Det fanns dock en tydlig önskan och intention hos BHV- sjuksköterskor (Studie II och IV) och BHV-samordnare (Studie III) att nå en jämlig BHV och det nya nationella BHV-programmet, var den mest besökta webb-sidan på RHB (Studie 5).

Avhandlingen visar att BHV-sjuksköterskor och BHV-samordnare ser på RHB som ett betydelsefullt verktyg vardagsarbetet, en resurs för lärande och en bidragande faktor till en jämlig BHV. För att vara trovärdig, användbar och relevant måste RHB hållas uppdaterad med ny forskning och gällande rekommendationer samt utveckla möjligheterna med IKT för att främja kontinuerligt professionellt lärande och hälsofrämjande arbete. Invollvering av RHBS målgrupp i utvecklingen av de webbaserade nationella riktlinjerna är viktig för att innehållet ska vara relevant och
stödja hälsofrämjande möten med barn och familjer inom BHV. Studiernas resultat visar på en positiv tendens i riktningen mot målet med RHB att bidra till en jämlik och rättvis BHV av hög kvalitet. Men denna avhandling visar också att trots att nationella styrdokument och myndigheter understryker betydelsen av användningen av IKT i hälso- och sjukvården liksom en jämlik och rättvis, hälsofrämjande hälso- och sjukvård, och trots webb-baserade nationella riktlinjer, är det utmanande att implementera dessa i landsting/regioner. Att förändra RHBs innehåll, struktur och access är inte tillräckligt, förutsättningar måste finnas i den lokala kontexten och först då kan RHB vara en bidragande determinant för en jämlik BHV.
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gick före på ”doktorsvägen” och hela tiden kommit med uppmuntrande tillrop, stöd, kritiska synpunkter, samt visat ett genuint intresse och engagemang för mina studier.

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References


Cresswell, K., & Sheikh, A. (2013). Organizational issues in the implementation and adoption of health information technology innovations: An interpretative review. *International Journal of Medical Informatics, 82*(5), e73–e86.


Appendix
Stora skillnader i svensk barnhälsovård

Barnhälsovårdsenhet avgör själva – oroande att nationellt program saknas

MARGARETHA MAGNUSSON, med dr, vårdutvecklare, Barnhälsovårdsenheten, Södersjukhuset, Stockholm
JOHANNA TELL, mag, barnhälsovårdsamordnare, hälsovårdshården, Blekingsjukhuset, Karlskrona
ANNCHARLOTE LINDFORS, fil


Fullständig referenslista

I dag saknas ett nationellt program för barnhälsovården. Professionen har startat ett arbete, och Socialdepartementet har i ett regleringsbrev för 2009 givit Socialstyrelsen i uppdrag att tills de vågledningar rekommenderar att det finns ett nationellt program för barnhälsovården. «Trots att den svenska barnhälsovården ofta beskrivs som generell och likartad, visar resultatet att det finns stora skillnader i landet vad gäller såväl utbud och metoder för barnhälsovården.»
Basprogrammet anger 4 Drygt hälften (53 procent) av I hela landet erbjuds alla barn en synun-

eller språkbedömning av BVC-sjuksköterskan. –tillsammans med sin barnhälsovårds- overläkare.

Figur 1. Antal barnhälsovårdsenheter som erbjuder 3, 4 eller 5 läkarbesök per barn under förskoleåldern.


Frågeformuläret bestod av information om organisatoriska frågor, hälsovårkullkningsprogrammet, bedömning av syn, hörsel och språk, föräldraröst, samverkan och datoriserad barnhälsovårdsjournal. Två påminnelser gjordes via e-post och därefter en via telefon. Detta resulterade i att alla 36 områden, 100 procent, besvarade frågeformuläret.

Data bearbetades i programmet Excel.

RESULTAT

Hemsökt till adoptivbarn erbjuds i 89 procent av områdena och till nyfylltade barnfamiljer i 47 procent. Ett anpassat basprogram för adoptivbarn erbjuds av 67 procent, och riktlinjer för omhändertagande av asyl- och flyktingbarn finns i 61 procent av områdena.

Vårdprogram för barn med fetma och övervikt förekommer i 89 procent av områdena, och i 27 procent av områdena ingen bedömning efter 8–10 månader. Som Tabell I visar är den mest använda evidensbaserade screeningmetoderna vid 2,5 alternativt 3 år. OAE erbjuds lokalformulär för föräldrarfrågor (50 procent), BOEL-test (31 procent) eller annat distraktionstest (12 procent) vid 8 till 10 månaders ålder. I två områden (6 procent) erbjuds ingen generell bedömning efter nyföddhetsperioden, och i 27 procent av områdena ingen bedömning efter 8–10 månaders ålder. Lekaudiometri vid 4 års ålder erbjuds i 67 procent av områdena.

Språkbedömning. Vid 2,5 alternativt 3 års ålder erbjuds alla barn i Sverige en språkbedömning, BVC-sjuksköterskan. Det är två evidensbaserade metoder som används: vid 2,5 år (Miniscaleco) [26] respektive vid 3 år (Westlerlund) [27]. Som Tabell II visar är det 24 områden, 67 procent, som använder de evidensbaserade screeningmetoderna vid 2,5 alternativt 3 år. Övriga, 33 procent, använder sig av dessa metoder i modifierad form eller av helt andra metoder.


Frågeformuläret sändes till samord- nande sjuk- sköterska/vårdutvecklare, som också ombads att besvara frågorna tillsammans med sin barnhälsovårds- överläkare.

Figur 1. Antal barnhälsovårdsenheter som erbjuder 3, 4 eller 5 läkarbesök per barn under förskoleåldern.


Frågeformuläret bestod av information om organisatoriska frågor, hälsovårkullkningsprogrammet, bedömning av syn, hörsel och språk, föräldraröst, samverkan och datoriserad barnhälsovårdsjournal. Två påminnelser gjordes via e-post och därefter en via telefon. Detta resulterade i att alla 36 områden, 100 procent, besvarade frågeformuläret.

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RESULTAT

Hemsökt till adoptivbarn erbjuds i 89 procent av områdena och till nyfylltade barnfamiljer i 47 procent. Ett anpassat basprogram för adoptivbarn erbjuds av 67 procent, och riktlinjer för omhändertagande av asyl- och flyktingbarn finns i 61 procent av områdena.

Vårdprogram för barn med fetma och övervikt förekommer i 89 procent av områdena, och i 27 procent av områdena ingen bedömning efter 8–10 månader. Som Tabell I visar är den mest använda evidensbaserade screeningmetoderna vid 2,5 alternativt 3 år. OAE erbjuds lokalformulär för föräldrarfrågor (50 procent), BOEL-test (31 procent) eller annat distraktionstest (12 procent) vid 8 till 10 månaders ålder. I två områden (6 procent) erbjuds ingen generell bedömning efter nyföddhetsperioden, och i 27 procent av områdena ingen bedömning efter 8–10 månaders ålder. Lekaudiometri vid 4 års ålder erbjuds i 67 procent av områdena.

Språkbedömning. Vid 2,5 alternativt 3 års ålder erbjuds alla barn i Sverige en språkbedömning, BVC-sjuksköterskan. Det är två evidensbaserade metoder som används: vid 2,5 år (Miniscaleco) [26] respektive vid 3 år (Westlerlund) [27]. Som Tabell II visar är det 24 områden, 67 procent, som använder de evidensbaserade screeningmetoderna vid 2,5 alternativt 3 år. Övriga, 33 procent, använder sig av dessa metoder i modifierad form eller av helt andra metoder.

Barnhälsovårdsjournalen. Drygt hälften (53 procent) av

Figur 1. Antal barnhälsovårdsenheter som erbjuder 3, 4 eller 5 läkarbesök per barn under förskoleåldern.
områdena använder sig av en datoriserad barnhälsovårdsjournal.

**Diskussion**


Svenska studier visar att hembesök ger en god möjlighet att identifiera risikobarn och familjer i behov av extra stöd [28]. Det har också visat sig att mödrar som fått hembesök tyckte att de fick prata mer i lugn och ro med BVC-sjuksköterskan, fick en större motivation att påbörja och bedöma utfall av nyupptäckta åtgärdsgrundade hälsoproblem fram till 18 månaders ålder. Utvärdering av mödrar och barnfamiljer har? Barnhälsovården is an upptäckta som bedömde utfall av nyupptäckta åtgärdsgrundade hälsoproblem fram till 18 månaders ålder visade att läkarundersökning efter 6 månader hade begränsat värde. Vi ifrågasätter att läkarens roll i barnhälsovården endast är att upptäcka somatiska hälsoproblem. För att kunna både identifiera och stödja barn med svårigheter i sin uppväxt, utvecklingsavvikelse, psykosociala problem krävs ett socialpediatriskt förhållningssätt i hela barnhälsovårdsstuden.


**Metoder för föräldrautbildning i grupp** vilar på den modell som togs fram då föräldrautbildningen infördes på 1980-talet. Överensstämma modellen fortfarande med de behov som dagens barnfamiljer har? Barnhälsovårdsenhetens metoder har blivit kritiserad för att inte nå pappor i tillräckligt stor utsträckning [34]. Avsaknad av utvärderingar har bidragit till att effekten av verksamheten är ofrågasatt, och mer strukturerade program har föreslagits [35]. I likhet med professionens egen kartläggning av det tidiga föräldrautbildet i grupp, anpassat till dagens föräldrar, inte att ersätta det med föreslagna strukturera program som tagits fram utifrån familjer med specifika problem.

**Arbetet med att tidigt identifiera** svenska länkHospital med depressive symtom är omfattande i de flesta områden. Trots att EPDS i dag finns översatt och validerat till ett jugo-

**Tabelli. Synbedömning vid 4 och 5–5,5 år**

<table>
<thead>
<tr>
<th>Metod</th>
<th>4 år</th>
<th>5–5,5 år</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVOT, N=34 (94 %)</td>
<td></td>
<td>HVOT, n=8 (100 %)</td>
</tr>
<tr>
<td>Annan, n=2 (6 %)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0,65 (53 %) 0,8 (47 %)</td>
<td></td>
<td>(0,8 (0 %) 0,8 (3) 3,0 (1) 4)</td>
</tr>
<tr>
<td>HVOT, n=8 (100 %)</td>
<td></td>
<td>Upptäckta saknas (1)</td>
</tr>
</tbody>
</table>

**Tabelll. Språk och talbedömning vid 2,5 alternativt 3-årsfonna**

<table>
<thead>
<tr>
<th>Metod</th>
<th>Ålder</th>
<th>Totalt, N=36</th>
</tr>
</thead>
<tbody>
<tr>
<td>Språkscreening vid 2,5 år (Miniscalco)</td>
<td>2,5 år, n=15</td>
<td>3 år, n=21</td>
</tr>
<tr>
<td>Språkscreening vid 3 år (Westerlund)</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Språkscreening vid 2,5 år – modifierad</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Språkscreening vid 3 år – modifierad</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Annan</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Totalt</td>
<td>15</td>
<td>21</td>
</tr>
</tbody>
</table>

»Läkarens roll i dethälsofrämjande arbetet är i dag starkt underutnyttjat och bör stärkas.«
Vi är bekymrade över att det i dag inte finns något officiellt dokument som reglerar Sveriges barnhälsovård.«

**REFERENSER**


**Kommenter**

Denna artikel på Lakartidningen.se


Rikshandboken i Barnhälsovård is a Swedish Web-based guide for child healthcare, providing quality-ensured guidelines and support contributing to equality in child healthcare among all children. In 2015, a new child healthcare program was implemented and made available in this Web-based guide. The aim of this study was to investigate how child healthcare nurses use Rikshandboken i Barnhälsovård and factors affecting its use. The study was a comprehensive Web survey of 2376 child healthcare nurses in Sweden answered by 1309. Statistical processing was performed using descriptive and analytical methods. Rikshandboken i Barnhälsovård was widely used by the respondents, but regional differences and number of years in the profession affected the use. Almost all nurses were satisfied with the usability, content, and design and felt that a national guide for child healthcare is important. This indicates that an established Web-based national guide is an appropriate setting when a new national program is implemented. In order to achieve an equal and equitable child healthcare, it is essential that all nurses use the national guide to provide evidence-based practice. The value of main child healthcare units as regional facilitators in the innovation process of Rikshandboken i Barnhälsovård should not be underestimated.

KEY WORDS: Child health, Decision support, Information technology, Innovation, Nurses

In 2006, the Swedish National Information Technology Strategy for Health and Social Care was published, declaring the need for implementation of information and communication technologies (ICTs) in healthcare organizations in order to provide safe and accessible care. Information technology–based knowledge support for professionals was highlighted. About the same time, a Web-based national guide, The National Guide for Child Health Care (in Swedish, Rikshandboken i Barnhälsovård, or RHB), was introduced to provide a current and quality-ensured knowledge base on young children’s health and development, as well as methods and guidelines for professionals in child healthcare (CHC). In 2015, a new Swedish national CHC program is available on RHB. Together, the guide and the program aim to create opportunities for an equal and equitable CHC to be offered across the whole country and contribute to evidence-based practice. An essential prerequisite to achieve these aims is that CHC professionals use RHB and the national CHC program. Even though the use of ICT in the healthcare sector is increasing, it is not advancing fast enough, according to several studies as well as the Swedish strategic plan for eHealth. For further implementation of the new program, it is important to examine the acceptability and usability of the Web-based guide as well as the factors influencing the adoption of such innovation.

Child Healthcare
Child healthcare, in any form, is available in most countries throughout the world, although its level and coverage vary. In Sweden, CHC is offered free of charge to all children from 0 to 5 years of age, and the participation rate is nearly 100%. The strategy for CHC is to provide a universal program on equal terms among all children in the country. This is an important basis for CHC that enables selective and indicated support to families and an equitable CHC. The different living conditions for families affect children’s health and can lead to differences in the child’s social status related to health, that is, the child’s social gradient. By providing universal, selective, and indicated support that is in proportion to the degree of vulnerability of families, the social gradient related to health can be reduced. The aim of CHC is to contribute to children’s physical, mental, and social health, promoting children’s health and development, preventing illness, identifying problems early, and initiating actions to counteract such problems. Child healthcare offers a combination of universal, selective, and indicated activities at CHC centers and via house calls, health guidance, health examinations, immunizations, and parental support. In 2008, the Swedish National Board of Health and Welfare (NBHW) rescinded its national instruction for CHC, and consequently, CHC was left without national guidelines.
This entailed each county council/regional board specifying its own requirements, tasks, and obligations in relation to CHC, complying more or less with the formal guidelines. Studies show that this autonomy for the county councils has led to regional differences resulting in a lack of equality and equity in CHC today.6,7 Each county council runs a main child healthcare unit (MCHCU) with at least one chief medical officer and a coordinating nurse (CHC coordinator). They work to improve local CHC by educating and supporting professionals at CHC centers. Annual follow-ups and evaluations of activities are conducted. The managers at CHC centers have a responsibility to ensure that the local CHC targets are met. The work at CHC centers is led by CHC nurses, who are specialists in either primary healthcare or pediatric care.8

Nurses and Internet Use
In relation to clinical decision-making processes, it is important that nurses are able to work in accordance with current guidelines, keeping abreast of new knowledge and having access to timely information.9-11 The Swedish National Strategy for eHealth10 states the need for healthcare professionals to have access to well-functioning electronic decision support mechanisms in order to ensure high-quality care and safety, as well as to facilitate the work. The term eHealth is used in the healthcare domain to refer to ICTs that allow the capture, storage, processing, and exchange of information plus communication via electronic means.10,12 Internet support facilitates speedy retrieval of health information, evidence-based practice, and patient education. According to O’Leary and Mhaolrúnaigh13 and Clarke et al.,14 nurses tend to rely heavily on their experiences or to ask colleagues for advice, rather than performing individual searches for information, although the use of Internet to search for information is increasing. This makes it relevant to investigate the use of the Swedish Web-based RHB, containing the most recent recommendations for professionals in CHC.

The Swedish National Guide for Child Health Care
The Swedish RHB8 was established in 2005 as a Web-based guide for professionals in CHC. Since 2012, it has also been mobile phone compatible because of a new, responsive design. The RHB aims to create opportunities for an equal and high-quality CHC to exist across the country, offering common guidelines to CHC professionals. The RHB began as the initiative of the Swedish Paediatric Society. Initially, the RHB was a password-protected Web site, exclusively for professionals, available via a previous Web site for parents. Inera, a company funded by the Swedish Association of Local Authorities and Regions, is in charge of coordinating Swedish eHealth work, and it took over the responsibility for the RHB in 2011. At that time, the RHB was given its own open-access Web site, www.rikshandboken-bhv.se.

The RHB contains a program for CHC, knowledge base, methodological guidance, educational materials, information for parents, and references with links to further reading. It has been written and developed by authors with different specialties: pediatricians, CHC nurses, psychologists, speech therapists, nutritionists, and others, all invited to contribute by an editorial board consisting of representatives from the county councils’ MCHCUs. All the content is based on the United Nations Convention on the Rights of the Child, laws, general advice, national guidelines, and current policies. It is continuously updated and is written to reflect the latest evidence-based policies, experience-based knowledge, and consensus discussions.2

The use of the RHB has increased fivefold in 3 years. The number of individual visits to the Web site during the period January 1 to July 31, 2012, was 103,645, whereas during the same period in 2013, the figure was 297,295, rising to 517,097 in 2014 (statistics provided by the chief editor of RHB). Although the RHB is a Web site with open access, it is primarily aimed at the professionals in CHC, and the majority of visits can be attributed to the 2376 nurses who were working at the CHC centers at the time of the study.

In April 2014, the NBHW published new guidance for CHC. This is intended to provide general descriptions and frameworks for CHC,15 whereas the RHB gives concrete advice for CHC professionals in their everyday work. Representatives from the county councils’ MCHCUs have worked in collaboration with the NBHW to develop a new national CHC program, which has been available on the RHB since autumn 2014 and will be implemented in the county councils across the country during 2015-2016. Together, these tools provide a common basis for CHC, with the aim of creating an equal and equitable CHC and contributing to evidence-based practice.9 Accessibility to the RHB and the acceptability and usability for this structured support service during daily work at CHC centers have not yet been studied. This information must be important, considering that RHB has been chosen as the setting for the new national CHC program.

Implementation and Innovation
The RHB is not a new Web-based guide, but it could be perceived as new by individual CHC nurses who have not previously encountered the Web site. It would therefore represent an innovation for them. An innovation is an object, idea, or practice that is apprehended as new by its users.16 In innovation research, implementation refers to the efforts that are made after a decision about the introduction of an innovation.17 Thus, the implementation of the RHB may be seen as one stage in a longer process that has the end goal to integrate the innovation of RHB into...
everyday work. Using a theory of innovation can give an explanation and facilitate the understanding why a particular result is obtained by the diffusion of RHB. Rogers'\textsuperscript{17} Diffusion of Innovation Theory is a widely used theoretical framework especially in dissemination of technological diffusion and adaption. According to Rogers,\textsuperscript{17} individuals such as CHC nurses can be in different stages: the knowledge stage, persuasion stage, decision stage, implementation stage, or the confirmation stage, in relation to an innovation process. In the context of the RHB, the innovation-decision process starts with knowledge of the Web site’s existence. In the persuasion stage, the CHC nurses must be convinced of the value of the RHB. This leads to a decision to use the Web site, which creates the foundations for the implementation stage, in which the CHC nurses must find a use for RHB in everyday working life in order for it to be accepted. Depending on the success of the innovation process, the CHC nurses will then decide whether to use the system fully or whether to abandon it altogether.\textsuperscript{17}

According to Rogers,\textsuperscript{17} CHC nurses’ decisions about whether to adopt the RHB can be influenced by a number of factors. One consideration is the degree to which the RHB is perceived as better than the local guidelines that are available on internal Web sites or in print, which RHB is supposed to supersede. Another influencing factor is whether the CHC nurses find that the RHB actually fulfills their requirements for a common Web-based guide. Other points include CHC nurses’ existing values, their experiences with the RHB, and ease of use of the Web site. Limited opportunity to experiment with the RHB also influences adoption, as well as the extent to which the innovation provides tangible results—in this case, an equal CHC. The functions and availability of the RHB are communicated through a number of channels: MCHCUs, RHB newsletters, and word of mouth in a social system of CHC centers and county councils. According to Rogers,\textsuperscript{17} opinion leaders claim informal leadership, have a unique position in their systems’ communication structures, and are able to influence other individuals’ attitudes toward the RHB. Change agents, who act as a bridge between technical experts and their clients, work proactively to create demand for the RHB, reducing barriers, supporting adoption decisions, and persuading adopters (ie, nurses).\textsuperscript{17}

Several studies have explored different factors influencing the implementation of ICT and Internet use in healthcare.\textsuperscript{13,15,16–20} Such implementation is influenced by various factors, including availability, clinical relevance, attitudes, time set aside for the purpose, and knowledge of how information can be sought online. When looking at the use of ICT from an organizational perspective, a key component for successful information technology adoption in healthcare organizations is the engagement of clinical leaders in the process as well as the culture, structural and electronic resources, and a supportive environment.\textsuperscript{16,20} For the end users, the design and usability are crucial factors in the acceptance and use of new technological innovations.\textsuperscript{13,18}

As the new national CHC program is introduced, it is important to note that this could also be perceived as an implementation of an innovation: the RHB. The prerequisite for utilizing the new national CHC program is the use of RHB content and the methods it provides. Prior to the implementation of the new national CHC program, it is important, therefore, to gain a deeper understanding of how the RHB is used for knowledge acquisition and methodological guidance, as well as of the frequency of use. The aim of this study was to investigate how nurses in CHC use the RHB and factors affecting its use.

**METHODS**

**Participants**

The study was a comprehensive Web survey\textsuperscript{21} conducted from May to September 2013, including all the nurses working at CHC centers in Sweden at the time (2376 people). E-mail addresses for the nurses were collected from the MCHCUs in each of the 21 county councils/regions. An information letter was sent to all CHC center managers. If the center manager did not decline to participate, then the CHC nurses were sent an e-mail request to take part in the survey. Four reminders were sent by e-mail. A nonresponse analysis\textsuperscript{22} was conducted through telephone interviews with 20 randomly selected nurses who had not responded.

**Data Collection**

A Web questionnaire,\textsuperscript{23} developed in the online survey tool Textalk Web Survey (Textalk AB, Mölndal, Sweden), was used. The questionnaire contained 28 questions with structured response options, including single, multiple choice, and scale questions.\textsuperscript{22} In seven questions, an opportunity to add comments was provided. The questionnaire consisted of three parts: background variables and questions about the respondents’ computer and Internet use, questions about the acquisition of knowledge and methodological guidance, and questions about the use of RHB and the factors that respondents felt were relevant for the use of a Web-based national guide for CHC. Questions about the accessibility of RHB as well as the Web site’s content, design, and its usability were included. To strengthen the validity and reliability of the survey, several questions were taken from or based on a relevant selection of the questions used in the Swedish version of the WIP Common Questions used in the World Internet Project (http://www.Internettstatistik.se/wordpress/wp-content/uploads/2015/08/CommonQuestions-Bogota2013.pdf). A pilot test of the Web questionnaire was conducted using five respondents working in CHC, which
led to minor changes being made prior to sending it to the participants in the study. Each questionnaire was coded with an identification number to identify the study participant.

**Data Analysis**

Data analysis was performed using SPSS 22.0 (IBM, Armonk, NY). Statistical processing of the results was performed using descriptive and analytical methods. The descriptive variables were analyzed with proportion analysis and crosstabs. A $\chi^2$ test was used to determine whether the relationships that emerged in the crosstabs were statistically significant. A backward logistic regression was conducted to determine whether independent variables influenced the frequency of RHB use by CHC nurses.

**Ethical Considerations**

An advisory statement was obtained from the Ethical Review Committee of the Southeast (Dnr. EPK 160-2013). The present study was conducted in accordance with the ethical principles for the humanities and social sciences. All the participants received information by letter about the study, which guaranteed confidentiality and indicated that participation was voluntary and could be terminated at any time.

**RESULTS**

The results are presented in accordance with the three parts of the questionnaire: background variables and questions about the computer and Internet, questions about the acquisition of knowledge and methodological guidance, and questions about the use of the RHB and factors that the respondents felt were relevant for using a Web-based national guide for CHC.

The questionnaire was answered by 1309 CHC nurses, a response rate of 55%. The number of missing values in the questionnaire was less than 1%. Only seven of the respondents were male; thus, no comparison between the sexes was made. The six healthcare regions were represented to different degrees (Table 1). The majority of the CHC nurses who participated belonged to the age group 41 to 50 years (Table 1). Because only 12 of the nurses belonged to the youngest age group, 21 to 30 years, this group was combined with the 31- to 40-year age group in the analysis. The nurses’ experience of working in CHC ranged from less than 5 years to more than 20 years (Table 1). Almost all the nurses had access to a computer with an Internet connection at home and at their CHC center (Table 1). The majority used the Internet almost every day either at work or for leisure purpose. Only a few nurses had access to the Internet via smartphones at work.

The county council-run MCHCUs were the most commonly used source of knowledge and methodological guidance for the CHC nurses’ work (Table 2). The other four most common sources were colleagues, Internet, one’s own experience, and internal Web sites/intranet systems. On the Internet, the most common Web site used by CHC nurses to obtain knowledge was the RHB (94%). The RHB was also the Web site used most often for methodological guidance (88%). Other Internet sources included various government-run and official Web sites.

The existence of a common guide for all professionals working in CHC in Sweden was considered to be important or very important by 99% of the CHC nurses. This answer did not differ between those who were low-frequency or high-frequency users of the RHB. Nearly all the respondents (98%) also thought it was important or very important to have a common national CHC program.

The RHB was used by 99% of the CHC nurses in varying frequencies (Figure 1). Of the low-frequency users, 86% ($P \leq 0.05$) used the Internet nearly every day, and 63% ($P \leq 0.05$) used the Internet to search for knowledge related to their CHC work. The low-frequency users of the RHB were more likely to use their experience to obtain knowledge (77%) ($P \leq 0.05$) than the CHC nurses who were high-frequency users.

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**Table 1. Variables From the Questionnaire, Which Were Included in This Study**

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>n = 1309, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare regions</td>
<td></td>
</tr>
<tr>
<td>Southern healthcare region</td>
<td>335 (26)</td>
</tr>
<tr>
<td>Southeastern healthcare region</td>
<td>156 (12)</td>
</tr>
<tr>
<td>Western healthcare region</td>
<td>211 (16)</td>
</tr>
<tr>
<td>Stockholm/Orebro</td>
<td>184 (14)</td>
</tr>
<tr>
<td>Northern healthcare region</td>
<td>140 (11)</td>
</tr>
<tr>
<td>Age groups, y</td>
<td></td>
</tr>
<tr>
<td>21-30</td>
<td>12 (1)</td>
</tr>
<tr>
<td>31-40</td>
<td>251 (19)</td>
</tr>
<tr>
<td>41-50</td>
<td>442 (34)</td>
</tr>
<tr>
<td>51-60</td>
<td>421 (32)</td>
</tr>
<tr>
<td>61-70</td>
<td>183 (14)</td>
</tr>
<tr>
<td>Experience as a CHC nurse, y</td>
<td></td>
</tr>
<tr>
<td>&lt;1-5</td>
<td>467 (36)</td>
</tr>
<tr>
<td>6-15</td>
<td>502 (38)</td>
</tr>
<tr>
<td>16 to &gt;20</td>
<td>340 (26)</td>
</tr>
<tr>
<td>Use of computer and Internet</td>
<td></td>
</tr>
<tr>
<td>Access to a computer with Internet connection at home</td>
<td>1271 (97)</td>
</tr>
<tr>
<td>Access to a computer with Internet connection at CHC center</td>
<td>1307 (100)</td>
</tr>
<tr>
<td>Using Internet almost every day at work or at home</td>
<td>1203 (92)</td>
</tr>
<tr>
<td>Access to Internet via smartphones at work</td>
<td>112 (9)</td>
</tr>
<tr>
<td>Have received computer training</td>
<td>829 (63)</td>
</tr>
<tr>
<td>Have received training in Internet use</td>
<td>349 (27)</td>
</tr>
</tbody>
</table>
(67%) \( (P \leq 0.05) \). The respondents with the least amount of experience as CHC nurses used the RHB most frequently; the frequency decreased with increasing time in the profession. Respondents with the longest experience were the least frequent users of the Internet to obtain knowledge. However, when they did use the Internet, the Web site that they used most frequently was the RHB. The proportion of high-frequency users ranged from 38% in Stockholm/Gotland healthcare region to 55% in the Southeastern healthcare region. A multivariate analysis (Table 3) using a backward logistic regression showed a higher odds ratio for low-frequency usage of the RHB if the CHC nurses belonged to the Southern, Northern, or Stockholm/Gotland healthcare region or had longer experience in their profession.

The main reasons for using the RHB were to confirm existing knowledge (86%) and to seek new knowledge (83%). Less important was obtaining methodological guidance (53%). Of the organizational factors, time required to access the system (79%), support from the CHC coordinator (62%), and support from CHC center managers (61%) were considered to have high or very high importance in relation to the use of RHB. Less important was to have access to RHB via mobile phone or tablet. Approximately half (54%) of the CHC nurses found this was of little or no importance.

The results showed that most of the CHC nurses were satisfied with the RHB’s usability, content, and design. Almost all of the nurses trusted the information on the RHB and considered RHB content to be of high quality. Fewer nurses were satisfied with the usability of the functions as one-third of the nurses did not feel it was easy to find what they were looking for on the RHB (Table 4). More than 85% of the nurses considered the print-out function, information for parents, educational materials, and overview of the CHC program as the most important components on RHB to use the Web site. Links to databases for information seeking were considered as important for 77% of the nurses. Less important were references for further reading (70%), ability to read frequently asked questions about CHC (70%), link to

<table>
<thead>
<tr>
<th>Table 2. The Five Most Common Sources Used to Gather Knowledge and Methodological Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>Main CHC unit</td>
</tr>
<tr>
<td>Colleagues</td>
</tr>
<tr>
<td>Internet</td>
</tr>
<tr>
<td>Own experience</td>
</tr>
<tr>
<td>Internal Web site/intranet system</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 3. Factors Related to Low-Frequency Use of RHB by CHC Nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables</td>
</tr>
<tr>
<td>Southeastern healthcare region</td>
</tr>
<tr>
<td>Southern healthcare region</td>
</tr>
<tr>
<td>Western healthcare region</td>
</tr>
<tr>
<td>Stockholm/Gotland</td>
</tr>
<tr>
<td>Uppsala/Orebro</td>
</tr>
<tr>
<td>Northern healthcare region</td>
</tr>
<tr>
<td>Age group 21–40 y</td>
</tr>
<tr>
<td>Age group 41–50 y</td>
</tr>
<tr>
<td>Age group 51–60 y</td>
</tr>
<tr>
<td>Age group 61–70 y</td>
</tr>
<tr>
<td>&lt;5 y in the profession</td>
</tr>
<tr>
<td>6–15 y in the profession</td>
</tr>
<tr>
<td>16 to &gt;20 y in the profession</td>
</tr>
</tbody>
</table>

**Abbreviations:** CI, confidence interval; OR, odds ratio.

OR value indicates risk to belong to the group who used RHB less than once a month.

<table>
<thead>
<tr>
<th>Table 4. CHC Nurses Satisfaction With Usability, Content, and Design of RHB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction With Usability, Content, and Design</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>RHB almost always has the information that is needed</td>
</tr>
<tr>
<td>Trust that the information on RHB is correct</td>
</tr>
<tr>
<td>RHB’s content is of a high quality</td>
</tr>
<tr>
<td>The information is pedagogical and easy to interpret</td>
</tr>
<tr>
<td>Satisfaction with the Web site’s appearance</td>
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<td>Easy to find requested information</td>
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**FIGURE 1.** Child healthcare nurses’ use of RHB.
the county councils local guidance (69%), and instructional videos for professionals (68%).

DISCUSSION
The aim of this study was to investigate CHC nurses’ use of the RHB and factors that affect its use. The results show that the RHB is used by nurses in all healthcare regions; they are satisfied with the Web site and considered it to be important with a common guide for CHC. The factors that influence their use of the RHB were also revealed.

The majority of the CHC nurses use the Internet almost every day, either at home or at work. Even the Annual Study of Swedish People’s Internet Habits 2014 shows that Sweden is one of the countries with the highest number of Internet users—more than 90% of people between 6 and 65 years old and 79% in the age group 66 to 75 years. The CHC nurses in this study used the Internet neither more nor less than the general population; hence, a lack of computer and Internet experience should not be a barrier to their use of the RHB. The majority of CHC nurses pointed out that time was an important factor in relation to their use of the RHB. A lack of time is a large barrier to the utilization of online services, as identified in previous studies.

In recent years, access to the Internet via smartphones and tablets has increased, complementing desktop and laptop computers. According to Moore and Jayewardene, the use of smartphones is increasing in healthcare, and their potential benefits are recognized by healthcare professionals. Even if the RHB is mobile phone compatible, this facility could be used by only a few of the nurses, as smartphones were not available at work. More than half of the nurses considered that such solutions had no or small importance for the use of the RHB. When 73% of the Swedes today are using smartphones and 69% connecting to Internet via smartphones, these results are surprising and raise questions why CHC is lagging behind in this area of ICT. These conditions may explain why Swedish nurses have not discovered the RHB’s full potential benefits yet. Because the RHB is mobile compatible, a tablet or a smartphone could have great significance for CHC nurses, making access to the RHB Web site possible during house calls and at parent groups and thereby use knowledge-based information, guidelines, and educational materials. To support the nurses’ adoption process from persuasion to decision and usage of the RHB in smartphones or tablets, it is of great importance to improve the usability, as well as giving nurses information on the use of the RHB and access to the Web site via mobile solutions such as smartphones and tablets at work. This should be the responsibility of the MCHCU and the managers at CHC centers. Difficulties in searching for information on the Internet depending on limited access to computers and a lack of experience/skills were not evident in this study, contrary to other studies.

Even though there were more high-frequency than low-frequency users of the RHB in all the healthcare regions, and the Web site was stated as being the most utilized Internet resource for acquiring knowledge and methodological guidance, there were differences in the nurses’ use of the RHB, evident at both the individual and regional levels. This is an interesting result, as previous studies have shown that there are regional differences resulting in a lack of equality and equity in Swedish CHC. The differences in rates of adoption for the RHB in different healthcare regions cannot be explained only by individuals’ behavior. The social structure of CHC affects the diffusion of the RHB in several ways; the norms, the roles of opinion leaders and change agents, the types of innovation-decisions, and the communication structures have an impact. According to Nilsson et al., there are three social challenges in the implementation of electronic information systems. The first is “power” with change of existing hierarchy and alienation. The other is the “professional identity” in which nurses’ call and being experts in nursing but novices in information systems lead to problems with their identity. The third social challenge, “encounter,” is characterized by poor introductions of electronic information systems and nurses’ preconceptions based on previous bad experiences with such systems. This highlights the importance of facing the challenges and continued local efforts in county councils/regions to remove barriers and facilitate the use of RHB, especially so that the new CHC program can be followed.

The results indicate that the MCHCUs are the sources which most of the respondents use for knowledge acquisition and methodological guidance. Furthermore, support from the CHC coordinators is an important factor in relation to CHC nurses’ use of the RHB. These findings indicate that MCHCUs play a significant role in influencing nurses’ attitudes toward the use of the RHB. Although the MCHCUs do not have personnel-related or operational responsibilities, they work closely with the CHC nurses and center managers for continued improvement, support, and education. This places high demands on MCHCUs to keep abreast of research and development in the field, which requires staff availability and expertise. In addition, the MCHCUs have a responsibility to disseminate knowledge, provide support, facilitate the use of RHB, and remove barriers in their county councils/regions, as opinion leaders and change agents. Further consideration of the role of MCHCUs and CHC coordinators as opinion leaders and change agents in future studies—and, in particular, of their potential to ensure the diffusion of the RHB and the implementation of the new CHC program—must be very valuable in providing a deeper understanding of technology innovation processes connected with new technologies in CHC.
The CHC nurses in this study stated that they tend to rely on their experience or to ask their colleagues when seeking knowledge and methodological guidance in their work, which is consistent with results of previous studies on information retrieval by O’Leary and Mhaolrúnaigh and Clarke et al. At the same time, the CHC nurses considered references to further reading and links to databases for information retrieval as important for their usage of the RHB. In recent years, there has been a considerable focus on the use of evidence in health care. A literature review by Clarke and Phipps indicated that nurses are concerned that colleagues’ recommendations may not be evidence based. The findings of this study raise questions about whether the results point to a change in nurses’ attitudes when it comes to seeking evidence within their work. The CHC nurses turn to the RHB to acquire knowledge and methodological guidance. Prepackaged guideline formats can make research-based evidence more accessible to nurses. This places high demands on RHB management to improve and update the Web site continually when new knowledge emerges, thus enabling CHC nurses to trust the content. Even if a high percentage of the CHC nurses were satisfied with the content, that the RHB almost always has the information that they needed, and that the information is pedagogical and easy to interpret, one-third of the nurses did not feel it was easy to find what they were looking for on the RHB or were satisfied with the Web site’s appearance. These are important areas of development. Otherwise, there is a risk that the confidence of the nurses in RHB will be lost, and the technology will no longer be accepted and used as intended.

The CHC nurses in the study with the most years in the profession tended to rely on their experience when it came to knowledge and methodological guidance, and they used the RHB less than less-experienced colleagues. However, when seeking information on the Internet, even this group preferred the RHB over other Web sites. This may indicate that it is not the RHB as such that constitutes a barrier, but rather the concept of using ICT and Web-based sources for information retrieval. The rather low use of RHB and tendency to rely on personal experiences among the CHC nurses in the study with the most years in the profession may indicate that these nurses believe that they do not need to search for knowledge and methodological guidance. One pitfall could be that these CHC nurses continue to work on the basis of outdated advice, without keeping abreast of developments in available knowledge; it is important to pay special attention to this group in the implementation of RHB and the new national CHC program. Regardless of the number of years in the profession, there are national and regional requirements for nurses to keep up to date with new knowledge and to work in accordance with current guidelines. The RHB represents a new technology, and the nurses may feel like beginners, although they are experienced in their profession.

This study was conducted as a comprehensive survey of all nurses working at CHC centers in all healthcare regions in Sweden at a particular time. The difficulty with a comprehensive survey is that it can be extensive and costly. The use of e-mail and Web surveys made it possible to conduct the survey in a reasonably cost-effective manner. The county councils’ MCHCUs provided contact information for all the CHC nurses and their managers, which was an important prerequisite for conducting a comprehensive survey. The response rate of 55% for this study can be considered acceptable to be a Web survey, according to Polit and Beck. As such, it can be supposed that a sufficient number of responses were received to give a reliable picture of CHC nurses’ use of RHB.

The pilot test of the Web questionnaire was conducted using five respondents who were known by the researcher, working as CHC nurses or at the MCHCUs, which required only minor changes in the questionnaire. A pilot test of more respondents who did not have a professional relationship with the researcher could have identified more weaknesses and provided more critical reflections to strengthen the validity. Several of the questions were based on relevant questions used in the Swedish version of Comment Questions used in the World Internet Project, which strengthens the construct validity. Possibly some questions could have been differently formulated to better capture the implementation barriers.

The external loss affects the validity of a study and, in this case, raises questions about how the CHC nurses who did not respond utilize the RHB. One potential area of bias that arises from the use of such a Web survey is that nurses who did not answer the questionnaire might not use the computer and Internet as much as their colleagues. Nonusers of the RHB would be representative, therefore, of the external loss. There was no indication in the failure analysis of a skewed distribution, however, which supports the reliability of the results. Failure analysis via telephone interviews showed that the most common reason for CHC nurses not responding to the survey was a lack of time. Another reason was the receipt of requests to complete a number of other surveys. The questionnaire was sent during the summer holiday period, which may also have affected the response rate. Some of the nurses on the list had also ceased to work in CHC, which could be a source of external loss (ie, a number of those targeted did not actually belong to the target group any longer).

The tool Textalk Web Survey showed that 95 of the nurses began to fill out the questionnaire but failed to reach the completion and submission stages. The initial focus on several questions about background variables may have
contributed to this discontinuation. Placing the questions in a different order, therefore, may have increased the response rate. The length of the questionnaire may have also contributed to the external loss.

Rogers'17 Diffusion of Innovation Theory was used as a theoretical framework for the study. There are also other theories and models used to understand innovation, implementation, and adoption of technology in healthcare. To bridge the gap between these, an all-encompassing, integrated technology implementation model has been developed by Schoville and Titler29 in 2015. The integrated technology implementation model is composed of 12 concepts in inner and outer organizational contexts to explicate factors that affect technology implementation in healthcare settings.28 The concepts are adoption, implementation, nature of the innovation/technology, interfacing systems, workflow, users (adopters), leadership, communication, accreditation/registration, economic environment, facilitators (boundary spanner), and vendor. The integrated technology implementation model could be useful in further in-depth studies about facilitators’ role in an innovation process in healthcare, as well as studying how the CHC nurses think that the RHB can be developed to best meet their needs regarding content, usability, and design.

CONCLUSIONS

The RHB is widely used by CHC nurses in Sweden, and the nurses who use this Web-based national guide were satisfied with its usability, content, and design. Almost all felt that it is important to have a national guide for CHC. The result indicates that such an established Web-based guide is an appropriate setting when a new national program is implemented, but it demands continual improvements and updates to the Web site to make new knowledge easy to find. Implementing national guidelines and programs on a Web-based guide is a technical innovation where usability and design are crucial factors in the acceptance and use. In addition, the low use of the RHB via smartphones indicates that availability to new technologies as mobile solutions is an important prerequisite for the use of Web-based guides in their full potential. In order to achieve an equal and equitable CHC, it is essential that all CHC nurses use the national guide to provide evidence-based practice. The value of MCHCUs as regional facilitators in different stages in an innovation process should not be underestimated. To gain a deeper understanding, further research with qualitative studies should focus on end-user request on Web sites content, usability, and design, as well as on the facilitator’s role in an innovation process in healthcare.

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References

Implementation of a web-based national child health-care programme in a local context: A complex facilitator role

JOHANNA TELL, EWY OLANDER, PETER ANDERBERG & JOHAN SANMARTIN BERGLUND

Department of Health, Faculty of Technology, Blekinge Institute of Technology, Sweden

Abstract

Aim: The aim of this study was to investigate child health-care coordinators’ experiences of being a facilitator for the implementation of a new national child health-care programme in the form of a web-based national guide. Methods: The study was based on eight remote, online focus groups, using Skype for Business. A qualitative content analysis was performed. Results: The analysis generated three categories: adapt to a local context, transition challenges and led by strong incentives. There were eight subcategories. In the latent analysis, the theme ‘Being a facilitator: a complex role’ was formed to express the child health-care coordinators’ experiences. Conclusions: Facilitating a national guideline or decision support in a local context is a complex task that requires an advocating and mediating role. For successful implementation, guidelines and decision support, such as a web-based guide and the new child health-care programme, must match professional consensus and needs and be seen as relevant by all. Participation in the development and a strong bottom-up approach was important, making the web-based guide and the programme relevant to whom it is intended to serve, and for successful implementation. The study contributes valuable knowledge when planning to implement a national web-based decision support and policy programme in a local health-care context.

Key Words: Child health care, facilitators, ICT, decision support, guidelines, implementation

Introduction

Implementation of information and communication technology (ICT)-based guidelines as decision support could contribute to nurses’ delivering safe and good-quality health care [1]. The use of clinical practice guidelines was facilitated when they were made available over the Internet [2]. The Swedish Rikshandboken (RHB; www.rikshandboken-bhv.se) is a web-based national guide for personnel in child health care (CHC). RHB is widely used, but regional differences and nurses’ experiences of their profession have been shown to affect its use [3]. Since 2015, a new national CHC programme is part of the RHB platform, and it is in the process of being implemented in all county councils/regions in Sweden.

Implementation of a CHC programme in a local context may cause challenges [4–6], which is why successful implementation is crucial and the role of a facilitator is so important [5,7].

In Sweden, CHC is an important health-promotion setting, offering a combination of universal, selective and indicated activities: health guidance, health examinations, immunisations and parental support (8). The strategy is to provide a CHC programme that is free of charge, on equal terms, to all children 0–6 years of age [8] according to the Swedish public health policy emphasising equality and equity in health care [9]. The Swedish local governments are responsible for implementing
The aim of this study was to investigate CHC coordinators’ experiences of being a facilitator for the implementation of a new national CHC programme in the form of a web-based national guide.

Methods

Study design

The study was a comprehensive survey using online focus group (FG) interviews [15] with CHC coordinators in Swedish county councils/regions. The FGs were conducted in two series of four FGs, one year apart. The first four FGs were conducted in 2014 before the introduction of the new national CHC programme, and the last four in 2015 when the implementation process had progressed further.

Participants

An information letter with an invitation to participate was sent to all 36 CHC coordinators in all 21 county councils/regions in Sweden. County councils/regions with more than one CHC coordinator were asked to choose one of them to attend. In total, 18/36 CHC coordinators from 15 county councils/regions agreed to participate. At each series of FGs, 14 respondents participated. Ten of these attended in both series. In 2014, four respondents participated in the first FG, two in the second, five in the third and three in the fourth. In 2015, three respondents participated in the first FC, five in the second, three in the third and three in the fourth.

Data collection

FGs were chosen to obtain a broad sense of how the subject was perceived in a group of people with a common background of experience [16]. The FGs were conducted synchronously online [15] via Microsoft Lync/Skype for business. The participants and the moderator could see and hear each other using microphones, speakers and a webcam, which supported interaction similar to that of a traditional face-to-face FG interview setting [15]. A semi-structured interview guide [17] was used with open questions about RHB, the implementation of the CHC programme placed on RHB, and the CHC coordinators’ role as facilitators in the implementation process. The FGs lasted one hour, with rich and open-minded discussions, led by the researcher. They were audiotaped and thereafter transcribed verbatim. An observer attended the FG and took notes to document technical issues as well as interesting discussions and ambiguities to follow up.

Data analysis

Qualitative content analysis with manifest and latent analysis was used [18]. The transcript was read several times to get a better understanding of the challenges, shows the importance of in-depth studies and specific knowledge of implementation changes. This important task, together with the above-mentioned special circumstances and specific knowledge of implementation challenges, shows the importance of in-depth studies to gain a better understanding of the MCHCU’s role in the process.

In an innovation and implementation process, facilitators are important actors [7,14] to help individuals, teams and organisations put evidence into practice. The Theory of Diffusion [14] highlights the importance of intermediary actors as opinion leaders, change agents and gatekeepers for successful adoption and implementation. The MCHCUs are perceived by CHC nurses as their facilitators to disseminate knowledge, provide support and remove barriers [3]. As use of the web-based CHC programme is important to achieve an equal CHC and the MCHCUs are facilitators in the implementation process, it is important to increase awareness of their role, as well as the challenges and promoting factors with which they are faced.

The aim of this study was to investigate CHC coordinators’ experiences of being a facilitator for the implementation of a new national CHC programme in the form of a web-based national guide.
times to create an overall image. The text was divided into meaning units by content and context. Thereafter, these were condensed, coded and grouped into categories with subcategories expressing the manifest content of the text. In the latent analysis, the underlying meaning through condensed meaning units, codes and categories was formulated into a theme.

**Ethical considerations**

The study was conducted in accordance with the ethical principles for the humanities and social science [19]. Basic ethical requirements for individual protection, information requirements, consent requirements, confidentiality and use requirements were considered. The participants received a written informed consent letter with information about the study, confirming confidentiality and voluntary participation, which could be terminated at any time. Before the interview started, this information was repeated, and the CHC coordinators were asked for consent. An ethical self-evaluation was made, and an advisory statement was obtained from the Ethical Review Committee of the Southeast (Dnr EPK 226-2014).

**Results**

In the facilitator role for the implementation of a new national CHC programme in the form of a web-based national guide, the CHC coordinators dealt with different aspects that sometimes opposed each other. Strong incentives as well as local circumstances and possibilities to influence affected the task. In the manifest analysis, three categories emerged, with eight subcategories. In the latent analysis, the theme ‘being a facilitator: a complex role’ evolved (Figure 1).

**Being a facilitator: a complex role**

The theme ‘being a facilitator: a complex role’ evolved in the latent analysis through the CHC coordinators’ expressions of contradictory experiences, challenges, possibilities, incentives and support of being facilitators for the implementation of the new national CHC programme in a web-based national guide. The CHC coordinators could be perceived as being advocates and mediators, and in these roles they could even be perceived to be fighters. On one hand, they had the task of implementing a new CHC programme in their county councils/regions. On the other hand, they did not have the mandate to make decisions on the allocation of necessary resources, were questioned and had to fight for the CHC. The CHC coordinators struggled with the ambivalence of closing down the local guides and doubts about certain parts of the CHC programme. Despite this, they emphasised the importance of the implementation of the national programme as a whole in order to achieve an equal CHC. The CHC coordinators were supposed to be a support for others, but they experienced insufficient support in their facilitator role and in the implementation process. All this made the role complex and contradictory.

It takes a while before you realise what the task looks like. It is so complex! ... There are large and small things, at all levels and in different contexts. The roads forward look different. (R1)

**Adapt to a local context (category 1)**

**Favourable preconditions are essential.** Favourable preconditions for the implementation made it easier to transform RHB and the CHC programme to a local context. In addition, favourable attitudes within the organisation, statements from the local primary health care to use RHB and the new CHC programme, and withdrawal of local guidelines supported implementation. These aspects, as well as the new programme being relatively similar to the previous local programme, strengthened the implementation. Implementation was easier in a small county council with personal knowledge of other actors.
Facilitating the implementation of a new national CHC programme in a web-based national guide

We can’t see any major difficulties in our county council … We are a small county council, and we know everyone who works here. The majority are positive … I feel that it is easy in our county council based on our preconditions. (R2)

Flexibility to circumstances. As facilitators, the CHC coordinators tried to find flexible solutions for a gradual implementation of the national CHC programme. A lack of resources was a central barrier. They worked with various efforts and degrees of support. This affected the progress and led to differences in adoption between the county councils/regions. Progress could be seen, experienced as a result of the facilitators’ ability to make adjustment to local circumstances.

We have written a guide for the introduction and how children born in different years may be part of the new program … And we find flexible solutions. (R3)

Advocating and mediating. A vital facilitator activity was to advocate the use of RHB and the CHC programme, and mediate between different interests in the county councils/regions. To create an understanding and an influence on local policy documents, personnel, politicians and managers, facilitators advocated in different ways – demonstrating, informing, reminding, referring and linking to RHB – and at different levels in the organisation.

When I started as a CHC coordinator I was struck by that you are working on so many different levels; on the CHC centre with practical everyday issues, with meetings and dialogues with managers, the management on the county council and our politicians. (R1)

Transition challenges (category 2)

Lacking a mandate. The CHC coordinators felt that they needed to fight for CHC and that child health promotion was not prioritised to the same degree as disease-oriented efforts. The importance and amount of adaptation due of the CHC programme was contested by managers, as the programme is a recommendation and not mandatory for the county councils/regions to follow. Having the task of implementing the CHC programme but no mandate to make decisions on the needed resources aroused frustration in the facilitators. These experiences and insufficient support from managers and NBHW raised requests for a national implementation plan.

We are expected to implement the program but have no decision-making mandate. That makes it difficult sometimes (R4).

Yes, you always need to remind [the management] that CHC is important. Primary health care has such a broad mission … We really fight for our CHC. (R5)

It needs to be fought for. (R1)

Handling own doubts. Not all CHC coordinators were convinced about all parts of the CHC programme that they were supposed to implement. Their doubts were about, for example, visits, house calls and attending professionals. There were also doubts about how to weigh universal efforts against targeted activities, and there was ambivalence about shutting down the local guidelines in favour of RHB. Such doubts were experienced as a dilemma and a challenge that the coordinators needed to struggle with in their facilitator role.

Personally, I doubt a general house call at 8 months of age … It feels like we spend more time on the universal than the targeted activities … It is a dilemma difficult to manage. (R6)

Difficult not to influence when you are in doubt. (R7)

Led by strong incentives (category 3)

ICT: a valuable resource. The web-based RHB was perceived as a valuable resource both for the facilitators and the CHC personnel, which was a strong incentive for promoting its use. As facilitators, their task was eased by being able to refer to a national web-based guide, used in all county councils/regions. Enhanced use of RHB as an ICT tool was suggested to improve both facilitator and personnel support, for example discussion forums, videoconferences and e-learning.

It is also very helpful for us at the MCHCU. It is the same guidelines, and we will hopefully send the same message. We can refer to RHB. It will help and support us all. (R8)

Confidence and pride. Other strong incentives were the confidence and a sense of pride of RHB as the CHC’s ‘own’ guide, developed by CHC professionals and ‘with the feet on the ground’. Central for being used and referred to, CHC coordinators expressed expectations on high quality, credibility and trust in RHB, its contents and organisation. Important for confidence was a RHB based on evidence-based practice, a health promotion approach and being continually updated.

I'm satisfied with RHB. The Editorial Board is linked to the CHC, as well as reviewers and authors … it’s an
incredible strength that it is like that. They have their feet on the ground which makes RHB very credible. (R3)

Equal and equitable CHC. Convictions on children’s right to an equal and equitable CHC were strong incentives for facilitating RHB use and implementing the CHC programme. The CHC coordinators expressed strong beliefs and expectations that RHB and the CHC programme could ensure equal opportunities for CHC, if used and followed in all county councils/regions. Hereby the CHC coordinators also saw the possibility of reducing differences in health and enabling children to be healthy.

It increases the possibility of an equal CHC throughout the country. And it ultimately can contribute to equal child health. (R9)

Discussion
As facilitators, and thus intermediary actors, the CHC coordinators had to a key role to play in the implementation of the CHC programme [3,7,14]. They had the necessary knowledge about the local context, and could take local-level interests into account. Thereby they could make adjustment to the circumstances [4,20] and make tailored interventions [21,22]. These are capabilities shown [4,20–22] to have positive effects on implementation and use of guidelines. The facilitator role differed between the various county councils/regions, as the possibilities of facilitating and influencing decisions could be a different challenge depending on the region. Advocating and mediating was a common and important part of the facilitators’ role in implementing a national programme in a local context.

The facilitators saw that disease-oriented efforts were prioritised before health promotion when resources were allocated in county councils/regions, something that has also been shown in previous studies [4–6,10]. This is a challenge in the facilitator task and a risk for unsuccessful implementation of the CHC programme. This obstacle must be taken in account when planning implementation of health promotion programmes in health care.

The experience of insufficient support from managers with personnel and operational responsibility is a dilemma, as support from leaders is crucial for successful implementation [2,6,7,20]. Without support from managers and the NBHW, the MCHCUs stand alone in their facilitator role, with a risk of a ‘mission impossible’. The World Health Organization [23] suggests both top-down ‘decisions’ and bottom-up ‘process’ perspectives when making action plans. A national implementation plan with economic incentives [13] would probably have been a support for CHC coordinators in their role as facilitators at the local level.

A positive attitude to RHB and the CHC programme was a favourable precondition that eased the facilitators’ role, as the attitude affected nurses’ use of ICT [7] and clinical practice guidelines [2,21]. An important task for facilitators is to influence other individuals’ attitudes [2,7]. This could be difficult for those who are struggling with their own doubts. For successful implementation, guidelines and decision support such as RHB and the CHC programme must match professional consensus, and it needs to be seen as relevant by all actors [7]. The doubts showed in the analysis, and the consequences of this need to be reflected on carefully.

To get the majority of CHC nurses to use the RHB was not seen as a problem to the facilitators, as the RHB was already widely used [3]. Still, according to Rogers’ innovation theory [14], the time needed for adoption can vary, and this is also the case in this implementation. In an implementation of innovation, an important facilitator task is to understand and meet end-users’ different needs [14]. The suggested further development of RHB as an ICT tool would probably contribute to an increased use of RHB, especially among the laggards [14] and facilitate the implementation of the CHC programme. E-learning could offer equal educational efforts to promote the use of clinical practice guidelines [2,21].

Confidence in RHB and the CHC programme were strong incentives in the facilitator role based on their participation in the development. The CHC coordinators’ involvement is important in making RHB and the programme relevant to whom it is intended to serve and for successful implementation [14,24]. Such participation and a strong bottom-up approaches are important principles in guiding health-promotion policies [6] and the implementation of these [7,14,24].

The role as facilitators for the implementation of the CHC programme in the RHB was seen as a part of a more comprehensive task, that is, to reach an equal and equitable CHC, important keystones in Swedish CHC [8,10,11]. To ensure equal opportunities to CHC and to enable children to achieve health and reduce differences in health are core activities in health promotion [23]. These common value principles were important incentives when the facilitators met the challenges.

Methodological reflections
A strength of the study was that 15/21 county councils/regions were represented, giving a broad picture
of experiences. Three CHC coordinators declined participation as the technical conditions to use Lync/Skype for Business were lacking in their county councils/regions. Conducting FG online [15] can enable studies that otherwise would not have been possible because of the geographical spread. Although the technological equipment was pretested, a few problems occurred with web cameras, microphones, speakers and access when the FGs started. It is important to account for such challenges when planning online FGs. When these issues had been solved, the FGs were conducted without problems, and as enough time was dedicated, the actual interviews were not affected. The discussions were rich and open-minded. Compared to traditional FGs, the online format has shown [25] to have a more ‘informal’ character that allows participants to be more open. This could contribute to a richer discussion but also to being more open and intimate than expected – an ethical issue to be aware of when conducting FGs online.

The main author has 10 years of experience as a CHC coordinator, with involvement in the use of the RHB and implementation of the new CHC programme. This could be both a strength and a challenge in the data analysis. To ensure trustworthiness, all the FGs were recorded and transcribed verbatim, and the three other authors reviewed the data material in every step of the analysis.

Conclusions

Facilitating a national guideline or decision support in a local context is a complex task that requires an advocating and mediating role. For successful implementation, guidelines and decision support, such as RHB and the new CHC programme, must match professional consensus and needs and be seen as relevant by all. Participation in the development and a strong bottom-up approach were important in making RHB and the programme relevant to whom it is intended to serve, and led to successful implementation. Common-value principles, for example to reach an equal and equitable CHC, were important incentives to meet challenges. A web-based national guide could be a useful support in the facilitator role and for end-users in an implementation process.

The study contributes to a deeper understanding of the facilitator role and emphasises the importance of such intermediate actors in implementation processes. Based on the analysis of the study, it is suggested that a national implementation plan with strong anchorage in the county councils/regions and facilitators with clear mandate and support from management are considered when planning to implement a national programme in a local context.

Further research is needed to provide a knowledge base when designing an implementation plan in health care and in implementing other national web-based decision support and policy programmes in a local context.

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Declaration of conflicting interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: JT is a CHC coordinator and is involved in the implementation of the new CHC programme, and is a member of the editorial board at RHB. The authors declare no other competing interests.

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References

Nurses use and ways of understanding web-based national guidelines for child healthcare

Johanna Tell, MPH, RN, Peter Anderberg, PhD, Ewy Olander, PhD, Johan Sanmartin Berglund, Professor

Corresponding author: Johanna Tell johanna.tell@bth.se +46 708402202

Blekinge Institute of Technology, Faculty of Engineering, Department of Health, 371 79 Karlskrona, Sweden

Abstract

The national *Rikshandboken* (RHB) for child healthcare is a web-based guideline for child healthcare in Sweden containing knowledge and methodological guidance, and a national child healthcare program in the process of being implemented. The aim of this study was to examine child healthcare nurses use and ways of understanding the national web-based *Rikshandboken*. A mixed-method study with sequential explanatory design in two phases was used; a web-survey with descriptive statistics was followed with telephone interviews with phenomenographic analysis. The study showed variations in use and contributed deeper knowledge of child healthcare nurses’ ways of understanding the unit RHB whose varied parts interact with each other. To be reliable, useful and relevant for nurses in their specific contexts, *Rikshandboken* must be kept updated and involve the end-users in the development process. With access to technical devices and optimal use of the possibilities with information and communication technology, *Rikshandboken* can be a resource of continuing learning, a tool in everyday work and a possible determinant to an equal child healthcare. The study contributes with valuable knowledge when designing web-based national guidelines for healthcare, making them useful and relevant for the end-users.

**Keywords:** child healthcare nurses, national guidelines, information and communication technology, mixed method, phenomenography

Background

Information and communication technology (ICT) has the potential to improve accessibility to guidelines (1), even if the effectiveness isn’t entirely clear (2). The web is a form of ICT often used for guidelines in healthcare. Web-based national guidelines for personnel in child healthcare (CHC) in Sweden is *Rikshandboken* (RHB) (www.rikshandboken-bhv.se). This unit integrates knowledge support,
methodological guidelines and a national CHC program. The CHC program is in the process of being implemented in county councils and regions. The implementation of web-based guidelines could be a challenge and is affected by various factors related to the ICT solution itself, the context in which it should be used and the user’s individual characteristics (2–5). Thus, for a successful implementation, a bottom-up approach with end-user’s involvement is crucial to make web-based guidelines relevant for those it is intended to serve (3–5). Accordingly, follow-up studies of CHC personnel’s use and ways of understanding RHB are essential in the development and implementation process of web-based guidelines in healthcare.

Implementation of web-based guidelines
Swedish CHC nurses need to stay abreast of new knowledge, be able to work in accordance with current CPG and have access to timely information (6, 7). The goal of CPG is to reduce variability and to decrease the gap between research and current practice by translating research and expert opinions and recommendations in everyday work for professionals (8, 9). Traditional printed guidelines are resource intensive and become quickly outdated while web-based guidelines have the potential to improve accessibility and credibility by keeping them continuously reviewed, updated and widely disseminated (1, 2, 10). Implementation of ICT and guidelines in healthcare are influenced by various factors (3–5). From an organisational perspective, key components for successful adoption in healthcare include management engagement and support, structural and electronic resources and a supportive culture and environment with implementation facilitators (3–5). From an end-user’s perspective, content, format, usability and easy access are crucial factors in the acceptance and use of ICT (4, 5). The web-based guidelines must match professional consensus and needs and be seen as relevant by all (3–5). Attitudes and perceptions could be both a barrier and facilitator for the use of ICT and guidelines (3–5). Review studies show that the end-user’s involvement in development and a strong bottom-up approach reduce the discrepancies between the functionality of the system and the ease of use (3, 4). However, web-based guidelines are often not implemented effectively (2, 3); an essential prerequisite for designing web-based guidelines for healthcare is to examine and follow the needs and abilities of potential users as well as the context of use (2, 4).

Child healthcare
In Sweden, CHC is an important health promotion setting as it provides universal and targeted interventions. The coverage is close to 100% for children 0-5 years age. CHC aims to contribute to the children’s physical, mental and social health by promoting children’s health and development, preventing illness, identifying problems early and initiating actions to counteract such problems (11). CHC includes health examinations, health guidance, vaccinations and parental support at CHC centres and via house calls. The work at the CHC centres is led by CHC nurses, who are specialists in either primary healthcare or paediatric care. Each county council/region runs a main CHC unit (MCHCU) with at least a chief medical officer and a CHC coordinator (11). Their responsibility is to facilitate the
implementation of the web-based RHB, including the national CHC program, improve the local CHC through education and support, monitor children’s health, conduct evaluations and develop methods for CHC (12, 11). CHC should be built equally on current guidelines, best available evidence, proven experience, patient preferences; evidence-based practice (11). Lack of equality and equity in Swedish CHC (13, 14) led to a new national CHC program, published on RHB in 2015 (12).

The web-based RHB
RHB was established in 2005 as a pass-word protected, knowledge and methodological support for personnel in CHC, encompassing the Swedish earlier national CHC-program. A study of CHC nurses’ usage of RHB, conducted in 2013 (15), showed that RHB was widely used but regional differences and nurse’s experiences in their profession affected its use. Since 2015, the new national CHC program has been a part of the updated RHB also containing knowledge and methodological guidance adapted to the CHC program aiming to contribute to an equal and equitable CHC and evidence-based practice. RHB also contains links to regional documents and websites in different county council/regions. Since 2012, RHB has been mobile compatible and open accessed produced by Inera AB, owned by the Swedish Association of Local Authorities and Regions in charge to coordinate and develop digital services for citizens, professionals and decision makers. The editors at RHB are supported by an editorial board consisting of representatives from the MCHCUs. The new CHC program is in the process of implementation in all county councils and regions, but the adoption is affected by local circumstances (12). According to Rogers (5), CHC nurses could be in different stages of the adoption process of a web-based RHB. Their varied experiences, perceptions and needs are valuable to study in order to deepen the knowledge about how web-based guidelines best can be a useful support. Therefore, the aim of this study was to examine CHC nurses use and ways of understanding RHB.

Methods
Study design
A mixed-methods study with a sequential explanatory design in two phases was conducted following four procedural steps (16). A web survey (17) was conducted in the first quantitative phase to get an overall picture of CHC nurse’s use and experiences of RHB, and it was analyzed with descriptive statistics. In Phase Two, based on the results in Phase One, a qualitative interview guide was constructed for telephone interviews, which was analysed using a phenomenographic approach (18). The qualitative results were used to explain the quantitative results in more depth for the purpose of complementarity (16).

Phase One: The web survey
As a first step, an information letter with an invitation to participate and a link to a web survey was sent to 95 CHC nurses (Figure 1) representing 20 of 21 county councils/regions in Sweden. They participated in an earlier study of RHB (13) and left their consent to be invited for a new study. Seventy of the CHC nurses were still working in CHC and 46 of them, from 15 county councils/regions, responded the web survey after three reminders. A
web questionnaire (17), created in the online survey tool Textalk Web Survey (Textalk AB, Mölndal, Sweden) was used. The questionnaire contained 16 questions with structured response options, including single, multiple choice and scale questions (17). It consisted of five parts: socio-demographic and clinical characteristics of CHC nurses, their use of and accessibility to RHB, their experience of support and usability as well as development areas to improve RHB. Several questions in the questionnaire were taken or based on a website usability measurement instrument (19), which strengthened the construct validity. The pilot test identified weaknesses and provided critical reflections, which required minor changes in the questionnaire to strengthen the validity. Each questionnaire was coded with an identification number. The web survey was conducted during four months in 2017. It was analyzed in Textalk Web Survey and Microsoft Excel using descriptive statistics with proportion analysis and crosstabs (20).

**Figure 1.** The sampling procedure.

*Phase Two: The telephone interviews*

Semi-structured interviews with open-ended questions, a common data collection method in sequential explanatory design and in phenomenographic research (16, 18) was chosen to gain insight into CHC nurses varied ways of understanding RHB. In the web survey, the respondents gave their contact details and permission to be invited to a follow-up telephone interview; 16 CHC nurses accepted and gave consent to participate. They represented different county councils/regions and had different background variables and could thereby contribute to a rich and varied picture of experiences and understandings of RHB. Unfortunately, one of the interviews couldn’t be used due to a technical error during recording. In the second step, the web survey results were used to create a semi-structured interview guide (21) including open-ended questions about the CHC nurses’ perceptions of the use of RHB in their everyday work, RHB as a web-based guide, requests...
for support, opportunities to influence RHB and wishes of improvements. A pilot test of the interview guide and the technological equipment led to minor changes. In the third step, the telephone interviews were carried out in between 16 to 40 minutes with a median duration of 26 minutes. They were conducted two months after the web survey, were audio-taped and then transcribed verbatim.

Phenomenographic analysis (18) was chosen in Phase Two as the focus was to describe variations in how CHC nurses perceive and understand RHB. Phenomenography is based on the assumption that a phenomenon can be understood by a group of people in a limited number of ways and each way of understanding expresses the relation between the subject and the phenomenon (18). The analysis was carried out according to the procedure of Larsson and Holmström (22). Each interview transcript was read and re-read to gain an overall impression of the data. Preliminary descriptions of each respondent's way of perceiving and understanding RHB was marked and summarized. Thereafter, the preliminary descriptions from all respondents were compiled, re-read and compared for similarities and differences. Similar statements were grouped into preliminary descriptive categories after a comparison to establish the boarders between them. To strengthen credibility and transparency, an overview of the phenomenographic analysis with regard to categories, statements and participating CHC nurses are presented as well as direct quotes from the interviews (Table 1). Finally, five descriptive categories emerged that constituted an outcome space (22). Figure 2 depicts the categories and the internal relationships between them. All authors had access to the data and were involved in the analysis process to reduce the risk of subjectivity. Findings in every step of the analysis were discussed and reflected upon by two of the authors to find consensus.
Table 1. Overview of phenomenographic analysis with regard to categories, statements, and participating CHC nurses (n=15)

<table>
<thead>
<tr>
<th>Categories of descriptions and perceptions</th>
<th>No. of statements</th>
<th>Participants id-numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>A tool that must be useful and relevant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Content that meets user needs</td>
<td>11</td>
<td>1, 3, 6, 10, 13–15</td>
</tr>
<tr>
<td>• Obtain the users views</td>
<td>10</td>
<td>1-2, 5, 7-8, 10, 13-15</td>
</tr>
<tr>
<td>• Develop and use of the possibilities</td>
<td>38</td>
<td>2-3, 5-15</td>
</tr>
<tr>
<td>with ICT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A resource that must be reliable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Feel confident</td>
<td>9</td>
<td>1, 4, 6, 9, 11,13, 15</td>
</tr>
<tr>
<td>• Keep updated with current recommendations</td>
<td>16</td>
<td>1, 3, 8–11, 14–15</td>
</tr>
<tr>
<td>A resource for learning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Own learning</td>
<td>34</td>
<td>2, 4-5, 7-8, 10-15</td>
</tr>
<tr>
<td>• Supporting others learning</td>
<td>32</td>
<td>1–2, 4, 6, 9, 11, 13</td>
</tr>
<tr>
<td>• Learning together</td>
<td>8</td>
<td>3, 6–14</td>
</tr>
<tr>
<td>A tool in everyday work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Practice of use</td>
<td>28</td>
<td>2, 4-5, 7-8, 10-15</td>
</tr>
<tr>
<td>• Changes of use</td>
<td>9</td>
<td>1–2, 4, 6, 9, 11, 13</td>
</tr>
<tr>
<td>• Time aspects</td>
<td>15</td>
<td>3, 6–14</td>
</tr>
<tr>
<td>Contributing determinant to an equal CHC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• National equivalence</td>
<td>15</td>
<td>1, 3, 7-11,13-15</td>
</tr>
<tr>
<td>• Regional differences</td>
<td>9</td>
<td>3, 5, 8-9, 14-15</td>
</tr>
</tbody>
</table>


**Figure 2.** The outcome space; Ways of understanding RHB among CHC nurses.

**Ethical considerations**

An ethical self-evaluation was made, and an advisory statement was obtained from the Ethical Review Committee of the Southeast for the two different phases in the study (Dnr. EPK 442–2017, Dnr. EPK 451–2017). Basic ethical requirements for individual protection; confidentiality, information requirements, consent requirements and use requirements were considered (23). Before both phases in the study, the participants received a letter with information about the study, confirming confidentiality and voluntary participation, which could be terminated at any time. Informed consent was obtained for each phase of the study separately. Before the interview began, the information was repeated, and the participant was asked for consent.

**Results**

**Phase One: The web survey**

The questionnaire was answered by 46 CHC nurses, from 16 of 21 county councils/regions, a response rate of 66%. Only one of the respondents was male thus, no gender comparison could be made. A majority, 72%, of the respondents were 31 to 60 years of age, and their experiences as a CHC nurse ranged from less than five years to more than 20 years. Fifty-seven percent of the respondents stated that the national CHC program was totally
implemented in their county council/region; 39% reported that it was partially implemented, and 4% did not know. RHB was used via computer by all the CHC nurses in varying frequencies—from several times per week to several times per day (65%), several times a month to once a week (26%), once a month or less (9%). RHB was used via smartphone once a month or less by 26% of the CHC nurses. Seventy-four percent had no access to smartphones via their employer, and 22% used their own private smartphone at work. There was no significant difference in usage frequency or use of technical devices between age groups or years of experience.

The results showed that most of the respondents were satisfied with RHB’s usability, content and design (Table 2). Almost all, 46 respondents (93%), felt that they could trust the content. Fewer CHC nurses, 31 (67%), considered that RHB contained needed information, and 11 (24%) considered the structure difficult to overlook. The questions about development and improvements (Table 3) showed that the CHC nurses considered that RHB need to develop information about new research relevant to CHC and different support for learning (Table 3). Searchability and interactivity were also factors considered in need of development to improve RHB. Nearly half of the CHC nurses considered that they need access to RHB via smartphones at work as well as time allocated at work to use RHB.

Table 2. CHC-nurses’ satisfaction with usability, content and design of RHB

<table>
<thead>
<tr>
<th>Satisfaction with usability, content and design</th>
<th>Agree completely or largely (n= 46), % (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHB almost always contain the information that is needed</td>
<td>67 (31)</td>
</tr>
<tr>
<td>Technical assistance is needed to use RHB</td>
<td>11 (5)</td>
</tr>
<tr>
<td>RHB is likeable</td>
<td>83 (38)</td>
</tr>
<tr>
<td>There are things that are not consistent in RHB</td>
<td>13 (6)</td>
</tr>
<tr>
<td>RHB is designed so the content is easy to access</td>
<td>65 (30)</td>
</tr>
<tr>
<td>It is difficult to find requested information</td>
<td>26 (12)</td>
</tr>
<tr>
<td>Trust that the information on RHB is correct</td>
<td>93 (43)</td>
</tr>
<tr>
<td>The structure is difficult to overlook</td>
<td>24 (11)</td>
</tr>
<tr>
<td>The information is pedagogical and easy to interpret</td>
<td>78 (36)</td>
</tr>
<tr>
<td>RHB should be more interactive (such as movies, animations, pop-ups, audio, music)</td>
<td>44 (20)</td>
</tr>
<tr>
<td>Overall, satisfied with RHB</td>
<td>70 (32)</td>
</tr>
</tbody>
</table>
Table 3. Factors considered by CHC-nurses need to be developed to improve RHB

<table>
<thead>
<tr>
<th>Factors at RHB</th>
<th>Considered have needs or large needs of development (n=46) % (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Website search function</td>
<td>63 (29)</td>
</tr>
<tr>
<td>Website interactivity (such as movies, animations, pop-ups, audio, music)</td>
<td>50 (23)</td>
</tr>
<tr>
<td>Information about new research relevant to CHC</td>
<td>59 (27)</td>
</tr>
<tr>
<td>E-learning</td>
<td>57 (26)</td>
</tr>
<tr>
<td>Pedagogical materials</td>
<td>70 (32)</td>
</tr>
</tbody>
</table>

**Phase Two: The telephone interviews**
In the phenomenographic analysis, five different ways of understanding RHB were identified among the CHC nurses: as a tool that must be useful and relevant, as a resource that must be reliable, as a learning resource, as a tool in everyday work, and as a contributing determinant to an equal CHC (Figure 2). The CHC nurses’ variations of understanding RHB are presented in the outcome space in how they are related to each other: prerequisites needed for using RHB, how it is used in learning and in everyday work in a local context, and as a contributing determinant in a national context. All descriptive categories interact with each other and together they give variations of understanding RHB as a unit.

**A tool that must be useful and relevant**
Content that meets user needs, to obtain the users views and to develop and use the possibilities with ICT were seen as important for a useful and relevant tool. Nurses with this way of understanding felt that the content must cover the complexity in CHC from situations in everyday work as well as in more rare situations. They felt that RHB should to be regularly evaluated and developed in dialogues with the CHC nurses, so it would be relevant and useful for them. This is proposed to be done through surveys, reference groups, mail, web-meetings and via the county councils MCHCUs. The understanding forming this category was that RHB as a web-based solution creates opportunities that could not be possible if the guidelines were printed. Some criticism emerged asserting that the website structure was similar to a traditional book, with long sections of text, which could make it difficult to find information. Better use of the possibilities with ICT in the design was suggested to improve RHB. Even if the technique could pose challenges, nurses with these ways of understanding perceived that ICT is necessary to accept and learn. A prerequisite for using RHB was that the structure and search function make it easy to find timely information. Direct links from the medical journals to relevant information was suggested to make RHB more accessible and useful. Lack of access to technical devices, such as smartphones and tablets at work, affected usage and RHB was mainly used via computer at CHC centre and to a lesser extent during house calls. *Dialogue is important...Our work is changing...There should be time allocated for those who work with*
RHB to meet us and discuss thoughts and ideas... We are working at the CHC centre and meet current issues (1).

A resource that must be reliable
To feel confident and to be kept up to date with current recommendations were important prerequisites for using RHB described in this category. Instead, as before, asking colleagues or random search on Google, RHB was seen as a resource that could offer information based on evidence and proven experience. It was expressed that the content must comply with the authorities and follow changes in the national CHC program. If something in the content was found wrong or wasn’t updated, confidence was lost and information was searched for from other websites instead. To be assured that the information is updated with new references and dates was perceived as important for credibility. Articles, new knowledge... That the content is updated. It is necessary. That you can feel that you can trust it. That you dare trust it (9).

A resource for learning
Different kinds of learning were the focus in this category of understandings: the nurse’s own learning, learning together and supporting others learning. This category proved to be the strongest with the most number of statements. RHB was understood as a resource, together with the MCHCU’s, for new knowledge, to get old knowledge confirmed and to get methodological support. Access to methodological guidance related to a specific health visit in the national CHC program, in-depth knowledge on specific topics and information about new research was expected by respondents with this way of understanding. RHB was used, read and discussed together with colleagues in common learning, in the learning of students and new colleagues and to show managers the complexity of CHC. It was also used as a second opinion to reflect on together with families. Making RHB more interactive with photos, audio recordings, videos, webinars and discussion forums for learning were suggested to improve this category of understanding. In many CHC centres, you are not allowed to participate in so much education. And I think if there were webinars and e-learning on RHB... introduction courses and information about conferences... I mean, everything is recorded and available at YouTube today. You should access this via RHB. It would be the future for RHB (15).

A tool in everyday work
The focus in this category was the ways of understanding RHB as a tool in everyday work: the practice of use, different aspects of time and changes of use. RHB was used in practice before a meeting with a family at the CHC centre or a house call, during and after the health visits, in telephone consulting and in parent groups. Different aspects of time were shown to affect the use of RHB in everyday work regarding lack of time to use it as well as the managements and nurse’s responsibility to allocate time. RHB was seen as a ‘time saver’ as it is web-based and not printed, and the importance of finding requested information quickly when it is needed was highlighted. Nurses with this way of understanding described how the use of RHB was changing with increasing time in the profession. For novices, RHB
was used frequently in everyday work while with more experienced nurses, it was used more seldom on unusual issues and to read about updates and new research. Respondents with this way of understanding considered that content must meet both novice’s and experienced CHC nurse’s needs. I used it more when I was novice then I do today. When I was new, I used it before almost every health visit...Now I don’t use it at the same way, but I still use it frequently. Now I know what I shall do, I have it in my head. Now I use it when I want to check special issues, to read about changes or to show anyone else (2).

A contributing determinant to an equal CHC
Focus in this category was the ways of understanding RHB as a contributing determinant to a national equivalence and to reduce regional differences in CHC. The fact that the national CHC program, knowledge and methodological guidance are embedded in RHB was seen as important to reach an equal CHC in Sweden. Information aimed at CHC personnel on many different websites, as authorities and county councils/regions own websites, was considered confusing especially if they were contradictory to the content on RHB. The links from RHB to county councils/regions websites was perceived by CHC nurses in this category as contributing with valuable local information and material but also to unequal CHC. It was suggested that the regional documents be as few as possible and that their content should be considered national if they were relevant in all county councils/regions. Sometimes we have different routines in our county councils, and it is important that there not are too many. They can’t take over so all have own routines even though we have RHB. Then there may be times when it is needed, but the aim must be coherence for the country (8).

Integration of Phase One and Phase Two
In the fourth step in the explanatory design procedure (16), the results from the web survey and the telephone interviews were summarized regarding the ways the qualitative findings with variations of understanding help explain and complete the quantitative result. In the web survey, 67% of the CHC nurses agreed completely or largely with the assertion that RHB always contain the information they need. The interviews solidified that RHB must be useful and relevant for the CHC nurses in their work, with the content they need; thus, they must be involved in development and improvement of RHB. Even if two-thirds of the respondents in the web survey agreed completely or largely with the assertion that RHB is designed so the content is easy to access, CHC nurses varied in their ways of understanding RHB and revealed a dissatisfaction with structure and design, suggesting better use of the possibilities with ICT to improve RHB.

Almost all the CHC nurses in the web survey said they trusted the information on RHB. The collective way of understanding RHB as a resource that must be reliable confirmed these statements and the importance of being able to rely on RHB being updated with current recommendations and based on evidence and proven experiences. More than half of the respondents in the web survey considered that information about new research needed to be developed on RHB and requested a more interactive RHB for learning. The telephone
interviews revealed an understanding of learning as a significant part of CHC nurses work and their expectations of RHB as a resource for continuing learning.

The web survey showed that RHB was used to a different extent by CHC nurses according to their county councils/regions, but there were no differences between the age groups or range of experience groups. CHC nurses also desired that time be allocated for using RHB at work. In the interviews, the collective way of understanding RHB as a tool in everyday work revealed that the way CHC nurses use RHB changed with increased experience. CHC nurses with this way of understanding perceive that a shared responsibility with the manager and themselves is needed to allocate time to use RHB. RHB as a 'time-saver' was also revealed in the interviews because it is web-based and not printed. The web-survey showed that there are still regional differences in Swedish CHC, but the collective way of understanding RHB as a determinant to an equal CHC revealed an intention to reduce these.

**Discussion**

The aim of this mixed-method study was to examine CHC nurses use and ways of understanding RHB. The results of Phase One showed an overall picture of the CHC nurses use of RHB while Phase Two revealed variations of ways of understanding RHB in more depth. The outcome space showed a complex view of use and ways of understanding RHB and how the different categories interact with each other. Learning and development appears in relation to all categories. It is a need to be aware of this interaction, thus it implies that it is not possible to only make differences and development in one of the categories without affecting the others. Changing the content and structure of and access to RHB is not enough. The prerequisites in the local context for CHC nurses to use it must exist, and only then can RHB be a contributing determinant to an equal CHC. The importance of strong anchorage, facilitating factors and intermediate actors in the local context when implementing web-based guidelines is clear (3,4,5,12). It was emphasized that the content in RHB must cover the complexity in CHC and therefore CHC nurses requested dialogue and participation in the development of RHB, a prerequisite for making the web-based guidelines useful and relevant for them. The result is consistent with previous studies (3, 5), showing that nurses must have an active role in development and implementation process of web-based guidelines for successful adoption. Therefore, in further development of RHB, it is essential to pay attention to how the CHC nurses can best be involved in the process of improving the web-based guidelines.

The CHC nurses almost always used RHB via a desktop at the CHC centre. RHB was more seldom used via other technical devices, such as smartphones and tablets, and RHB was used to a lesser extent during house calls. The result differs from studies showing that the most common way to access the Internet in Sweden, 2017, was via smartphone (24) and the use of smartphones in healthcare has generally increased (25). Access to RHB via smartphone can enable CHC nurses to use their guidelines even if a desktop is not available, for example, in parent groups and during house calls. A possible consequence of having no smartphone at work is that CHC nurses cannot reach needed methodological and
knowledge support and fully do their work as ICT tools are necessary in providing accessible and safe healthcare (10, 26). Technical devices used and managed in optimal ways improve nurses working conditions and save time (10). The use of RHB was stated to save time for CHC nurses, but lack of time allocated as a supportive factor for using RHB also emerged. Access to electronic resources, a supportive environment, management engagement and support are key components for successful implementation of web-based guidelines (3, 5). Even if national decisions and policies, such as the Swedish National Strategy for eHealth (26), state the need for healthcare personnel to have access to well-functioning electronic decision support, changes must be made in the local context to make differences for the CHC- nurses in their everyday work.

The CHC nurses’ collective understanding of RHB as a resource for learning complies with earlier studies of CHC nurses use of RHB (12,15) where access to research, pedagogical materials, instructional videos, discussion forums and e-learning were suggested as improvements of RHB. According to the Swedish Society of Nursing (6), CHC nurses should be able to educate individual and groups of parents, students and colleagues. Therefore, it is necessary to create local conditions for nurses to conduct such education. ICT can be utilized for teaching and learning in different ways, create opportunities for flexible, efficient learning in healthcare and offer a time-and cost-effective alternative method of education (27, 28). ICT has been shown to support nurses continued learning and professional development (10). The CHC nurses' needs and requests for learning and the role of RHB to improve the use of existing knowledge and to facilitate more effective acquisition of new knowledge need to be reflected in further development of RHB.

An overall category of understanding was RHB as a contributing determinant to an equal CHC and national equivalence. The interviews revealed varied ways of understanding the value of the county councils/regions websites and regional differences. They can contribute to local information but may also lead to unequal CHC. Tell et.al 2018 (12) found the ambivalence of CHC coordinators regarding parts in the new CHC program and to shutting down their local guidelines in favour of RHB. As the MCHCU’s have shown to be the most commonly used source of knowledge and methodological guidance for CHC nurse’s work (15) and are important facilitators in the implementation of RHB (12), these are dilemmas need to struggle with in county councils/regions. According to Wallby (14), varied interventions are needed to get an equitable CHC, but they must not be at the expense of universal efforts. He also stresses the importance of clear national guidelines to ensure universal, selective and indicated interventions in CHC. (14). As the web-based guidelines aims to reduce variability in practice (8-9), this knowledge is valuable to consider in the development of RHB, how to match professional consensus and needs and how RHB best can contribute to both an equal and equitable CHC (11, 14).

This study was conducted as a mixed-method study. According to Creswell (16), a combination of two methods can provide a better understanding than a singular method can, strengthening each study and minimizing the weaknesses. A limitation of the study is
that the questionnaire was answered by 46 CHC nurses, too small a sample for drawing conclusions from statistical analyses or generalizing the result. The nurses were all those who had given their consent to be invited, which could be seen as a weakness since it was not a randomized sample. Fifteen telephone interviews were conducted in this study. According to Larsson and Knutsson-Holmström (22), 20 participants are sufficient to identify different perceptions of phenomena. Thus, a strength is that the CHC nurses represented all health care regions, have used RHB since at least 2013, worked during the implementation of the new national CHC program, which give a broad view of experiences. The interviews were rich and gave a varied picture of experiences with RHB. The use of purposeful sampling is common in explanatory studies to show the range of different perspectives in a group of people (16). It is not claimed that the findings can be applied to CHC nurses in general but the variation in ways to understand RHB in a group of CHC nurses. As CHC nurses in Sweden have heterogeneous education and the same working context, it might increase the transferability of findings to similar contexts. The primary author has 12 years' experience as a CHC coordinator including involvement in the editorial board at RHB, which could be both a strength and a challenge in the research process. To ensure trustworthiness, every step in the study was discussed and reviewed by the three other authors.

Conclusions

The study, with both a web-survey and telephone interviews contribute a deeper knowledge of CHC nurses’ use and ways of understanding RHB whose varied parts interact with each other. To be reliable, useful and relevant for nurses in their specific contexts, RHB must be continuously updated and involve the end-users in the development process. Access to technical devices and optimal use of the possibilities with ICT, the national web-based RHB can be a resource for continuing learning, a tool in everyday work and an essential contributing determinant to an equal CHC. The study contributes valuable knowledge regarding designing web-based guidelines for healthcare, making it useful and relevant for those it is intended to serve. Further studies regarding how the varied categories of RHB could be developed to improve and strengthen RHB and contribute to an equal and equitable CHC and evidence-based practice are suggested.

References

   *Sacroma* 2015;614179.


   *Int J Nurs Stud* 2016; 60: 54-68.


The usage of web-based national guidelines for child healthcare - a web analytic study

Johanna Tell, MPH, RN, Peter Anderberg, PhD, Ewy Olander, PhD, Johan Sanmartin Berglund, Professor

Corresponding author: Johanna Tell johanna.tell@bth.se +46 708402202

Blekinge Institute of Technology, Faculty of Engineering, Department of Health, 371 79 Karlskrona, Sweden

Abstract
The development and dissemination of information- and communication technologies in healthcare is rapid. The purpose of web-based national guidelines is to support professionals in everyday work providing equivalent, safe and qualitative healthcare. Web-based national guidelines are often not implemented effectively in healthcare why studies reflecting different aspects of use and implementation is needed. The aim of this study was to investigate the usage of the web-based national guidelines, Rikshandboken i barnhälsovård. In this case study with cross-sectional design, usage of the web-based guidelines was studied for one year using the web analytic tool, Google Analytics. The usage data were analysed with descriptive statistics. The study showed the general usage pattern of RHB, changes in usage through the year and various usage pattern in different user groups. The usage of RHB had increased, the web-based guidelines was used in all county councils/regions and the most common visited web-page was the new national child healthcare program. This tendency suggests a positive direction towards the RHB aim to contribute to equal, equitable and high-qualitative CHC. The result also showed the importance to study different user groups as the usage pattern differs. This provide valuable knowledge in the development of web-based national guidelines making them useful and relevant for all its users.

Keywords: National guidelines, information and communication technology, child healthcare, user experiences, user engagement, Google Analytics

Background
The development and dissemination of information- and communication technologies (ICT) is rapid and there is a wide range of ICT used for supporting and providing healthcare. These might be management systems, communication systems, information systems, and computerised decision support systems that are valuable in nursing practice in various
ways (De Angelis et al., 2016; Mair et al., 2007; Rouleau et al., 2017). Computerised decision support systems are accessible from various devices such as computers, tablets or smartphones and they support professionals’ decision-making for assisting them with guidelines (Mair et al., 2007). The guidelines aim to reduce variability in healthcare and translate research and expert opinions to recommendations in clinical practice (Committee on Clinical Practice Guidelines, 1992; Gundersen, 2000). ICT has the potential to improve accessibility to the guidelines (De Angelis et al., 2016; Jun et al., 2016; Neuhaus et al., 2015) even if the effectiveness is not entirely clear (Neuhaus et al., 2015), and may facilitate nurses learning, their continuing development and growth (Fagerström et al., 2017). Traditional printed guidelines are resource intensive and quickly become outdated while ICT-based have the potential to improve accessibility and credibility because they can be by continuously reviewed, updated, and widely disseminated (De Angelis et al., 2016; Jun et al., 2016; Neuhaus et al., 2015;). “Web-based” national guidelines is the term that is used in this study to describe the Swedish Rikshandboken for child healthcare (RHB) www.rikshandboken-bhv.se. ICT and national guidelines are often not implemented effectively in healthcare (De Angelis et al., 2016; Fagerström et al., 2017) why studies reflecting different aspects of use and implementation is needed. Several studies (De Angelis et al., 2016; Jun et al., 2016; Tell, 2018a) have explored the use of web-based national guidelines from the end users’ perspective using various methods. Using a web analytic tool could get insight in user experiences (UX), user engagement (UE) and usage patterns from a website viewpoint (Clark et al., 2014; Song, et al. 2018; Vogel et.al 2016;). According to Saura et al. (2017) web analytics are widely used by popular websites to provide useful data about its users, but it has not been the subject of much research. Follow the users behavior “from within” the website could contribute with knowledge useful in improvements of RHB to make it useful for end users, but also be a base for further studies of UX and UE related to web-based national guidelines.

The web-based RHB

RHB was established as an initiative of the Swedish Paediatric Society in 2005, as decision support for personnel in child healthcare (CHC). Initially, RHB was a password-protected website, exclusive for professionals, available via a previous website for parents. Since 2012, RHB is produced by Inera AB, owned by the Swedish Association of Local Authorities and Regions, in charge of coordination and development of digital services for citizens, professionals and decision makers. Since then RHB has been an open-access website and smartphone compatible via responsive design. The editors at RHB are supported by an editorial board consisting of representatives from the main CHC units in the county council/regions; chief medical officers, CHC coordinators and psychologists. The editorial board communicates opinions, requests and needs from the CHC users to the editors and
invite authors and reviewers from different areas of specialisation: paediatricians, CHC nurses, psychologists, speech therapists, dieticians, physiotherapists and others (RHB, 2017).

The web-based RHB contains, since 2015, a new national CHC programme in progression to be implemented in Swedish county councils/regions and professional knowledge- and methodological guidance adapted to the CHC program (RHB, 2018). RHB aims to contribute to equal, equitable and high quality CHC by providing guidelines to the professionals in the all Swedish county councils/regions (RHB, 2017). The homepage www.rikshandboken-bhv.se [Figure 2] is designed to provide an overview of the content on the RHB. There are clickable tabs to web pages with knowledge and methodologic guidance for working at CHC, with the CHC-program and meetings with children and parents. These webpages include links to regional documents and websites in different county council/regions, and links to government websites. On the homepage there are also clickable tabs to news in CHC and on RHB, to research and projects, and to a CHC newsletter. The newsletter is also distributed to subscribers with information about the latest updates and new research periodically. The newsletter was sent to 3352 subscribers in June 2018 (statistic from the editor at RHB). In a collaboration within Inera AB, RHB provides information written to parents to be published on 1177.se, a website that offers general health guidance to citizens, CHC-nurses recommend parents to use 1177.se when they search for health information related to children on the Internet. In this study the concept RHB is used including the whole unit RHB with all its part, inclusive the new national CHC-program.
In 2015, 2376 specialist nurses worked in CHC in Sweden (Tell et al., 2016). Even though the target audience for RHB is professionals in CHC, the website is open accessed which means it is available to anyone. RHB are widely used by CHC nurses, but the use and experiences of the web-based guidelines varied (Tell et al., 2016, 2018b). Earlier studies (ibid.) of UX of RHB shows that the usage is affected by circumstances in the CHC nurses’ local context as well as factors related to RHB itself. The CHC nurses belongs to the primary target group for RHB and emphasized that their experiences need to be considered in the development process and improvements of RHB to make the web-based guidelines useful and relevant for them. RHB content must match their needs, cover the complexity of CHC and be kept updated to be reliable. Better use of the possibilities with ICT has been suggested to improve the search function, the structure and design and to be a resource for learning and a useful tool in everyday work (Tell et al., 2016, 2018b).

Website usage
According to a literature review by Luna et al. (2015), user-centered design (UCD) can increase the adoption and use of ICT in healthcare as well as patient safety and the user satisfaction. UCD implies to a design of ICT focusing on the end users needs and interest (ibid.) and incorporating UCD in the development of decision support systems can improve usability compared with traditional design (Luna et al. 2017). Usability is a common
concept in the research field of human-computer interaction. The term usability is defined by the International Organization of Standardization (ISO) (2018) as the “extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use”. The usage of RHB could be measured with web analytics and one way is to follow how the users behave on the website i.e. their usage pattern. This could also provide information about UX by measuring UE (Lalmas et al., 2014; Lehmann et al., 2012). UX relate to humans’ use of an interactive product or system; in this study, this refers to web-based RHB, and the emerging perceptions, responses, and activities that come through its use (Hassenzahl, 2010; International Organization of Standardization, 2010). Considering the UX is necessary in the design of RHB to ensure that the web-based guidelines are useful for its end users (Hassenzahl, 2010). UE is described as the quality of the UX that highlights the positive aspects of the interactions. UE is based on observations that users not only use technology but also engage with it because they invest time, attention and feelings into its use (Lalmas et al., 2014; Lehmann et al., 2012). According to O’Brian et al. (2018) UE is an abstract, and dynamic construct that is situated in a given context, which makes it challenging to define, design for and evaluate. The measurement of UE can be divided in to three methods; self-reported engagement, cognitive engagement, and online behaviour metrics (Lalmas et al., 2014; Lehmann et al. 2012). All three methods have their advantages and disadvantages and can contribute to different aspects of studies. Online behaviour metrics create an opportunity to collect data from a large number of users and determine their depth of engagement with a website without reliance on user subjectivity. The users’ depth of engagement with a website can be measured based on popularity, activity, and loyalty. Popularity is reflected in a high number of visits, activity in how much time users spend on the website, and loyalty in how frequently users return to it (Lehmann et al. 2012). In this study, online behaviour metrics were used to gather knowledge about the quality of the UX of the web-based RHB.

Google Analytics
Web analytics is conducted to measure, collect, analyze and report Internet data for the purposes of understanding and optimizing web usage (Web Analytics Association WAA, 2018). Google Analytics (GA) (Support.google.com, 2018) is a free web analytic tool providing quantitative data on website usage, usage patterns and UE, primarily from a marketing perspective of online behavior (Clark et al., 2014; Crutzen et al., 2013; Song et al., 2018). Data from GA do not contain any personally identifiable information and are presented in aggregated level. The first time the website is visited a signal is sent from the visitor’s browser to GA, which create a cookie with an anonymous identification number, Client id. The cookie is stored in the computer with the purpose of being a unique
identifier. It is not possible to get information exactly on how many persons visiting the website, since it is the number of unique browsers which counts, referred to as visitors or users (Clark et al., 2014; Song et al., 2018). A visit on the website is called a session which may include one or more pageviews. If a visitor is inactive for 30 minutes, any future activity is counted as a new session. The initial session counts as a new session by a new visitor. Returning users refers to the number of sessions visited through the same Client id. GA prohibits tracking and collection of raw data and produces aggregated data in statistic reports (Clark et al., 2014; Crutzen et al., 2013; Song et al., 2018). The data gathered by GA can be used to determine how the visitors behave, where they come from and what content they are exposed to (Crutzen et al., 2013), which gathered information about their user experiences and UE.

Even if GA is designed to provide insights from a marketing perspective, it is widely used in evaluation of various web-based interventions and for website improvements (Clark et al., 2014). Even if web analytics have not been used in research to such an extent (Saura et al., 2017), GA has been analyzed and used in some studies related to healthcare websites (Clark et al., 2014; Crutzen et al., 2013; McCloskey et al., 2017; Song et al., 2018; Vogel et al., 2016; Vona et al., 2014). However, no research has been found using a web-analytic tool focusing on the usage of web-based national guidelines for CHC. Previous studies of RHB have examined CHC nurses and CHC coordinators use and experiences of the web-based national guidelines using web-surveys, focus groups and interviews (Tell et al., 2015, 2018a, 2018b). Tracking visitor’s behavior using GA is independent of the user’s memory and interpretation in contrast to self-reported studies and measures (Crutzen et al., 2013). Studies of usage patterns using GA could contribute with complementary aspects and a knowledge base for further studies of UE and UE as well as for improvements of RHB to better meet the user needs.

The aim of this study was to investigate the usage of the web-based national guidelines for CHC, RHB, using the research questions:

1) How does the general usage look like during the investigated year?

2) In what way does the usage pattern change during the year?

3) In what way does the usage pattern differ between high, medium and low frequency user groups?
**Methods**

A cross-sectional design was chosen in this case study to describe the status of the phenomenon that is the usage pattern of RHB at a fixed point in time. This case study can be a useful method of exploring a phenomenon that has not been rigorously researched, obtaining descriptive data and creating opportunities to examine usage trends over time (Polit and Beck, 2016). GA standard reports and custom reports were utilized for the data gathering and analysis, and then data were exported to Excel for further analysis.

**Data collection**

Inera AB use GA with purpose to follow the usage of their services. One of the authors, JT, obtained administrative permissions to GA at RHB to study website usage data. The data about RHB usage were obtained from GA´s audience-, acquisition- and behaviour statistical reports (Crutzen et al., 2013; Song et al., 2018; Support.google.com, 2018) for one year (August 1, 2017 to July 31, 2018). Custom statistic reports provide a combination of dimensions and metrics which are not included in the standard reports. The audience report data that were collected about the visitors comprised; number of visitors to RHB, the new and returning visitors, their location on an aggregated level, technical devices used, sessions rate, the numbers of page views, mean session duration and bounce rate. Bounce rate refers to the percentage of visitors who leave the website after viewing only one page (Support.google.com, 2018). Low bounce rate suggests that users are engaging with the service (Song et al., 2018). The acquisition report data that were collected about how the visitors access RHB showed whether this was from search engines, referral from other websites, direction from the browsers, emails or social media. From the behaviour report data, information was collected on occurrences during a session on RHB that is the most visited web pages, time spent on each page view, entrances and exits (Support.google.com, 2018). Entrances refer to the number of times that a specific web page serve as an entrance to RHB and exits refers to the number of times a specific web page is the last one that’s is viewed by the visitors on RHB (Song et al., 2018). These standard reports included data about the total group of visitors on RHB during the investigated year. Smaller groups of users may have behaviours that differs from the average; thus, the segmented data of defined user groups were collected by creating custom reports. Earlier studies of CHC nurses’ use of RHB (Tell et al., 2015, 2018b) revealed their high, medium, and low frequency use of the web-based guidelines. Therefore, the total group of users was divided into the same three frequency user groups in this study. These divisions could contribute with valuable insight into whether and how the usage pattern of high frequency users differ from those of, for example low frequency users and vice versa. Visitors with four or more sessions per month were considered as high
frequency users, visitors with two to three sessions per month as medium frequency users, and visitors with zero to one session per month was considered as low frequency users.

**Data analysis**

Usage data for RHB were analyzed using the audience-, acquisition-, behavior- and custom reports from GA (Support.google.com, 2018). Data from the statistical reports were exported to Excel format and analyzed using descriptive statistics. The number of visitors and sessions per day, usage hour during the days of week, technical devices and data about the most viewed web-pages, were listed and compared per month over the investigated year. Total number of page views, average time per session, average number of page views per session and bounce rate were metrics used for measuring UE in the user groups (Lehmann et al. 2012; Support.google.com, 2018).

**Ethical considerations**

Approval to monitoring the usage of RHB with GA was obtained from RHB, Inera AB. All data is presented at aggregated level. IP- addresses cannot be tracked via GA, thus individuals cannot be identified. An ethical self- evaluation was made, and an advisory statement was obtained from the Ethical Review Committee of the Southeast (Dnr EPK 479- 2018).

**Results**

**Overview**

The study showed the general usage pattern of RHB for one year, changes in usage through the year and various usage pattern in the user groups. The result also revealed differences in UE between user groups.

During the investigated year, RHB had 777 488 visitors, resulting in 1 235 168 sessions and 2 899 498 pageviews. Of these sessions, 73 % were made by new visitors to the website and 27 % were returning visitors that is they had visited RHB even before the investigated period. The average duration of time a user spent on RHB was 02:13 minutes including 2,34 pageviews. The bounce rate was 66 %, where users only viewed a single page and vanish without trace. The median was 2 140 visitors per day with the highest number of visitors per day (n 2 705) in January and the lowest number of visitors (n 1 595) in July (Table 1). Smartphone users accounted for 61 % of all sessions, desktop users for 33 % and tablet users for six percent. The highest percentage of smartphone users, and lowest percentage of desktop users visited RHB in July.
Table 1. Number of visitors per day per month, number of sessions per day per month and the percentage of devices used to access RHB per month.

<table>
<thead>
<tr>
<th>Month</th>
<th>Average visitors/day/month</th>
<th>Average sessions/day</th>
<th>Smartphone user/month %</th>
<th>Desktop user/month %</th>
<th>Tablet user/month %</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 2017</td>
<td>2345</td>
<td>3478</td>
<td>66</td>
<td>28</td>
<td>6</td>
</tr>
<tr>
<td>September 2017</td>
<td>2483</td>
<td>3902</td>
<td>62</td>
<td>33</td>
<td>6</td>
</tr>
<tr>
<td>October 2017</td>
<td>2297</td>
<td>3716</td>
<td>59</td>
<td>36</td>
<td>5</td>
</tr>
<tr>
<td>November 2017</td>
<td>1984</td>
<td>3277</td>
<td>56</td>
<td>39</td>
<td>5</td>
</tr>
<tr>
<td>December 2017</td>
<td>1782</td>
<td>2809</td>
<td>60</td>
<td>34</td>
<td>6</td>
</tr>
<tr>
<td>January 2018</td>
<td>2715</td>
<td>4162</td>
<td>60</td>
<td>33</td>
<td>7</td>
</tr>
<tr>
<td>February 2018</td>
<td>2288</td>
<td>3704</td>
<td>60</td>
<td>34</td>
<td>6</td>
</tr>
<tr>
<td>Mars 2018</td>
<td>2252</td>
<td>3667</td>
<td>61</td>
<td>34</td>
<td>6</td>
</tr>
<tr>
<td>April 2018</td>
<td>2028</td>
<td>3272</td>
<td>61</td>
<td>33</td>
<td>5</td>
</tr>
<tr>
<td>May 2018</td>
<td>1951</td>
<td>3267</td>
<td>60</td>
<td>35</td>
<td>6</td>
</tr>
<tr>
<td>June 2018</td>
<td>1790</td>
<td>2890</td>
<td>65</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>July 2018</td>
<td>1595</td>
<td>2492</td>
<td>72</td>
<td>23</td>
<td>5</td>
</tr>
<tr>
<td>Mean</td>
<td>2126</td>
<td>3386</td>
<td>61</td>
<td>33</td>
<td>6</td>
</tr>
<tr>
<td>Median</td>
<td>2140</td>
<td>3377</td>
<td>61</td>
<td>34</td>
<td>6</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>326</td>
<td>485</td>
<td>4</td>
<td>4</td>
<td>0.65</td>
</tr>
</tbody>
</table>

RHB was mainly used in Sweden (92 %), but it was also visitors from other countries as Germany (2%), Finland (1%) and Norway (1%). RHB was used in all county councils/regions in Sweden, with the highest frequencies of visitors from the largest regions; Stockholm (33 %), Västra Götaland (18 %) and Skåne (14 %). Organic search, visits from search engines, led to 83 % of the visits, other channels were direct traffic (11%), referral web-sites (4 %), social media (1%) and e-mail (1%). The most used browser was Safari (47 %) followed by Chrome (30 %) and Internet Explorer (14 %). RHB was most frequently used from Monday to Thursday (16-18 % of all sessions), and in lesser extent on Fridays (14 %) and weekends.
(8-10 %). Lowest bounce rate, 52 %, had desktop users with a mean session length at 02:47 minutes with 3,13 pageviews. Smartphone users had the highest bounce rate, 78 %, with a session length at 01:08 minutes and 1,65 pageviews.

**Differences between user groups**

The largest group of users was the low frequency user group which made 610 346 sessions during the investigated year. The medium frequency user group made 277 889 sessions. The smallest user group with high frequency users made 346 933 sessions (Table 2). Comparison of metrics for UE in the different groups of users revealed that the group of high frequency users spent more time at RHB, visited more pages, had lower bounce rate than the groups of medium- and low frequency users. The group of users who accessed RHB via the newsletter had an average session time at 03:27 minutes including 4,13 pageviews.

**Table 2.** Total numbers of sessions, total numbers of page views, number of pages per session, average time per session, and bounce rate by the different user groups.

<table>
<thead>
<tr>
<th></th>
<th>High frequency user-group n 42 579</th>
<th>Medium frequency user-group n 124 665</th>
<th>Low frequency user-group n 610 244</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total n of sessions</td>
<td>346 933</td>
<td>277 889</td>
<td>610 346</td>
</tr>
<tr>
<td>Total n of page views</td>
<td>1 406 720</td>
<td>559 602</td>
<td>933 176</td>
</tr>
<tr>
<td>N of pages/session</td>
<td>3.16</td>
<td>2.14</td>
<td>1.75</td>
</tr>
<tr>
<td>Average session duration</td>
<td>00:03:11</td>
<td>00:01:40</td>
<td>00:01:32</td>
</tr>
<tr>
<td>Bounce rate %</td>
<td>50</td>
<td>66</td>
<td>75</td>
</tr>
</tbody>
</table>

The group of high frequency users accessed RHB via desktop in the highest degree, which differ from the other user groups who accessed RHB via smartphones in higher extent (Table 3). This user group also accessed RHB via email in higher degree than the others. Search engines was the most common way of entering RHB in each user group, followed by direct traffic. The high frequency user group were most active used RHB from 0700 until 1700 during Mondays-Thursdays (18-20% per day). RHB was visited by 14% on Fridays and 5-6% per day during the weekends. The medium frequency user group visited RHB from Monday to Thursday (16- 17 % per day), and from Friday to Sunday (10-13% per day) and 60 % were most actively used RHB from 0700 until 1700. Even if the majority, 56 %, of the sessions by the low frequency user group were made from 0700 until 1700, almost half, 44 % of the sessions were made between 1800-0600. RHB was used from Monday to Thursday (16-17% per day), and from Friday to Sunday (11-13 % per day).
Table 3. The percentage of devices and channels used to access RHB by the different user groups

<table>
<thead>
<tr>
<th>Devices and channels %</th>
<th>High frequency user-group n 42 579</th>
<th>Medium frequency user-group n 124 665</th>
<th>Low frequency user-group n 610 244</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desktop %</td>
<td>60</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>Smartphone %</td>
<td>38</td>
<td>65</td>
<td>63</td>
</tr>
<tr>
<td>Tablet %</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Search engines %</td>
<td>63</td>
<td>81</td>
<td>83</td>
</tr>
<tr>
<td>Direct %</td>
<td>23</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>Referral %</td>
<td>8</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Social %</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>E-mail %</td>
<td>6</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

The most visited web pages

Table 4 shows the ten most viewed web pages, numbers of page views, average time at the web page, their entrance, exit and bounce rate. RHB homepage had the highest entrance rate and was also the most viewed page followed by nine web pages. These web pages included both “category web pages” and “texts web pages” with more in-depth information. The visitors spent less time on the “category web pages” and more time on the web pages with in-depth information which also had a higher bounce rate. The “top 10” table-list of popular web pages, appeared fairly consistent during the year, with the exceptions of some topics that were more relevant to the seasons such as “children and the sun” during May-July, “child´s sleep” during April to July and “Infection guide” during September-October”. The visitors read about children and sun and children´s sleep during the sunny and bright months and about infections during the autumn. It was found differences in the “top 10” table-list between the user groups. The most visited web pages, except RHB homepage, by the high frequency user group were “category web-pages” and “text web pages” about vaccinations, the national CHC programme, paediatrics, newborns, infant formulas and screening for depression. In the medium frequency user group “category web pages” and “text web-pages” about infant formulas, the national CHC programme, vaccinations, eye disorders, child´s growth and breastfeeding problem were the most visited. The “top 10” web pages, except RHB homepage, by the low frequency user group were text web-pages about rashes and dots- infections, eye disorders, infant formulas, child´s sleep and child´s growth. The possibility in GA to measure the use of RHB internal search function has been available since 2018 mars 7e. From that date to July 31e,
3,35% of the visitors used this function to search for information. The most common search term was EPDS, a screening questionnaire for post-partum depression, with 2753 searches.

Table 4. The 10 most visited web pages, numbers of page views, average time at the web page, entrance, exit and bounce rate during the investigated year.

<table>
<thead>
<tr>
<th>Web pages</th>
<th>Page views</th>
<th>Average time</th>
<th>Entrance n (%) a</th>
<th>Exit (%)</th>
<th>Bounce rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHB homepage</td>
<td>281 355</td>
<td>00:00:45</td>
<td>231 940 (18.7)</td>
<td>27.8</td>
<td>28.2</td>
</tr>
<tr>
<td>The national CHC-program (category)</td>
<td>141 562</td>
<td>00:00:39</td>
<td>42 588 (3.4)</td>
<td>22.1</td>
<td>56.4</td>
</tr>
<tr>
<td>Vaccinations (category)</td>
<td>65 073</td>
<td>00:00:22</td>
<td>10 769 (0.8)</td>
<td>6.3</td>
<td>10.4</td>
</tr>
<tr>
<td>Infant formulas (texts)</td>
<td>48 081</td>
<td>00:03:51</td>
<td>41 017 (3.3)</td>
<td>83.2</td>
<td>86.6</td>
</tr>
<tr>
<td>Rashes and dots- infections (texts)</td>
<td>47 908</td>
<td>00:01:21</td>
<td>36 684 (2.9)</td>
<td>64.5</td>
<td>67.3</td>
</tr>
<tr>
<td>Pediatrics (category)</td>
<td>46 209</td>
<td>00:00:37</td>
<td>4 953 (0.4)</td>
<td>10.9</td>
<td>21.3</td>
</tr>
<tr>
<td>Eye disorders (texts)</td>
<td>37 066</td>
<td>00:04:05</td>
<td>33 247 (2.6)</td>
<td>89.6</td>
<td>91.9</td>
</tr>
<tr>
<td>Vaccination schedule (texts)</td>
<td>36 955</td>
<td>00:03:33</td>
<td>16 268 (1.3)</td>
<td>64.6</td>
<td>75.9</td>
</tr>
<tr>
<td>Overview- the national CHC-program (texts)</td>
<td>34 487</td>
<td>00:04:45</td>
<td>29 096 (2.3)</td>
<td>84.3</td>
<td>92.8</td>
</tr>
<tr>
<td>Newborns (category)</td>
<td>32 456</td>
<td>00:00:35</td>
<td>3 403 (0.2)</td>
<td>10.1</td>
<td>25.9</td>
</tr>
</tbody>
</table>

a Only several of the most viewed web pages are included in the table as the number do not add up to 100%.

Discussion
The result gave an overall picture of the usage over the investigated year and the various usage patterns among the user groups. The number of sessions during August 1, 2017 to July 31, 2018 were 1 235 168 sessions which showed that the usage of RHB has increased over the years. Tell et al. (2015) report a usage of RHB with 103 645 sessions during six months in 2012, 297 295 sessions the same period 2013 and 517 097 sessions in 2014. Since then, the new national CHC programme (RHB, 2008) has been a part of the updated RHB, which could possible explain the increased usage. The result showed that RHB is used in all county councils/regions, the usage has increased and the most visited web-pages, except the homepage, was the national CHC programme, valuable knowledge in the evaluation of the web-based guidelines possibilities to reach its aim; contributing to equal, equitable and high quality CHC. RHB do not use the function in GA to measure formulated goals for the website, so called conversions (Support.google.com, 2018). This function
could generate valuable information about the development of the web-based guidelines and gathering deeper understanding of user experiences.

As RHB is open access, the result does not reveal if it is the target group, professionals in CHC, or other consumers, as parents, that are the users. GA does not distinguish data by different users of RHB (Clark et al., 2014; Crutzen et al., 2013; Song et al., 2018). However, earlier studies have shown that RHB is widely used by CHC-nurses in Sweden and 76% of them were high frequency users of RHB (Tell et al., 2016) using the same definition of frequency groups as in this study. The high frequency user group accessed RHB in largest extent via desktop from Mondays to Fridays during regular office time and visited category web pages and methodological content such as the national CHC-programme and immunisations. It can be assumed that the professionals in CHC are using RHB during working time in highest degree, to get information related to the CHC programme, and mainly access RHB through a desktop in their consulting room at the CHC center. Earlier studies of CHC nurses use of RHB shows that they mostly used RHB via desktop and to a smaller extent had access to smartphones in their work (Tell et al., 2016, 2018b). The low frequency user group visited RHB, via smartphones, after office time in higher degree, were more active on the weekends and they visited in higher degree text web pages about specific symptoms. These could indicate that this user group in larger extent access RHB as private persons and not as professionals, thus it can be a CHC nurse using a private smartphone at leisure time. In a study of a Finnish governmental website (Paukkeri, 2017) similar patterns regarding time for access to the web-sites could be seen comparing authorities and applicants use of the website.

The group of high frequency users accessed RHB via email in a higher degree than the total group of users and the medium and low frequency user group, which could be an indication that there are more subscribers on the RHB newsletter in the high frequency user group. Even if email was a channel used by only a few percent of the visitors it is worth to note, as users accessed via this channel had the longest average duration of time on RHB and visited more page views than the average user during the year, i.e. a higher UE. Professionals in CHC need to keep abreast of new knowledge and to be able to work in accordance with current guidelines (Swedish society of Nursing, 2017), thus the newsletter could have an important role provide them with new research and up-dated information.

Almost three quarters of the sessions were made of new visitors to RHB, they had not visited the website before the investigated year. As a high number of returning visitors has been used as an indicator for UE with the website (; Lalmas et al., 2014; Lehmann et al., 2012; Song et al., 2018) this result point at disengagement by the users of RHB. According to Clark et al., (2014) it is not possible to draw conclusions about unique numbers of
visitors as well as returning visitors. Cookies, that are used to recognize unique browsers, could be cleared, a visitor can return to the website using a new device or a different browser and will be counted as a new visitor. These could imply that a visitor e.g. access RHB via a work place desktop daytime and return via a private mobile phone on the evening. User in the high frequency user group can also be a user in the low frequency user group. These are biases in analysis and interpretation of data from GA which make it challenging to draw conclusions about individual visitors. Thus, in this study user-groups are studied and not individual visitors.

Number of page views, the amount of time the users spend on the website and bounce rate are other metrics for measuring UE (Lehmann et al. 2012; Support.google.com, 2018). With this point of view the comparison between the different user groups showed a higher degree of UE in the high frequency group then the other user groups, as this group spent more time at RHB, visited more pages and had lower bounce rate. A higher bounce rate among smartphone users (68.7%) compared with desktop users (50.0%) were also found in a study of Vogel et al., (2016). The bounce rate differs from 50% among the high frequency user group to 75% against the low frequency user group. The “top 10”-list over most visited web pages showed a higher bounce rate from “text web pages”, which could be interpreted as disengagement, but also that the user found exactly what looking for on that specific page, but still counts as a bouncer (Clark et al., 2014; Crutzen et al., 2012; Song et al., 2018). Looking at the three web pages on the “top 10”- list with highest bounce rate, they were also those pages where users stayed the longest time, which may indicate that the visitor read the content on the page. According to Clark et al., (2014) these aspects raise the question if a bounce rate at 70-80%, as often seen, may not be as bad as it first appears.

The number of visitors and sessions on RHB were relatively stable throughout the year, with dips in December, June and July. These months contain a lot of holidays, which could explain a decrease in use by CHC-professionals at work. The same pattern with dips during these months could be seen in the study of a Finnish governmental website (Paukkeri, 2017). It could be assumed that the higher use of smartphones and lower usage of desktop in July compared with the rest of the year also could be explained by holidays and absence from the work place computer.

GA is designed to provide insights from a marketing perspective and provide aggregated data. This is a limitation when using GA in research. Even if the web analytic tool has been used in scientific studies the aggregated data made it difficult to test statistical significance for rigorous research purpose. The validity is limited when it comes to draw conclusions about UE from the conceptions of users, sessions and bounce rate (Clark et al., 2014; Song
et al., 2018). Thus, in this study the metrics of the website and its flows were in focus and the results generate valuable data which could be used to monitor the trends for the website usage.

Conclusions
The study showed the general usage of RHB, changes in usage through the year and various usage pattern in the user groups. The usage of RHB has increased, the web-based guidelines are used in all county councils/regions and the most common visited web-pages was the new national CHC programme. These data indicate that RHB is developed in the right direction reaching the aim to contribute to an equal and equitable CHC of high quality by providing guidelines to the professionals in the whole country. The result also showed the importance to study different user groups which usage pattern differs from each other and the group as a whole. This provide valuable knowledge in the development of web-based national guidelines making them useful and relevant for all its users. GA offered useful data on aggregated level on the usage patterns of RHB but need to be used in combination with other studies of user experiences. Further studies of user experiences using qualitative methods are suggested to get deeper knowledge of different user groups need and requests of web-based national guidelines.

References


ABSTRACT

In Sweden, child healthcare (CHC) is an important health promotion setting, providing universal and targeted interventions. High demands on child healthcare and the competences of CHC nurses, highlight the importance of access to supportive web-based guidelines in everyday work. The implementation of web-based guidelines is affected by various factors and can be challenging. The Swedish Rikshandboken is national guidelines for CHC that are in the process of being implemented. The overall aim of this thesis was to investigate the CHC provided in Sweden before the implementation of the national CHC programme, and the implementation and usage of web-based national guidelines for CHC. Study I aimed to investigate whether the Swedish CHC programme was equal and which methods for health surveillance the county councils offered. A web-survey distributed to CHC coordinators was used, and the data were analyzed with descriptive statistics. Study II aimed to investigate how nurses in CHC use Rikshandboken and factors affecting its use. A web survey was used and analysed using descriptive and analytical statistics. Study III aimed to investigate CHC coordinators’ experiences of being a facilitator in the implementation of a new national CHC programme in the form of a web-based guide. Focus group interviews via Skype for Business were conducted and analyzed using qualitative content analysis. Study IV aimed to examine CHC nurses’ use and ways of understanding the national web-based guidelines, Rikshandboken. A mixed method with sequential explanatory design in two phases was used; a web-survey with descriptive statistics followed by telephone interviews with phenomenographic analysis. Study V aimed to investigate the usage of the national web-based guidelines, Rikshandboken. The data were collected from Google Analytics, and analyzed using descriptive statistics. The results of the studies show that Rikshandboken is widely used and that its usage has increased. CHC nurses are generally satisfied with the website and emphasizes the importance of national guidelines for CHC. Factors needed to be developed to improve Rikshandboken were suggested as well as prerequisites that are needed in the local context to use Rikshandboken fully. It must be reliable, useful and relevant why the end users need to be involved in the development. With the right conditions, Rikshandboken could be a resource for learning and a tool in everyday work for CHC nurses. The result also shows that the CHC is provided unequally, and that the CHC programme is challenging to implement in the local context. The CHC coordinators’ task is to facilitate the implementation of the web-based national guidelines; however, this responsibility is complex. Changing the content, structure and access to Rikshandboken is not sufficient, in the local context, prerequisites for the use of these web-based national guidelines must exist, and only then can Rikshandboken be a contributing determinant to an equal CHC.