D2.5

Final Human Experience Analysis Report

D5.5

Context Design Field Trial Evaluation Report
Authors:

Professor Birgitta Bergvall-Kåreborn, Luleå Technical University of Technology, Sweden (Lead editor)
Frank Larsen, The Norwegian Center for Integrated Care and Telemedicine (NST), Norway (Lead editor)
Dr. Suzanne Martin, University of Ulster, Northern Ireland
Maria Runelöv, Municipality of Boden, Sweden
Anna-Lena Andersson, City of Luleå Social Welfare Services, Sweden
Dr. Polit. Halgeir Holthe, The Norwegian Center for Integrated Care and Telemedicine (NST), Norway
Mrs. Melanie Mc Clements, Southern Health and Social Care Trust, Northern Ireland
Alfons Kemming, Municipality of Tromsø, Norway
Contents  
SUMMARY ........................................................................................................................... 5  
1 Introduction .......................................................................................................................... 6  
1.1 The aim of the report ........................................................................................................... 8  
1.2 The report .......................................................................................................................... 8  
2 Methodology ......................................................................................................................... 9  
2.1 Framework of ideas underlying FormIT ............................................................................ 11  
2.2 Characteristics of FormIT ................................................................................................. 11  
3 THE DEVELOPMENT PROCESS ........................................................................................... 12  
3.1 General shape of FormIT .................................................................................................. 12  
3.2 Planning ............................................................................................................................ 12  
3.3 Concept design .................................................................................................................. 13  
3.4 Design Prototype of the MH@A SERVICES ..................................................................... 14  
3.5 Design final system .......................................................................................................... 16  
4 PARTICIPANTS ...................................................................................................................... 17  
4.1 Context for participation ................................................................................................... 17  
4.2 The Older participants ..................................................................................................... 18  
4.3 The professionals ............................................................................................................. 19  
5 User needs ............................................................................................................................ 21  
5.1 Individual user needs ........................................................................................................ 21  
5.2 Meta-Needs ....................................................................................................................... 22  
5.3 Main recommendations ..................................................................................................... 23  
6 USABILITY Evaluation of the prototype ............................................................................. 24  
6.1 Actual use SCENARIOS of the MyHealth@Age system .................................................. 24  
6.2 The smart phone .............................................................................................................. 24  
6.3 The safety alarm .............................................................................................................. 28  
6.4 Prescribed Healthcare ...................................................................................................... 30
6.5  Social networking ................................................................. 31
6.6  Mapping and prioritizing of improvements ....................... 32
7    USEFULNESS Evaluation of the System ......................... 34
     7.1  Use of the system ......................................................... 34
     7.2  The Mobile Safety Alarm ............................................ 37
     7.3  Prescribed Healthcare ............................................... 40
     7.4  Social networking ......................................................... 45
8    Conclusion ........................................................................ 46
     8.1  USABILITY ................................................................. 47
     8.2  USEFULNESS ............................................................. 48
     8.3  Organisational issues .................................................. 49
     8.4  Being, belonging and becoming ................................... 50
9    REFERENCES ..................................................................... 50
SUMMARY

The MyHealth@Age (MH@A) project is a three year project (2008-2010) within the Northern Periphery Program. The consortium members include Northern Ireland, Norway and Sweden each with local partnerships including representatives from business, research organisations and health care organisations.

The project aims to utilise a smart phone as a technical platform for applications that will support services to enable elderly people to live an active life, both socially and physically. The vision was to develop a smart phone that would include three services: 1) mobile safety alarm, 2) prescribed health care and 3) social network. The services were designed to increase the capacity of healthcare organisations to provide care to a growing number of clients.

Using participatory research methods the development and evaluation of the MH@A products has been organized in three phases. During the two first phases (Work package 2) the aim was to develop solutions that could fit well into the daily life situations of the participants and the health care workers, and solutions that would be beneficial to their lives and work practices. During the second phase Work Package 5 has been working collaboratively with members of Work Package 3 in user focused workshops and face to face interviews with participants to explore scenarios and ideas of how the design, interface and functionalities of the smart phone could be like to the users. Within the iterative methodology the information from the participants was fed directly into work Package 3 for further development of the products. The products were then presented to the users and both users and project members have been testing the products in meetings, during work time and leisure time.

This report presents the results from the evaluation of the use of the MH@A products in the three partner countries. The data that is presented and analysed in this report has been gathered during the last 14 months of the project. The report is a result of collaboration between Work Package 2 and Work Package 5. It is has been of significance to compare the result of the end evaluation with result from users needs analysis made by WP 2 in the beginning of the project.

During the needs analysis phase the participants emphasized the need for feeling safe and secure and an ability to live an active, physically as well as socially, life, and if they got sick they should be able to measure relevant clinical parameters at home and to communicate with healthcare professionals. This would enable them to live an independent life and to remain at home for a longer period.

The participants found both the Mobile Safety Alarm and the Prescribed Healthcare services to be very useful. These two services have the potential of being tools that can help people who need support to live an independent life. The participants have some comments regarding the usability of the products, especially regarding the smart phone that has been acting as a platform for all the three services. Healthcare professionals also found the two services useful for the participants. Although the participants think that social networking is of importance they didn’t use the Social Network frequently as they thought they already had tools for social networking.
1 INTRODUCTION

The MH@A project is a three year research- and development initiative (2008-2010) within the Northern Periphery Program, with partners from Northern-Ireland, Norway and Sweden. The overall objectives of the MH@A project are to improve health, safety and well being for elderly people in the Northern Peripheral region of Europe through the use of new products and services based on mobile telephone technologies.

The MH@A consortium aims to address the problems faced in the regions by a growing elderly population who are living longer, often with long term conditions. Therefore health and welfare organisations (HWOs) may have problems providing adequate medical and welfare services to meet their needs. In addition the consortium realize that ehealth services based on cell telephones would be a help in increasing the capacity to provide health care of good quality within the limited resources available to provide healthcare in Europe. The MH@A project may therefore be important to secure health and well being for the increasing number of elderly people in the Northern periphery regions of Europe in the coming years. The MH@A products and services focus on mobile safety alarms, personal health monitoring and social networks, identified as important by earlier projects and the users and stakeholders involved in the MH@A.

The MH@A applications stimulating social interaction among the users may also improve the quality of life for elderly people who otherwise may already be quite isolated. The net benefits of the MH@A may be improved quality of life for elderly people. The system may reduce the burden on resources (time and cost) for health and welfare organisations, and enhance service production for the increasing number of elderly people in what is called "the ageing society". Further still, the MH@A project also aimed at providing administrative services for the health professionals, making it easier for them to interact with their elderly clients, managing appointments, transferring instructions, get structured feedback regarding medication etc. This may improve the work methods and processes of HWOs.

The field trial was carried out from the fall of 2009 throughout 2010, during which the number of participants increased from the earlier phase of the project. The intention of the MH@A field trial was to evaluate equipment, products and services simultaneously in Northern Ireland, Norway and Sweden. The prolonged time period for the field trial would make it possible to improve the prototype based on early user feedback. The MH@A project comprised of 5 work packages (wps). WP 2 focused on the user needs assessment. This work package identified user needs and preferences through dialogue with older participants and professional health workers in a three-stage design process. The results were fed into the technical development process carried out in WP3. In work package 3 a functional prototype was implemented, where as work package 4 made the market analysis for the MH@A products and services. When WP2, and WP5 had iterated once by balancing the functional and technical specifications, WP3 implemented the ICT-functionality and made the prototype available for the other work packages. Package 4 was later carried out in parallel with work package 5. Through dialogues with HWO decision makers and elderly people a business model were developed which will make it possible to offer the MH@A products and services in larger scale after the project has been completed.
In person-centred clinical practice as well as in rehabilitation research, Participatory Action Investigation principles can serve as a participatory model for service development where empowerment of the users is in focus. We call this Participatory and Appreciative Action and Reflection (PAAR). The essence of the PAAR process is about recognizing the positive possibilities embedded in the current situation and taking the necessary action to positively engage with others, so that valued outcomes unfold from the generative aspects of the current situation. At the heart of PAAR are a constellation of radical questions. For example, ‘What would happen if we worked out a way for strengths to be connected to other strengths?’ ‘Would this merely help us to change systems, manage more effectively and perform better? Or would this strengths-based strategy help us not merely to perform, but help us transform these things to improve quality and enhance human flourishing?’

The MH@A project was implemented as a research and development project with three cycles based on the Form-IT methodology. The first cycle involved a needs assessment among participants and professional health workers at the three test sites in Northern-Ireland, Norway and Sweden. The second cycle comprised the design of concepts and prototypes, while the third cycle focused on the evaluation of the system in use. The Human Experience Analysis elicited user needs and desires at an early project stage. The results of this analysis were pivotal and crucial for the remaining design process. The Human Experience Analysis built on focus group interviews with selected informants, cultural probe activities, workshops, and multi-stakeholder meetings. In addition, context information was collected. The human factors analysis report of the MH@A presented earlier deals with the process from need finding (appreciating opportunity) to the first field testing of the prototype. The analysis would serve as a basis for further development of the prototype. The Human Experience Analysis and the evaluation of the MH@A products concern three test sites in Northern Ireland, Norway, and Sweden. Qualitative methods of individual interviewing, workshops, multi-stakeholder meetings and collection of context information have been conducted according to a common scheme for all test sites, allowing for comparison of data between sites. Each test site has been managed quite independently by local teams, but several coordination meetings and joint planning sessions have ensured a common approach. The descriptive and analytic results from each test site presented in this report have been put together by the local teams.

A limited number of elderly end-users and HWO employees evaluated the user friendliness, usefulness and reliability of the prototype making sure that it was good enough for the contextual design field trial. The hardware and software facilities of the MH@A were developed and evaluated through field trials in close cooperation with participants, HWO staff, Information and Communications Technology companies and research teams in Northern-Ireland, Norway, and Sweden. The planning and implementation of the field trials was carried out within work package 5.

The users have contributed extensively to the design process of the MH@A prototype, via the Human Experience Analysis and the evaluation of the products. They have been asked to make comments on the performance, applicability and usefulness of the MH@A system, and in this report we summarize the information they have provided concerning the usability as well as applicability of the MH@A hardware and services.
1.1 THE AIM OF THE REPORT

This report synthesizes the final outputs from Work Package 2 and Work Package 5 therefore reflecting the efforts of work directly with participants and service providers and also the evaluation phase of the project. The methods and key findings from the contributions made by internal project members, the participants and health care professionals are presented and synthesised.

The main objective of this report is to evaluate the MH@A products. The deliverable will focus on three issues; Firstly, assessing the user friendliness and usability of the MH@A products, secondly, to gain knowledge about how the system can fit into the daily life of the participants, and finally, to identify and map the values that the services bring to the actors, health care workers and the participants. This is the end report of the MH@A project.

1.2 THE REPORT

Chapter 3 takes a closer look at the methodology used in the MH@A project, Participatory and Appreciative Action Research (PAAR). Chapter 4 gives a description of the development process as it was structured in the project. In chapter 5 we present the group of users involved in this project, the participants, the people who have been using the services, and the health care professionals, who were going to provide the services. Chapter 6 explores and presents the experiences and reactions of participants and health care professionals to the MH@A products and services. The chapter is divided into three subsections. The first section presents the users’ needs identified and mapped in an earlier phase of the project, the second section presents the users’ view on the usability of the MH@A solutions, and the third section presents the users’ view on the usefulness of the services. Finally in chapter 7 we sum up and discuss our main findings.
2 METHODOLOGY

Participatory and Appreciative Action Research (PAAR) is the umbrella methodology for the MyHealth@Age project. There has been a creative fusion between this and FormIT (see below). Participatory and Appreciative Action Research (PAAR) can be regarded as a kind of 3rd generation of action research and builds on both AR and PAR. Arguably it can be said to be even more appropriate to research in health and social care and rehabilitation (Ghaye, 2007; Ghaye, Melander Wikman et al, 2008). In our conception of PAAR there is a focus on ‘we’ and on the idea of relationships and this requires users of PAAR to draw upon their social intelligence. Central are the processes of collective working and appreciative knowledge sharing. When the participating elderly persons are engaged in giving their view upon how the design should be to fulfil their needs and are active shapers of knowledge that is used by the technicians, this is in line with the ideas of PAAR (Melander Wikman, 2008).

![Some Characteristics of (PAAR)](image)

Figure 1. Some characteristics of PAAR.

Instead of only looking for what problems are to be solved, fixed and removed, the PAAR methodology focuses on success and its root causes, so that success can be better understood and amplified. PAAR is about what we want more of, not less of. So in the MyHealth@Age project we focused on what the elderly persons and the health care staff wanted more of. On what strengths and successes we could build. The improvements here required us to have an appreciation of aspects of “the positive present” (cf. Ghaye, 2008). It is the use of appreciative intelligence that distinguishes PAAR from PAR, meaning that is about our ability to reframe a given situation so that we can ‘see’ what the positive parts of the present actually are and to understand how they have come to be that way. This is crucial. If we fail to understand the
root causes of success, we may never be able to amplify of repeat success in the future (Ghaye, Melander Wikman et al, 2008). So the essence of the PAAR process is about recognising the positive possibilities embedded in the current situation and taking the necessary action to positively engage with others, so that valued outcomes unfold from the generative aspects of the current situation (ibid.). PAAR uses the power of the positive question when addressing service and systems improvement issues. For example: What are our successes and how can we amplify them to build and sustain a better future from valued aspects of the positive present? The rationale for framing questions of this kind is that we know that:

- We live in a world that our questions create
- Change (and hopefully improvement) begins with the very first positive question we ask
- Our questions determine the conversations we have
- The more positively we frame the question, the more chance we have to create the possible
- The use of questions can lead to positive emotions, movement and progress.

The project has also followed a living lab approach. Living Labs are an emerging phenomena and largely function as public-private partnerships whereby firms, academics, public sector authorities, and citizens work together for the creation, development and adoption of new services and technologies in multi-contextual real-life environments (Bergvall-Kåreborn and Ståhlbröst 2009). The purpose of a Living Lab is to create a shared arena in which digital services, processes, and new ways of working can be developed and tested with users who can stimulate and challenge both research and development. Part of the rationale driving these innovations is the desire to open up company boundaries in order to harvest creative ideas from different stakeholder groups.

Living Labs have emerged in areas as diverse as ICT-development, health services, and rural development, and this heterogeneity means that the concept of Living Lab can be seen as difficult to classify and describe. They have been variously defined as an environment (Ballon, Pierson and Delaere 2005; Schaffers et al. 2007), as a methodology (Eriksson, Niitamo, Kulkki and Hribernik 2006), and as a system (CoreLabs. 2007). Here we present a Living Lab project and link it to the broader field of participatory design (PD). A shared understanding within Living Lab projects is that users should not be viewed merely as passive information providers: ‘…one thing is common for all of us; the human-centric involvement and its potential for development of new ICT-based services and products. It is all done by bringing different stakeholders together in a co-creative way.’ (Open Living Labs 2009).

The development methodology that has guided the development work is called FormIT (Bergvall-Kåreborn, Holst, and Ståhlbröst 2008) and has been adopted across the three countries involved. It is a human-centred approach (Kling and Star 1998) to developing IT-based artefacts and services. As such, FormIT aims to guide and facilitate the development of innovative services that are based on a holistic understanding of people’s needs and wants, paying due consideration to issues such equity, autonomy, and control in relation to actual use situations.
In this section, we present the framework of ideas and characteristics of FormIT before we introduce the general shape of FormIT, in order to give a holistic view of the methodology.

2.1 FRAMEWORK OF IDEAS UNDERLYING FORMIT

FormIT (Bergvall-Kåreborn, Holst, and Ståhlbröst; 2008) is inspired by three theoretical streams: soft systems thinking (SST), appreciative inquiry (AI) and need finding (NF). From the first stream, SST (Checkland, 1981), the assumption is that changes can occur only through changes in mental models when utilized. This implies that we need to understand both our own as well as other stakeholders’ worldviews and we need to be clear about our interpretations and the base on which they are made. The second stream, AI (Cooperrider and Avital, 2004), has encouraged us to start the development cycle by identifying the different stakeholders’ dreams and visions of how IT can improve and support the lives of people. This includes a focus on opportunities, related to specific trends, contexts, or user groups, and on the positive and life-generating experiences of people.

This way of thinking is closely aligned with the philosophy behind SST, since it also highlights the importance of people’s thoughts about themselves and the world around them in a design situation. Hence, instead of starting the process by searching for problems to solve in a situation, we identify what works well and use this as a basis for design.

The third stream, NF, has two different inspirational sources. The NF concept, as such, and its motivation finds its origin in a paper by Patnaik and Becker (1999). Patnaik and Becker (1999) argue that the main motivators for the NF approach are that needs are not influenced highly by trends; hence, they are more long lasting. The needs generation process, on the other hand, is inspired by Kankainen and Oulasvirta (2003) and Tiitta (2003). These authors inspire us to focus on user needs throughout the development process and to use these as a foundation for the requirement specification.

2.2 CHARACTERISTICS OF FORMIT

Grounded in these three theoretical streams, FormIT enables a focus on possibilities and strengths in the situation under study; this is fundamentally different from traditional problem solving approaches. In our perspective, identifying opportunities is the basis for appreciating needs since needs are opportunities waiting to be exploited (Ståhlbröst, 2008). Hence, FormIT strongly stresses the importance of the first phase in the concept design cycle, usually referred to as analyses or requirements engineering. Since this phase creates the foundation for the rest of the process, errors here becomes very hard and expensive to correct in later stages. This also is the phase in which users can make the strongest contributions, by actually setting the direction for the design rather than mainly responding to (half finished) prototypes. Since users’ needs and requirements can change as users gain more knowledge and insights into possible solutions, it is important to continually re-examine their needs and make sure they correlate to given requirements.

In accordance, the FormIT method is iterative and interaction with users is an understood prerequisite. The idea is that knowledge increases through iterative interactions between phases and people with diverse competences and perspectives. In this way, knowledge increases through dialogue among participants. The idea is that the cross-functional interaction enables the processes of taking knowledge from one field to another to gain fresh
insights, which then facilitates innovative ideas. The shared understanding of the situation informs and enriches the learning processes and thus facilitates changes in perspective and leads toward innovative design-processes. This, in turn, increases our qualifications to design IT systems that answer to user needs (Ståhlbröst and Holst, 2006).

3 THE DEVELOPMENT PROCESS

3.1 GENERAL SHAPE OF FORMIT

The FormIT process can be seen as a spiral in which the focus and shape of the design becomes clearer, while the attention of the evaluation broadens from a focus on concepts and usability aspects to a holistic view on user experience and benefits with using the system; see Figure 2.

In this process, three phases – generate needs, design, and evaluate – are repeated in three iterative cycles. The first cycle is called concept design, the second is prototype design and the third is final system design. The name of the cycle indicates the expected output of each cycle. Besides these three cycles, two additional phases are included in the figure. The first is planning, seen in the upper right hand corner of the figure and the second is commercialization. The focus of this paper is concept design, which is managed in the first cycle, illustrated in the upper level of Figure 2.

3.2 PLANNING

The planning phase began by writing the research funding application with partners from the three countries together with three elderly people from Sweden representing potential users. This provided the elderly with an opportunity to have an impact on the aims and scope of the project, rather than be enrolled at a later stage when the funding has been secured and project objectives have been agreed and defined.

Writing the application was also the starting point for deciding the project team on an overall level and discussing such issues as the purpose of the project, the specifics of the context, important constraints and relevant methodologies, and methods for the project as a whole. This facilitated the creation of common perspectives as well as understanding differences in values around these issues.

In the planning process the three areas (safety, prescribed healthcare, social networking) were also discussed and it became clear each had different boundaries. Safety was already predefined to represent a safety alarm that had previously been developed for indoor use. The boundaries around prescribed healthcare were less clear, but it was to include taking medical tests at home and sending the results to health professionals. Social networking was the most open area, with no clear predefined concept. It was intended that these three areas would be combined into one system.
3.3 CONCEPT DESIGN

In the first phase of Concept Design (Bergvall-Kåreborn and Ståhlbröst 2010), a number of need generating sessions were held with the two user groups, older participants and health professionals in order to understand their needs, behaviour, and hopes related to the key areas of the project (safety, well-being, and social networks). This was done using methods such as focus group interviews, workshops, and cultural probe (for more detail see report 2.4). Based on these activities 74 needs were interpreted by the researchers from the statements and stories provided by participants. These were then clustered around the three themes of the project: safety (12 needs), well-being (49 needs), and social contact (13 needs). While this activity could have been carried out in conjunction with the participants the assumption was that the task was too time consuming and that it would be worthwhile for the researchers to interpret their stories and relay this back for feedback. (The complete list of needs can be found in report 2.4).

While we were aware of the need to generate a higher level of understanding and move from individual statements to a more thematic approach, nevertheless we were concerned that our interpretations should be transparent and could easily be traced back to statements from the user group. In order to explain our interpretation and to keep the traceability between statements the information was linked together in a table. This allowed the elderly representative group to provide feedback on areas of misunderstanding. A common problem when generating user requirements is that the process is often opaque and users are expected
to make the mental leap from translating their practical needs into abstract diagrammatical representations.

After this we ranked and clustered the needs into meta-needs, both on a national and international level. This allowed us to identify national differences. Once the needs had been clustered, additional meetings occurred where the elderly, health professionals, designers, developers, and researchers together discussed how the identified needs might be supported by ICT. At this phase the project leader, developers, and researcher became the dominant players with the elderly participating in assessment and evaluation, rather than idea generation and design. Scenarios were developed to depict a ‘typical user’ and their range of needs in order to provide the developers with a broader understanding of the users, their context, and important situations in their life. The aim was to create a bridge between the people carrying out the fieldwork and the system developers, while maintaining close contact with the users. In addition to creating a story we added quotations from the users in order to give the developers a more diverse picture of the users, using quotations from different people linked to the same need. This form of illustration is richer than simply providing one mainstream scenario and generates further debate and discussion of the needs. Regarding traceability, it is possible to return to the quotations throughout the project when there is uncertainty as to what a need really stand for, or should stand for. This allows for people to discuss and question the framing and formulation of a need and express different opinions as to what certain quotations represent and imply.

However, during this phase we also identified the needs that fell within the boundary of the project and constituted the base for the conceptual models and requirements. This was done during multi-stakeholder meetings which are taking place every six weeks to discuss issues concerning needs, design concepts and emerging requirements from different perspectives. Based on the identified needs that fell within the boundary of the project we also developed traditional scenarios that described parts of the MyHealth@Age system as well as possible use situations. However, the participants did not really feel that these pictorial descriptions added much to their already established understanding of the services gained through the multi-stakeholder meetings.

During this phase and the two following phases multi-stakeholder meetings was held in each country on a regular interval. This meant that the group of participants together with representatives from the health care and care sector, the IT companies developing the service, and researchers, were having seminars around issues that needed to be discussed in order to develop the MyHealth@Age services. The participants were frequently visiting the meetings and also active.

3.4 DESIGN PROTOTYPE OF THE MH@A SERVICES

In the second phase the list of needs and the concepts designed in the first phase were translated into system requirements. Based on these requirements the first prototype was developed. This work was mainly carried out by the project leader, researchers within WP 3 and WP2, and software professionals. However, the users and other project participants were also involved in this phase, but their role was mainly to assess the requirements and prototype and come with suggestions for modifications and improvements.
The first prototype consisted of a mobile telephone with an integrated fall sensor, a GPS locating system, as well as software enabling transfer of personal health information and social networking. The fall sensor alarm and GPS locating systems communicated with a central alarm server at a care or health care organisation in each country. The personal health data was communicated to a GP or specialist nurse team via a web based interface and the social networking facility was based on swarm technology.

The project members presented standard smart phones and software programs specially developed for the MyHealth@Age project to the users during autumn 2008 and spring 2009. During focus groups meetings the users, the participants and the health care workers, discussed and evaluated the smart phones, the software programs and the services. During these meetings it became clear which smart phone the users would prefer. The smart phone would be the platform for the participants’ use of all the three services while the health care workers would use their normal work station.

At the beginning of the use and assessment period of the system (autumn 2009) it was agreed in the project consortium that each test site should have a specific focus on one of the three services of the MyHealth@Age system: Tromso should focus on the alarm facility, Luleå should concentrate on the health monitoring system, and Belfast on the social networking facility.

During autumn 2009 and winter 2010 the functional design of the MH@A products was tested. This phase also included a technical assurance made to ensure the technical quality of the MH@A products as well as the operational environment, customer- and technical support. Participants, health care workers and project members have been testing the smart phone and the services. Different methods have been used to gather data: verbal comments, observation and written material. This triangulation of methods and sources has strengthened the relevance of the data.

The end-users have been given opportunity to test the products on an individual basis and in groups or forums. During focus group meetings the project members demonstrated the MH@A products and manuals were handed out. During the meetings the end-users tried out a list of tasks and commented the products as they went about the tasks, a “think aloud” way of testing products. The meetings also enabled the project members to observe the end-users while they were using the products. Project members have also been testing the products. The purpose of the testing was twofold: 1) to test the overall system, the different applications and the communication between applications and the manuals, 2) to get to know the system before it were demonstrated to the users. It has been important that the users, the participants and the health care workers, should be able not only test the MH@A products during meetings but also during every day life or working days.

During the test period a common excel sheet was published on the project coordinator. The local project organisations in Sweden, Northern Ireland and Norway could put their suggestions to improvements in the excel sheet. There are total number 42 improvements included in the list (Delivery 5.4 – Functional Design and Technical Assurance and Evaluation, Appendix 2). 32 of the proposed improvements were related to the prescribed healthcare application, 6 to the safety alarm application and 5 to the social network application. The person(s) or group who made the proposed improvements marked them as “high priority”, “medium priority” and “low priority”. The improvements were then discussed
and prioritized in a meeting in Sweden in the beginning of February of 2010 where all the local project organisations participated. After the prioritization was completed, the companies that are responsible for implementing the proposed improvements estimated how many hours each improvements would take. In mid February 2010 the list of proposed improvements related to prescribed healthcare was completed. As there was not enough hours available for all the proposed improvements members of the MH@A project had to decide which improvements to be realized. Most of the prioritized improvements were things that are meant to improve the usability of the prescribed health care services for the participants.

3.5 DESIGN FINAL SYSTEM

During the third phase the users, the participants and the health care professionals, started to use the MH@A products. The field trial started in autumn 2009 and lasted until November 2010. The evaluation of the MH@A products has been an ongoing process during the whole field trial period.

Different methods can be employed to evaluate new eHealth services, both quantitative and qualitative. Quantitative methods are focusing on quantitative properties of the phenomena and the relationships between phenomena. The result can be presented by numbers. Numbers of users, numbers of work operations to perform a task, response time, failure rate, costs etc. are variables that can be measured in order to evaluate the services. Qualitative methods are focusing on the qualitative properties of the phenomena. The result can be based on the qualitative reactions to the system of the participants and the health care professionals.

This evaluation is based on the use of interviews; both focus group and individual interviews. The interviews were conducted by project members who had conducted interviews during earlier phases of the project. The interviews were based on semi structured interview guides. There were a number of open ended questions, some followed up by triggers. The interview guides focused on the usage and usability of the services, the process of using the services in everyday life and the values that the services bring to the users, both to the participants and the health care providers. The pro of open ended interviews is that they give us a richer and deeper understanding of the phenomena. They give the interviewed a possibility to present themes that the researchers had not been considering before the interview started and it allows the interviewer to follow up the answers of the interviewed with additional questions. But individual interviews are resource demanding. In this project we have normally been using focus group interviews. The pros of focus group interviews is that is less resource demanding and that interviewees can comment on themes brought up by other interviewees. The con of focus group interviews is that the situation can be dominated by one or two talkative persons. The interviews should be performed by a skilled professional. Our impression is that both participants and health care professionals are talkative and have come to know each other after meeting each other on regular bases for a long period of time. It has been also been of benefit that interviewers have been the same persons for the whole project period.

A formative element has been a part of all the previous evaluation reports. It has been important for us to identify and document the reactions of the users to the MH@A products and services during the whole project period. These reactions were meant to be translated into requirements that could improve the products and produce services that are in accordance with the user’s needs. This formative aspect has also been a part of the evaluation phase.
In Boden there has been twenty-one meetings with the elderly since May 2009 - October 2010. The meetings have taken place at Boden city hall and almost everyone of the 13 elderly have participated in the meetings. In the beginning, there were 15 elderly, but 2 decided to withdraw from participation. One because she had too much to do and it all together made her sick. The other was a friend of her, who decided to drop of when her friend left. In 2010 there has been 3 drop out for some months. One participant had a stroke and couldn’t participate, one had a leg operation and wasn’t allowed to walk for 3 months, and the third was her husband. Two of them have rejoined the group during the fall. The final field trial in Sweden began the 26th of August and ended 10th of October. 12 participants participated in the last field trial.

Within Northern Ireland participant meetings specifically focusing on the field trial were scheduled on a fortnightly basis between April and November 2010. These took place in Newry city with the rural participants commuting from home into the central location. At one stage there were 15 older people attending however the cohort averaged approximately 12 at each session. The reason for some of the drop outs related specifically to the usability issues of the smart phone. This built up significant frustration with some of the participants who did try to persevere with the device.

Within Norway participant meetings have been arranged every sixth week between September 2009 and November 2010. The meetings took place in a nursing home in the municipality of Tromsø. A total number of 13 participants have attending the meetings, but normally 8-9 participants have attending each session.

## 4 PARTICIPANTS

### 4.1 CONTEXT FOR PARTICIPATION

The MH@A project has involved two groups of users. The first group is older participants for whom the MyHealth@Age system is designed. The second group is the health care professionals who use the MyHealth@Age system as a new service interface towards the elderly people.

**Northern Ireland**

In Northern Ireland the research organisation of the University of Ulster (TRAIL living Lab) worked in partnership with the Southern Health and Social Care Trust (http://www.southerntrust.hscni.net/). The Southern Health and Social Care Trust (SHSCT) is a National Health Service (NHS) organisation providing Acute and Community based Health and Social Care services to people who live in the regions of Armagh, Banbridge, Craigavon, Dungannon and Newry and Mourne. The Southern Health and Social Care Trust delivers services to the population through four main Programmes of Care.

- Children’s Services;
- Mental Health and Disability;
- Acute Services and;
- Older People and Primary Care.
The Promoting Well Being Department, which sits within the Directorate of Older People and Primary Care has worked directly on MyHealth@Age, with support from specialist nurses and personnel from the established telehealth projects. With a brief to focus on community development and health improvement this department sought consensus from volunteers from the Newry and Mourne area to participate in this project with support from the Confederation of Community groups in Newry. The SHSCT has a strong ethos of user involvement in service design, delivery and evaluation. This project is aligned to this ethos and also the desire to empower people to such a degree that they can self manage, take responsibility for their own health conditions and live a full and engaged life in local communities.

**Norway**

The MyHealth@Age project in Tromsø was organised by The Norwegian Center for Integrated Care and Telemedicine (NST) in close collaboration with Tromsø Municipality. The MyHealth@Age project team in Tromsø consists of four people from NST and two from Tromsø Municipality. The project management group organised regular meetings throughout 2008, 2009 and 2010, and also participated in weekly overall project development and management telephone conferences with the partners in Northern-Ireland and Sweden.

**Sweden**

The participants in the study in Sweden, and participating in the multi-stakeholder meetings, consist of the following people:

- the project leader;
- older people who had been involved in previous projects and participated in writing the application;
- persons formally representing elderly organisations, usually elderly people themselves with a good understanding of elderly issues in general;
- older users recruited to broadly represent the target group of the proposed system;
- alarm professionals from the municipality of both Luleå and Boden;
- healthcare professionals from Boden municipality (a GP and a physiotherapist);
- designers and developers from industry (Artic Group and Tieto);
- researchers from Luleå University of Technology.

**4.2 THE OLDER PARTICIPANTS**

There have been approximately 13 participants between the age of 60 to 85 participating in the project from each country. Between 5-10 of the participants, in each country, participated in the concept design phase during the first year of the project. As the project entered the testing of prototypes design additional participants were recruited. In Sweden and Norway most of the participants lived with family/carrier and only few lived alone, while in Northern Ireland the majority lived independently in their own homes. Most of the participants were physically and socially active with established social networks. We wanted to recruit participants living in rural as well as urban areas. In Sweden and Norway the majority lived in urban areas while in Northern Ireland the majority lived in rural areas. One important issue linked to this is the distance between their home and their local health centre. The group also includes both sexes in all three countries.
Table 1 below provides a summary of the main characteristics of the initial group of the participants. In Sweden the participant user group selected according to the inclusion criteria was extended with additional five people in order to safeguard the continuity of user experience from previous research projects. The group was also extended in order to further strengthen the selected group with people representing elderly organisations, and thus with a good understanding of elderly issues in general.

**Table 1. Summary of the participant user characteristics**

<table>
<thead>
<tr>
<th>Demographic factors</th>
<th>Norway (n=12)</th>
<th>Northern Ireland (n=12)</th>
<th>Sweden (n=13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Mean = 67 years (61-74)</td>
<td>Mean = 74 years (67-84)</td>
<td>Mean = 73 years (59-80)</td>
</tr>
<tr>
<td>Gender</td>
<td>6 female, 6 male</td>
<td>6 male, 6 female</td>
<td>5 female, 8 male</td>
</tr>
<tr>
<td>Living condition</td>
<td>3 living alone, 9 living with partner</td>
<td>11 living alone, 1 living with partners</td>
<td>2 living alone, 11 living with partner</td>
</tr>
<tr>
<td>Location of living</td>
<td>11 living in the city, 1 living 30 km from the city centre</td>
<td>1 living in the city, 11 living in rural area 8 km from city</td>
<td>13 living in a city with 0-4 to 8 km to the city centre</td>
</tr>
</tbody>
</table>

**4.3 THE PROFESSIONALS**

The importance of including different professionals’ perspectives in the development of the MyHealth@Age system has been appreciated from the inception of the project. To reflect the differing approach to health care delivery within each region the MyHealth@Age system has been integrated into current service delivery models. This is an important feature of the system. The Prescribed Healthcare and the Mobile Safety Alarm services are the main services requiring action and communication from professional staff, while the social network is the only service that is independent of the health care organisations. The prescribed health care service links to the health care professionals whereas the mobile safety alarm links to alarm centre staff. In total there have been 8-30 professionals involved from each country. For more detail see Table, 2.

**Table 2. Summary of the health care professional characteristics**

<table>
<thead>
<tr>
<th>Professional roles</th>
<th>Norway (n=30)</th>
<th>Northern Ireland (n=8)</th>
<th>Ireland (n=19)</th>
<th>Sweden (n=19)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General practitioners</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>(GP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------------</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td></td>
</tr>
<tr>
<td>Allied Health Professional</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nurse/nurse assistant</td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alarms service professions – (receiving the alarms from participants)</td>
<td>25</td>
<td>2</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Alarms service professions – (finding and helping participants)</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>
5 USER NEEDS

5.1 INDIVIDUAL USER NEEDS

Based on the work described under section 5.3 – Concept design, 74 needs were identified and from these 45 were judged as relevant for the MyHealth@Age project and selected as the base for the system design. Of these 45 needs five needs were overarching and as such they related to the MyHealth@age system as a whole, rather than any of the three functions. In relation to the three functions, 9 of the needs where related to safety alarm, 19 to health monitoring, and 12 were related to social networking.

Of the needs related to one of the three functions it was the well-being and safety functions that the elderly users could relate to with ease. The social networking felt most abstract to them, and many of them did not really feel of need for IT-based services related to this function. When they did it was usually in relation to the two other functions, safety and well-being, not as a service focused on social networking in it self. The needs, listed below, constituted the base of the work in cycle two, prototype design.

Overarching needs (5)
- Need for mobility
- Need for individual solutions
- Need for easy communication
- Need to be independent of one’s children
- Need not to worry or burden one’s children

Safety alarm (9)
- Need to feel that someone notice if anything would happen to me.
- Need to be able to call for help when stuck in the bath
- Need to find my way geographically when I am out
- Need to feel safe in rural areas
- Need to feel safe when walking in the forest
- Need to feel safe at night
- Need to feel safe when it is dark
- Need to not be afraid of falling
- Need for family members to feel secure without disturbing me and intruding on my life

Well being and Health monitoring (19)
- Need to manage basic health issues such as food, exercise and medicine until the age of 70-75 at least
- Need to have a diary
- Need for positioning; localisation facility
- Need to get support/check up of prescribed home exercises
- Need not to eat to much
- Need to have access to my own medical data at all times
- Need for easily understandable information about my health
- Need to know how to reach my doctor
• Need to be able to transfer medical data to medical personal.
• Need to receive feedback from relevant medical personal
• Need for feedback from the GP on what they want or not, or on tests taken
• Need to take tests at home
• Need for monitoring well-being (medical and physical) parameters
• Need for nutrition information
• Need for medication reminder
• Need to know why the measured values are unstable
• Need to be able to check with medical personal that I have received the right medication.
• Need for people to keep appointments

Social networking (12)
• Need to participate
• Need to be asked for, to be missed
• Need to be occupied
• Need for social network
• Need for easy access to contact information to family and friends
• Need for user-set contact list
• Need for networking facility
• Need to be able to contact family and friends
• Need to be able to use technology to contact family and friends
• Need to be able to use different media to contact family and friends.
• Need for easy way to take photos and to share them with other people
• Need to have the possibility to social contact when I feel a need for it

5.2 META-NEEDS
From the above list of needs we also created a list where these needs were clustered into so-called meta-need. The reason for creating meta-needs was to be able to create sub-functions within each function and from these sub-functions develop illustrative concepts describing the systems main functionality.

Overarching needs (4)
• Need for mobility
• Need for individual solutions
• Need for high usability of the system
• Need for creating/maintaining an independent relation with ones children

Safety alarm (3)
• Need for personal safety (includes both actual and experienced safety)
• Need for easy communication and notification to relatives and friends
• Need to feel safe in rural areas

Well being and health monitoring (7)
• Need for monitoring and controlling ones own well-being and health (both in general and in relation to specific treatments)
• Need for reminders related to treatments and medication
• Need to be able to take tests at home
• Need to have access to my own medical data at all times
• Need to understand the information received, stored and sent regarding ones own health
• Need to communicate with health care staff in new ways (not only by physical meetings and through phone)
• Need to exchange information between elderly people – professional health care staff

Social networking (5)
• Need to have the possibility to socialise when one feels like it
• Need for easy ways to create and share information (photos, film, letters, chat) with family and friends
• Need to be able to communicate with family and friends through different media
• Need to feel a part of social groups
• Need for easy access to contact information to family and friends

5.3 MAIN RECOMMENDATIONS
The main recommendations of the human factor analysis team were to allow for personalisation of the health monitoring and social networking facilities. The GPS locating system should only be activated when an alarm is triggered so as to maximise availability of battery power. In connection with the social network facility the GPS locator should be easy to switch on and off. The communication between the fall sensor and the alarm central needs to be further tested. The interface of the health monitoring facility is evaluated as applicable by the participants, but the communication between GPs and their clients should be subjected to further testing. Optional strategies for financing of the equipment and the running of it should be available as soon as possible.
6 USABILITY EVALUATION OF THE PROTOTYPE

In this section we assess the usability of the MH@A products as well as the device, the smart phone, which have acted as a platform for the solutions. In this evaluation interviews and focus group interviews have been organized as an information gathering methods where the users’ reactions have been identified, analyzed and documented.

6.1 ACTUAL USE SCENARIOS OF THE MYHEALTH@AGE SYSTEM

All the older participants have had access to the mobile safety alarm functions, either via the smart phone or via a fall sensor. In Norway and Sweden the participants were to trigger the alarm during specific periods. In relation to the mobile safety alarms there have been two groups of professionals involved, one group has received the alarm and another group has responded to the alarm. In Sweden the alarms have been sent to an alarm centre where they have been received by the same health care professionals who receive the normal safety alarm calls. This group then forwarded the alarm to a second group of health care professionals who responded to the alarm. This group tested the technical functionalities of the system for the GPS and confirmed that it was operationally stable. In Norway the test has only included the professionals that receive alarms, no alarms have actually been sent to the responding group. Within Northern Ireland this scenario has been simulated and discussed with the commercial provider of telecare, in the absence of a live pilot.

Prescribed Healthcare functions was available to participants in Sweden and four of the participants in Norway used the service. During the field trial period this group of users had the opportunity to communicate with health care professionals. In Norway the four participants were to communicate with their GP and in Sweden the participants were to communicate with their GP and/or a physiotherapist. The organization of the services has been worked out by the health care professionals. In Northern Ireland this service has not been operationalised, instead it has been explored by the use of mock up demos and scenario building.

The Social Network gives the participants an opportunity to communicate with each other. They have a possibility to establish forums, organized around a specific activity (going for a walk, exercise, cultural activities, discussions etc.) or to use it as a message board. The Social Network is not a service, meaning that there is no moderator involved; the use of the Social Network is based on initiatives and activities performed by the participants themselves.

6.2 THE SMART PHONE

The older participants

In SWEDEN, 12 of the 13 participants who have been testing the smart phone are in possession of a mobile phone. Every one of the participants has used the smart phone since the day they got them. One of the participants hasn’t used it so much, because he had a double subscription on his regular mobile phone, but technically it didn’t work. When he used the
alarm or the prescribed healthcare, he switched SIM-card from his regular mobile phone to the MH@A smart phone. Also the health care workers (3) from the municipality of Boden have been using the smart phone. The GP and the physical therapist have been using a computer to answer the test result and to send out prescriptions to the participants. But they could also use the smart phone to communicate. In the beginning there have been 7 care workers from the municipality of Boden, but in the end only 3 of them stayed in the project. The reason for the drop out was that they felt stressed when they had to answer the alarm, while others weren’t interested in the project.

Since the participants have been using the smart phone, they have been able to compare the Sony Xperia with their own mobile phone. The participants have several comments regarding the smart phone such as.

- The symbols on the edge are hard to notice
- The size is ok, but the phone is quite heavy
- The pen is to small (thin)
- The hard key pad is not necessary (when you have a soft key pad)
- The telephone menus are too difficult to understand
- The menus of the applications are easy to understand
- The way to move between programs is difficult to understand
- The period before the light on the screen fades away is to short
- Battery time is too short
- It is difficult to press the keys with the pen both on the soft panel and the hard panel
- It is hard to know if the phone is on or off
- The size of the text is to small

Most of the comments were related to the use of the smart phone. The participants find the smart phone very complicated. They said that it takes a lot of practice to use the smart phone. One even said that because of the phone, he hasn’t used the different services. But some thinks it is good to have radio and camera on the phone. One has even added an audio book on the phone, as he is listens to when he goes for a walk. Some of the comments can be interpreted in a context where the users are not accustomed to the use of the Sony Xperia menus, for example that the menus are difficult to understand and it’s difficult to move between applications. The font size is still too small. One of participants had an idée that the phone could be controlled by voice. The menus for prescribed healthcare are clear. They are easy to read and easy to understand. But when the text is written with red on black background it is hard to say what it says. The menus for the mobile safety alarm are also easy to understand. The screen contains two big squares, one with the alarm button, and one button to shut down the alarm. There are 5 small dots or symbols that inform the user about the status of the: 1) fall sensor, 2) battery capacity for the smart phone, 3) battery capacity for the fall sensor, 4) connection to the alarm centre, 5) if you have a GPS-position. Some of the participants have been thinking about the small dots on the menu, and some of them have not, but everyone agreed that it was good to have them there. They also think that it was good to have all of the dots, not less. That the battery time is short can also be interpreted in a context. The battery capacity is related to the use of different applications, the GPS, for
example, uses a lot of power when it’s turned on. In mars 2010, the technician from the vendor company, implemented an improvement so the battery capacity increased. The participants found the battery capacity better after the upgrade. The participants have tried the smart phone outside in daylight and they had trouble to see the text on the screen.

Most of the participants used the soft keypad, but some of them used the hard keypad. Some had problem to hit the right letters when using the soft keypad.

Some of the participants wanted to simplify the phone, so it looks more like a regular safety alarm.

In NORWAY, as in the other two countries, a Sony Ericsson Xperia has served as a platform for the use of the three MH@A services. All the participants have their own mobile phone, a mobile phone they carry with them and use on regular basis. The participants have often, during discussions of the pros and cons of using the Xperia smart phone, been comparing the Xperia with their own mobile phone. They compared the size of the phones, the screen and the keypad, the weight and the menus. They knew that the smart phone needed to be windows based, but their own telephone became more like an ideal phone the Xperia could be evaluated against.

Many of the comments regarding the smart phone the participants made during the test period were repeated during the field trial period. The participants found the size of the phone to be too big and too heavy. They made a comparison with their own mobile phone, not only did compare the usability of the phones but also how it was to bring the phone with them while walking or travelling. The weight of the phone made it less convenient to bring with them compared with the one they normally use. During a requirement specification process early in the project period the participants said that smart phone should include a hard key pad. The rationale behind the requirement is that elderly people are accustomed to use of a hard key pad, but the participants also wanted to test soft key pads. During the training session we observed that the participants were able to use the soft key pad, and the focus group interviews with the participants revealed that they normally have been using the soft key pad.

The battery capacity has been of major concern during the field trial period. Already when the project members presented the idea about a mobile safety alarm the participants were concerned about the battery capacity. They were focusing on using the safety alarm as a technology that would enable them to be more mobile, both in urban area and out in the nature. To be out in the nature, at the cottage, picking berries or fishing from a boat, a situation where there is no access to electricity the battery capacity is vital to participants in Tromsø. During the field trial the participants noticed the battery faded very quickly and they had to recharge the battery quite often.

The participants found the Xperia menu complicated to use. During the training session and the following discussion the participants compared the menu on their own mobile phone with the smart phone. Although they recognized that the their comments regarding their reaction to the menu on the Xperia were based on a comparison with their own mobile phone, a menu they were accustomed to, they found the menu on the Xperia to be more complicated also because the menu had a number of extra functions. The ideal phone for them was their own phone, or more precise, in the future they wanted to have the possibility to integrate the MH@A products in to whatever mobile phone they own.
In **Northern Ireland** all the participants were issued with the smart phone. The use of the device including charging and turning on and off was demonstrated in the group and also one-to-one with participants. A user friendly manual of device operation was also developed and provided for home use. Sim cards were provided. A major problem was evident from the outset relating to mobile telecom network stability along the border region. This resulted in fluctuating service access and high costs incurred.

In **NORTHERN IRELAND** the majority of the participants had existing mobile phone with pay as you go contract option. They had chosen simple devices and elected when to turn on/off the phone. They had tended to be selective in use in terms of time of usage and also who they would share the number with. Within the myHealth@age project the older people were encouraged to adopt the selected device as their main phone. They found the device very complex for a range of reasons.

The stylus was difficult to locate and remove against contemporary design and colour of the phone. However they found it useful.

- The icons for example on/off button were difficult to see
- The phone was heavy
- The hard key pad was redundant
- The telephone menus were difficult to understand
- The phone settings were difficult to locate and change for example the alarm
- The way to move between programs and applications was difficult to understand
- The period before the light on the screen fades away was too short
- Battery time was too short
- The text was hard to read

As a result of the above issues a significant proportion of the field trial time was taken up on resolving usability issues flagged up by the participants. This tended to knock the participants confidence and therefore self esteem around how useful they could be to this project.

**The professional participants**

In **SWEDEN**, both project members and health care workers have been testing the smart phone. Two of the project members are also health care professionals representing two of the health care organisations that the participants are going to communicate with. The project members and health care workers were focusing on the usability of the phone.

Comments made by the project members and health care workers:

- Bad sound quality/low volume if you don’t hold the phone in the right position.
- The telephone is heavy
- Long time from it’s turned on before it’s ready
- The keypads are small
- The telephone is sometimes locked and it is impossible to turn off and on without having to remove the SIM.
- Difficult to change battery and SIM
• The battery time is short
• The smart phone is too complex
• The menus on the mobile safety alarm are easy to understand and easy to find. Good to have a picture of the one that made an alarm
• Easy to find the participants on the map

In **NORTHERN IRELAND**, for the purposes of the field trial the smart phone was reviewed by technical experts and Healthcare professionals. Overall, the findings concurred with those of the older people outlined above. In summary the view was that the phone couldn’t accommodate for any of the declines in sensory or physical function occurring naturally as part of the ageing process.

### 6.3 THE SAFETY ALARM

**The older participants**

In **SWEDEN**, when the participant makes an alarm call the alert is sent to the Lighthouse (Fyren), the alarm centre. The personal at the Lighthouse make a call to home care personal in Boden, Sandbacka, and the home care personal call the participant and try to find him or her.

Three times, the participants got a schedule to make one or more alarms. The participants had their own day to try the alarm. The participants could choose not to follow a schedule, but all of them wanted to follow a schedule. On a question does the fall sensor make them feel safer, they said it’s hard to imagine because this is only a test.

One of the participants has tried the alarm daily. Most of the time, it has worked well. But sometimes the positioning wasn’t right. When the ash cloud was over north of Sweden, the GPS position didn’t work. On the question of where the alarm should go to all of the participants wanted the alarm to go to an alarm centre, and not to relatives. The communication between the participants, the alarm centre (the Lighthouse) and Sandbacka worked ok, but sometimes the participants didn’t get an answer from the Lighthouse and Sandbacka.

• I will not bother my children with my worries. I want professional care if the accident happens
• It’s complicated to activate the alarm, since you have to change the panel. It’s easier and faster to dial 112
• One said he made an alarm in another city, but then the alarm centre couldn’t find him.

In **NORWAY**, the participants have been testing the alarm in group sessions and individually. In order to trigger an alarm they had to press the alarm button until a signal tells them that the alarm has been activated. The participants found the alarm menu quite user friendly, but in the beginning they had some problems cancelling the alarm. When the participants evaluated the whole concept of the alarm services their major concern was the battery capacity and the smart phone.
The fall sensor should be able to communicate with the smart phone up to a distance of ten meters and the participants can deactivate the alarm both from the fall sensor and the smart phone. The participants were able to activate the alarm via the fall sensor and to cancel the alarm via the smart phone. To cancel the alarm via the fall sensor was a little bit trickier because they had to press a button on the fall sensor three times, and every time they had to wait for an audio signal before they could press one more time.

The participants were concerned about some specific issues regarding the mobile safety alarm: What are the areas covered by the GPS? Who are responsible for taking action when the participants are outside the municipality? Will the personnel be able locate a person buried under snow via the GPS, for example if an avalanche hit the person while he or she is skiing in the mountains?

Within **NORTHERN IRELAND** the participants were generally very positive about the safety alarm. The ability to use in remote rural areas was considered particularly helpful. In addition participants liked the fact that they could request assistance by engaging the system, and additionally that the system was ‘smart’ enough to understand if they had fallen and might require assistance. Fall scenarios for each participant were described and discussed (some based on real life experience). From this the ‘what if’ exemplars emerged for example what if the sensor fell from my person, or what if I couldn’t communicate with the phone. Over all both the male and female participants reported that they would wear the sensor and didn’t consider it too large or visible.

The health care professionals could appreciate the value of the service even though they are not directly involved in it. This was considered an important service that would directly meet the needs of older people. It was also considered a useful tool to decrease the anxiety levels of children who lived/worked a distance from elderly parents. The system by directly addressing the safety and social isolation issues of older people has potential to have positive impact on reduced need for health service intervention.

**The professional participants**

In **SWEDEN**, at the alarm centre The Lighthouse 13 healthcare professionals has been involved during the field test, answering mobile safety alarm from 13 participants. Before the on- site installation of the equipment at the Lighthouse all technical parts was tested. The equipment consisted of two mobile phones and a computer used as an alarm computer. This pre test was done in order to minimize technical problems during field test. After the on-site installation all health care professional participated in a training sessions. Two super users got additional training and also shared a higher responsibility for the actual field test. The training sessions conducted by at several points, both in the beginning and also after summer break. A representative of the vendor was also the first line support/ help desk during the field test. The alarm centre received approximately two to four alarms per day.

The alarm centre was to receive the alarm from the participants both via the computer and sms-message in the mobile phone. The professionals answered the alarm, and via GPS and maps they positioned the participant. After that they called the health care professional in Sandbacka, Boden Municipality, to act upon the alarm if needed. At the later phase of the field-test the field test leader in Sweden made a alarm schedule for the participants in order to increase the number of alarms for the final part of the test.
The home care personal said it was hard in the beginning, to get a position from the participant that made an alarm, but once the participant left, the alarm running, the home care personal could see the position. If the participants turned off the alarm a little too fast, the connection with the home care personal was lost. When an alarm goes off, a signal sounds on the alarm computer. The signal is according to the personal of the alarm centre too noisy. The alarm centre hasn’t got any real alarm, only tested alarm. Neither the alarm centre nor the home care personal did track the participants for real. They only looked on the smart phone where to find them. They said it was easy to find the participants just by looking on the map on the smart phone.

In NORWAY the health care personnel at the alarm centre were to call the persons who had activated the alarm. During the testing of the safety alarm the health care personnel didn’t call the health care workers who are suppose to give support to the person who has activated the alarm. This was according to plan. If however the alarm centre couldn’t contact the participant they would have taken appropriate action. When a participant triggers an alarm the participant data, name, address, phone number and eventually a GPS position if the participants triggering the alarm were connected from an outdoor location, appears on a screen on a computer. During the test period the data was presented on a web-based terminal separated from the conventional system at the alarm centre. The health care personnel were to call the participant on their test device. If they got contact, the professionals asked why they have used the alarm and took appropriate action after that.

The system prototype was not easy to handle due a premature release and implementations. At the alarm centre the audible alarm could not be switched off when triggered by the participants. The only way to mute the sound signal was to activate the stop tracking in the Graphical User Interface. Normally the professionals simply switched into the operating system and muted the main sound device entirely. The result was that proceeding alarms were not detected and acted upon.

6.4 PRESCRIBED HEALTHCARE

The older participants

In SWEDEN, when the field trial began in September, the GP and the physical therapist sent messages to the participants to take 5000 steps per day to promote activity and healthy living. Some of the participants got stressed by the messages and some liked it. Some of them could say that they exercised more now than before. One said that he only reported the test result if something wasn’t right. Many of the participants liked the blood pressure monitor best. It was easy to use and they felt safe when they used it. One said it easier to use a computer rather than using the smart phone.

The older participants said that:

- Good to have direct contact with the GP
- Good to have direct contact with an experienced GP
- Good to get an answer the same day
- The relation with the GP has been much better now than before
- The principle of the project is very good regarding mobility, but some things has to make easier.
- One participant have used heart rate monitor ant the step counter and sent the result to the physical therapist.

In NORWAY four of the participants have been using the Prescribed Healthcare service while other participants only have been testing the solution. The latter group of participants have been registering clinical values and forwarding them to professionals at a nursing home, and the professionals have then sent messages to confirm that they had received the data. The four participants who used the service have been measuring clinical parameters and forwarded the values to their GP. They have also used the communication tool for sending and receiving messages.

The participants found the usability of the Prescribed Healthcare solutions to be good. They activated the services via the MH@A panel and registered the clinical values, either via the hard pad or via the soft pad using the pen stylus. One of the participants said it was unclear what “save” actually meant. Did it also include that the message was sent to the GP? And why did he have to press “OK”?

Within NORTHERN IRELAND the prescribed healthcare was explored with the participants via workshop scenarios using discussion, video, device mock-ups and case studies. Technical challenges involving the maturity of the devices on offer and the difficulties to integrate into the robust NHS system were too large to successfully tackle within the constraints of the project. For example it was deemed necessary to have blue tooth or wireless automated input of clinical data from the patients on the prescribed healthcare service. This is a basic requirement inline with the current service specification. This reduces the potential for manipulation or erroneous data entry and thus is a more robust system.

The biggest demand from the participants was particularly for the remote management of diabetes. This did not prove possible it was disappointing from the users’ perspective.

**The professional participants**

In order to get access to clinical data the health care professionals have to log in to a program. Normally the health care professionals have been using their normal work station. The healthcare professionals in Sweden have not been satisfied with the user interface, and some parts of the services have been used because of the poor design of interface. Regarding the user interface of the service the GP in Norway said that the interface is better now than it used to be. In an earlier version of the program he had to search for specific patients. In the latest version all the new data can be found on the first window.

**6.5 SOCIAL NETWORKING**

The participants in SWEDEN haven’t used the social network very much. One has used it regularly, just to see if anyone has been writing something. One said that instead of social network, he wanted the First Aid to be downloaded.

Comments from the participants:
• Hard to read and use
• Small text
• Only been testing it a few times
• I have a social network already
• I like Facebook better

In **NORWAY**, the use of the Social Network has been limited. The Social Network was more complicated to use than the other two services. During the training sessions the participants had some problems entering correct user names as they got a suggestion to auto-complete with a space added after the first name, a space that should not be a part of the user name. During the training sessions the user managed to register themselves as member of a particular group (culture or “go for a walk”) and to write messages. Compared to the other two services the use of the Social Network meant that the participants have to use the writing function more intensively. The participants compared the Social Network with SMSing on their own phone, where they didn’t have a “log in” function, they got a signal when receiving a new message and they could use menus they were accustomed to.

Within **NORTHERN IRELAND** a series of workshops focused on the social networking service. Participants were registered on the service and connected with peers. Run-throughs in-situ were developed with technical support. Between workshops participants were encouraged to connect with each other using the social networking software.

Participants suggested that the software could have been a little more intuitive. The user interface once inside the system required the participants to remember navigation flows. It was tricky to establish when messages had been sent. There was no alert outside the system to flag to the participant that a friend has sent a message for example.

### 6.6 Mapping and Prioritizing of Improvements

During the test period a common excel sheet was published on the project coordinator. The local project organisations in Sweden, Northern Ireland and Norway could put their suggestions to improvements in the excel sheet. The list included the identity of the person(s) or group who proposed the improvements and the comments regarding the proposed improvement, often the rationale behind or measurements to be taken. There are total number 42 improvements included in the list (report 5.4). 32 of the proposed improvements were related to the prescribed health care application, 6 to the safety alarm application and 5 to the social network application. The person(s) or group who made the proposed improvements marked them as “high priority”, “medium priority” and “low priority”. The improvements were then discussed and prioritized in a meeting in Sweden in the beginning of February of 2010 where all the local project organisations participated.

After the prioritization was completed, the companies that are responsible for implementing the proposed improvements estimated how many hours each improvements would take. In mid February 2010 the list of proposed improvements related to prescribed health care was completed. As there was not enough hours available for all the proposed improvements members of the MH@A project had to decide which improvements to be realized. Most of the prioritized improvements were things that are meant to improve the usability of the prescribed health care services for the participants.

The list of improvements decided to be implemented:
It is good that "NEW" only display patients with new messages or newly submitted diagnose measurement results. The status change shall instead be done manually when the healthcare person has performed the necessary activity that is related with the information

It’s also decided to implement two other improvements. One improvement is related to the battery capacity. Two possible solutions were to be considered, but it’s now decided to implement the low power version directly. The other improvement concerns the ability to access the social network without having to log in.
7 USEFULNESS EVALUATION OF THE SYSTEM

In order to understand and assess the usefulness of a system it is important to also understand the context of use as well as the frequency of use. To enhance understanding this sub-section is introduced with a short description of the context of use as well as the frequency of use before we describe how the users have assessed the usefulness of the system and its different services.

7.1 USE OF THE SYSTEM

The older participants

In SWEDEN the level of use within and between the different user groups has varied quite a lot. For the older users about one third have used the system on a regular bases, one third have used it occasionally, and the final third have only used the system a few times during the test period. Among the services included in the MyHealth@Age system it is only the prescribed health care service that has been used by the older users under fully realistic conditions and on a regular basis. Within this service, it is the self-test function, such as blood pressure, pulse, and weight, that is used most frequently and as a result of their own initiative. The safety alarm has been tested mainly in relation to constructed test activities, while the social network has received limited interest from both older users and professional users.

Due to the different use conditions linked to the three services we make a difference between using the system and testing the system in order to capture the realistic principle of the Living Lab approach. Using the system implies that the use have occurred in realistic contexts and use situations and thereby created a feeling of realism among the users. Testing the system implies that it has not been possible for the users to interact with the system under conditions that fully resemble natural and full scale use.

For the prescribed healthcare service a few older users have created daily routines around the service and it is fair to say that they have actually used the service, not just tested it. The safety alarm on the other hand has been tested rather than used due to security issues. When it comes to the social network the product has been possible to use by both the older users and the professional users, but since none of the user groups have started to use the product by their own initiative or included it in their live or work routines no real use situations have developed.

Some of the users also pointed to how changes in their life effected their use of the system. One Swedish user says that “I have used the system every day until lately. After the summer vacation I have lost my routines a bit and this has resulted in a less frequent use of the system”. The main reasons given for not using the MyHealth@Age system on a regular basis have been that the phone has been so difficult to use in combination with reasons such as no real need for a specific service (not all of the user have been in need of all the three services), and laziness. For the mobile safety alarm the test situation rather than a use situation also had a negative impact on frequency of use.
As pointed out earlier in the report it has been hard for some of the older users to separate between different boundaries such as products and services, or hardware and software. One example of this can be found in the following statement by Swedish user: “I have only used the health monitoring system about three times but I have taken my measurements such as blood pressure every day”.

When it comes to the system’s effect on the relation between the older users and the professional users many of the older users say that their relation to the health professionals has been improved due to the MH@A system and the project and that they feel a closer relation to the GP now. One of the elderly says that “I know him better and he knows me better. He remembers me and my medical situation more in detail now. It feels like we have a direct contact now and a more personal contact”.

The elderly also say that the multi-stakeholder meetings and other project meetings have resulted in a good group where it feels like everybody know each other quite well. “It becomes a fun atmosphere in the meetings and you get to know the people not just their profession”. Another person says that “when you go to doctor appointment you directly end up in the roles of doctor and patient, which is detrimental”.

In NORWAY, as in Sweden, the uses of the MH@A products have varied, from user to user and over the time period of the project. A few participants have left the project during the project period while others have been part time participants due to time commitments to other activities at the time. The participants have been testing all the MH@A products in group sessions several times. During the tests they triggered the Mobile Safety Alarm, both via the smart phone and via the fall sensor, and sometimes they tried to cancel the alarm before it was activated. During the training session the participants have been activating the Prescribe Health Care service and registered (fake) clinical parameters. The Social Network has also been tested during the sessions. The participants have been given the task of logging into the Social Network, register themselves as member of specific forum and then to send messages to the forum.

The participants have been given the task of triggering the alarm in everyday life situations. This was done in order to make the tests more realistic. During specific periods they were to trigger the alarm and answer the call from the alarm centre. The activity during the test period has varied, but they have tested the alarm both in-door and out-door. The complexity of the smart phone menus, the weight and the size, and the low battery capacity, something the participants have commenting throughout the whole testing period, meant that the smart phone never became an item they would think of in the daily life. As one of the participant said, he kept the smart phone in a drawer and would only find it when he had a specific task to do.

Four of the participants were recruited by a GP and were measuring real clinical parameters. They used the Prescribe Health Care to manually register the data. The GP could then access the data via Prescribe Health Care soft ware program on his regular work station. The use of the Prescribe Health Care service has varied from person to person and time period to time period. One of the participants said the GP told him to use the services more frequently. One of the participants has been using the service or a more regular basis. He has been using the services both at home and on journey.
The participants were told that they could use the Social Network whenever they felt for it. The use has been low. Some of the participants have been checking the Social Network but as there was little or no activity in the forums they found it of no interest.

**NORTHERN IRELAND’S** use of the phone: At the inception of myHealth@age the vision was to develop an integrated system that fit healthy older people would benefit from to address the breadth of their needs with regard to management of long term conditions, personal safety and social isolation. Two aspects of the project that would prove critical to success involved the mobile device for the older people, and the integration of the services. At an early stage in the evaluation it emerged that the device of choice (Sony Eriksson Xperia) was a major impediment as a device for the older people to use the service.

The technical challenges created by the design and functionality of the phone have been covered in the earlier section of the document. Reflecting on usefulness of the device the older people did attempt to integrate this smart phone into their daily routines. The majority of the older people tried to adopt this as their main phone. The practicalities around usage caused the older people to revert to their own phones, this emerged over time as they grew tired with the Sony Eriksson Xperia.

**The professional participants**

In **SWEDEN** the professionals’ frequency of use is linked both to personal motivation and to the nature of the service as such. The alarm personnel, for example, have only used the safety alarm service and this service is reactive rather than proactive. They react on alarms coming in, but there are no functions where they take the initiative to an activity or interaction with the older users. As such their frequency of use is totally governed by the older users’ frequency of setting of the alarm. The health monitoring service has both active and reactive activities linked to the health care professionals. The health care professionals can both activate an activity such as prescribing medication or react to an activity such as answering a question from an older users. Finally, the social network service could also been seen as both active and reactive but since the service is not linked to the other two services the alarm and health professionals have not seen their role in relation to this product/service.

None of the alarm and health professionals have created formalised routines in the form of policies or guidelines related to the use of the MH@A system, such as detailed how regularly they should log in to the system, how quickly they should respond to messages, how often they should create activities linked to the system and through this stimulate to use of the system by the older users. The professionals also say that they have used the system for the older users, not for their own sake. It is also the older users, their use and benefits of the system that the professionals have had in focus during the project.

Further, in Sweden, the professionals do not think that their professional role will changes in any substantial way due to the use of the MyHealth@Age system. They say that the use of the system has not resulted in any revolutionary changes to the way they work. They all say that they think ICT-based systems of this type will be standard in health care in the future. They also say that even when the older users take a larger part in their health and well being the authority and responsibilities do not really change. In relation to the self-tests linked to the prescribed health care the GP says: “The responsibility is mine, that does not change”.

36
However, the health care professionals also say that they hope there will be changes in the organisational culture due to new systems such as MyHealth@Age system, since there is many work practices and routines that can be rationalised with the help of ICT. One example is that many GP still go the round using pen and paper and after the round they enter the data electronically. A second example is that health professionals often need to call people in different departments to find available places and beds for the patients, since there is no system in which they can search for this information.

When it comes to the relation to their patients the health professionals say that being able to communicate with the patients in many different ways creates a closer relation to the patients. “It is the combination of meeting the patients on regular appointments and open meetings and keeping contact through email in between these meeting that creates a feeling of close relationship”. The contact via mail feels closer sometimes compared to phone meetings, since mail creates a feeling of being accessible. The GP checks her/his mail and answers email about twice an hour, and feel that s/he can do this since it is so easy to check and answer mail.

As stated before the participants in NORWAY were to use the mobile safety alarm during specific test periods. One professional at the alarm said that participants have not been activating the alarm very frequently. One reason for that could be that the smart phone had low battery capacity in the start because the GPS consumed too much power. Even after an update of the soft ware and the participants was informed that the power consumption was lower and, the participants still assumed that the safety alarm consumed a lot battery capacity.

Within the NORTHERN IRELAND context telehealth systems and prescribed healthcare systems communicate directly to the specialist nurse as opposed to the GP. However, where medical attention is required there is dialogue between the nurse and the doctor. The impact that this would potentially have could result in a rise in self management, self responsibility by the older person and a potential shift in work practices for the professional with a decrease in clinic and home visits.

7.2 THE MOBILE SAFETY ALARM

The older participants

In SWEDEN the evaluation of the mobile safety alarm has been a technical test, rather than a live pilot, since it has not been possible to test the mobile safety alarm in total due to ethical rules and regulations protecting participants in research projects. The older user group have tested the mobile safety alarm service both by themselves and in constructed tests. The constructed tests where arranged by the field trail leader on three occasions and resulted in significantly more alarms compared to alarms that the older users activated by their own initiative. Since the older users have not been able to use this service fully it has not felt meaningful to most of them to create routines around this service. Hence, only a couple of older users have created a routine for this service as well and tested the alarm function on a regular base and by their own initiative, throughout the test period. The frequency of use for the majority of the older users has therefore been concentrated to the three constructed test activities.
The fact that the service have been tested rather than used in realistic situations have affected the older users, as one of the older users from Sweden says: “Already for the beginning it was pointed out and stress that the use of the safety alarm was only a test, and it is possible that this has affected my use and view of the service. I should not think that this is for real, this is just a test. And this was emphasised incredibly strong before the test in meetings and in written documents”. Another Swedish user says laughing that “I have tested the alarm because I am a professional guinea pig”.

Focusing on the potential usefulness of a service such as the one they have tested the older users were very positive and considered it to be a very useful service. It was felt to be beneficial to them when they are out in rural areas but also when they are walking in their local town. Some of the older people have also showed the MyHealth@Age system to their friends and as one of them describes: “when I showed them the alarm service their mouths were hanging wide open and they were very impressed. They though it looked great and also said ‘with a device like that I would dare go on biking trips again’”.

Some of the older users say that it has been hard for them to assess the mobile safety alarm based on usefulness due to the poor usability of the phone. Here again we see the difficulty of separating the device from the service and how this affect not just usability but also their view of usefulness.

The seniors in NORWAY found it quite easy to activate the safety alarm via MH@A menu. From the menu they could access the mobile safety alarm by pressing one of the three buttons on the touch screen. The only thing they got to keep in mind was that they had to press the alarm button for sufficient amount of time until there was a sound telling them that the alarm had been activated. They could then cancel the alarm via one button if they wanted.

The traditional safety alarm is in-house alarm, while the new system can be used by the senior outdoor, in rural as well as in urban areas. The seniors expressed positive attitudes to the mobile safety alarm. They underlined that the mobile safety alarm is a technology that can make them feel secure and safe, both in-house and outdoors. The alarm make them feel more safe because they know if something happened they can activate the alarm and someone will notice the alarm and act accordingly. The existence of a mobile safety alarm will make the seniors more mobile. They will be able to live a more physical active life, and therefore also a more social life. And they will be continuing doing things they appreciate for a longer time and to do things they otherwise not would not have been doing.

The overall positive gain of having a mobile safety alarm is that the technology can help them to be more in charge of their own lives. Out-door activities are of big importance for the Norwegian seniors. The services will also enable the seniors to live at home for a longer period. And the services also have positive gains for relatives and friends as they are reassured that the seniors will get adequate help if something were to happen.

The fall sensor is a device that is seniors are supposed to wear. If a senior falls then fall sensor will send a signal to the smart phone and the smart phone would then activate the alarm. The men could easily fasten the fall sensor to the belt while the women were not satisfied with the design of the fall sensor. The women found it inconvenient to wear the fall sensor when they are wearing a dress. The women preferred to have a smaller device, a device that was design
like costume jewellery. That would make it easier for them to wear the fall sensor in situations where they are not using a belt.

In NORTHERN IRELAND the participants underlaying needs related to the mobile safety alarm differed to some extent. In Northern Ireland the older participants expressed stronger needs of feeling safe in town settings while the participants in Norway and Sweden expressed stronger needs of feeling safe in rural areas. The sensor was considered to be discrete enough for both male and female to wear, and it received positive comments from both. The option of the interactive and automated service was greeted favourably and the elders could see scenarios from their daily life within which each would be useful. The user interface on the phone was considered clear and easy to find. The utilisation of this was successfully achieved by all participants.

**The professional participants**

In SWEDEN the professionals involved in the mobile safety alarm service comes from two different municipalities: Luleå and Boden. The alarm service can be divided into two categories of work tasks for the professionals; one group that received the alarm and another group that responded to the alarm. All calls where received by the professionals in Luleå since the municipality of Boden did not have an organisational structure that easily supported this new type of incoming alarms. For patients belonging to Luleå municipality the alarms where received by, and responded to, by the same professionals, while for patients belonging to Boden municipality the alarm was received by the professionals in Luleå and responded to by the professionals in Boden.

As for the older users, the professionals also say that the fact that the service have been tested rather than used in fully realistic situations have affected their use of, and attitude to, the service. Due to this all normal activities and responsibilities have taken priority which means that they sometimes, for different reasons, have not been able to act on the alarms from the older users. In Boden, where the participation in the project has been optional the number of involved professionals decreased from eight to four people as the project progressed. The two main reasons for this were a feeling of stress and a lack of interest.

In relation to the usefulness of the service the professionals said that they found the service very useful for the older people. None of them related the usefulness to themselves and their own work situation. Instead they said that the mobile safety alarm would represent an extension of their normal service offerings to their customers and they thought this was very good, but for them as professionals it involved additional work tasks rather than less. They stressed the benefit for the older participants as the mobile safety alarm made it possible for them to be mobile and still feel safe.

In NORTHERN IRELAND the professionals said that they found the service very useful for the older people. None of them related the usefulness to themselves and their own work situation. Instead they said that the mobile safety alarm would represent an extension of their normal service offerings to their customers and they thought this was very good, but for them as professionals it involved additional work tasks rather than less. They stressed the benefit for the older participants as the mobile safety alarm made it possible for them to be mobile and still feel safe.

In NORWAY the safety alarm service was to be handled by all the staff working at the alarm centre, approximately 25 persons. Not all of the staff has been using system correctly. Some of the staff are extra personnel and were not acquainted properly with use of system, while other did not regard the use the system as a part of their job. Most of the professionals have been using the system as prescribed during the test period.

The main benefit of the mobile safety alarm is that the professionals can track the participants almost wherever they are and can send help more efficiently if needed. One example is a
participant on a mountain trip or out in the forest triggers the alarm, GPS position received at the alarm centre, the problem is a broken leg, the GPS position is sent to emergency rescue services. With the GPS position system they can dead centre on the participant which gives a very short response time to help.

Evaluation of usefulness within NORTHERN IRELAND is minimal by virtue of the limited implementation and integration. The factors affecting this were outside the control of the older participants and primarily issues of a technical and managerial nature (relating to tendering). However, testing of the system whilst not triggering live alarms was viewed positively by the older people and was reported as a system that was useful and user friendly.

7.3 PRESCRIBED HEALTHCARE

The older participants

In SWEDEN the natural and realistic use situations have emerged in relation to the prescribed healthcare service. The reason for this is both that it has been possible to create realistic use situations in Sweden and that the older users have experienced clear needs of such a service. One user say that “Using the system is like having your yearly check-up every day”. A few older users have also created daily routines around the service, a good example of a daily use of the service is given by one to the older users as he describes his daily morning routines.

“I get up in the morning and after that I go the round with myself and for myself. I start with taking my medicine, and then I check my blood pressure and weight and report the values to the GP using the MH@A system”.

The self-test function of the service has been very appreciated by the older users and many of them point to the easy and convenience with being able to take their measurements at home. This is especially emphasised by the users that need to take measurements on a regular basis. “It has been very nice and easy to be able to take measurements at home and not have to go to the health central when you do not feel OK”. Common for most of the older users is that they have considered good values as a sign that everything is fine with them and therefore they have tended not to report these values. “When the values were normal I did not bother to report them, because then it was OK. I reports if something is wrong not when everything is fine or OK”.

Another benefit stressed by the older users is the possibility to relate how they feel, physically, with medical data. This gave them a possible answer to what caused their feeling and also provided them with a knowledge base that helped them make a decision whether or not they needed to contact a health professional. “The blood pressure has been easy to use, and when I felt strange I usually took the blood pressure and saw that the values was outside the normal scale. This meant that I did not have to think about it any more because I knew what the problem was. When the values were outside the normal scale I took the blood pressure again after a while and then usually the values was OK and I knew that everything was fine. But if the values were strange three to four times in a row then something was wrong. … So for me it has been valuable to be able to take the blood pressure”.

The possibility to have a direct line to their GP through the MyHealth@Age system has also been greatly valued by the older users. Here, they stress the importance with having contact with their doctor, not just any doctor: “It’s been so valuable to have direct contact to my GP, a
person who is knowledgeable, knows me and what I need”. This importance with having contact with their GP and just a GP is also stressed by the health professionals.

The direct contact with health care staff, and especially the GP, also links to the above paragraph, because the older users say that it has been important for them to take test and then get feedback on results that they felt was outside of the normal range for them. Usually, when they have discussed their values with the GP, there have been a reason for why the values were outside of the normal that have been linked to their age, the way they have exercised, etc, not to a sickness or sickness symptom. By getting this information they felt satisfied and not anxious. They also felt that they learnt about themselves and their health. Having the possibility to measure and understand their values meant that they did not feel a need to visit the health central, and this was seen as a good thing.

While many of the older users say that the use of the service have increased their own awareness of their health, this awareness has not always resulted in behaviour changes. That is, is has not resulted in more nutritious meals, less unhealthy intakes, more physical exercises, etc. As one of the older users from Sweden says “One can be sensible in regard to other people, but not in regard to one self. Not me at least. … I am aware of my lifestyle but that is not wellbeing directly”.

However, for some of the elderly it has: “since I started to weigh myself and register the values I have thought about what I eat and also changed my eating behaviour to the better. The measurement became a incentive to keep my weight and not allow my weight to increase, or my values to decrease”. He says that this feels positive for him.

Finally, one of the participants also describes a situation where the daily blood pressure measurements she took helped the medical staff diagnose her medical condition. She said: “It feels very good to be able to measure and report the values and I am very happy that I had the blood pressure measurement. Without it the medical staff might still not have identified my problem”. She also said that “The nurse that I talked to and gave my measurement to said ‘you know the measurements that you brought with you were very helpful to us, they were what got us on the right track’ ”.

In NORWAY the patients who have been communicating with the doctor have been equipped with medical devices to measure clinical data. The patients register the data on the smart phone and the GP can access the information on his her computer. The service is not integrated with the electronic patient record.

The seniors have been using the prescribed health care services in different spatial localities. They have using the service both at home and when travelling, and one of the seniors has also been using the service while being abroad. The fact that the service enabled them to be mobile was something that the seniors appreciated.

The seniors found the service quite easy to use and the user interface acceptable. They activated the service via the MH@A panel and the registered the data, normally by using the pen stylus. After saving the measurements they got a message telling them that the data had been saved.

The seniors, both the four who had been using the service and the seniors who have been testing the service, are overall positive about the service and the values the service can bring, both to the patients and the health care sector. It’s a mobile tool that the seniors can bring with
them wherever they go. They don’t have to make an appointment with the GP and avoid travelling to the GP office. Avoiding travelling to GP was something the seniors emphasized as a benefit when they were talking about people living in rural areas.

The seniors who have been communicating with their GP felt that the service made them better informed about their health status and therefore more in charge of their health as they can be more active in the care. The service has a pedagogical function as they come to learn more about their own health status and their reaction to medicine, and the service can make the patient more motivated to take responsibility for their own healthcare. As they are becoming more informed about their health status they also feel that they can engage in a dialogue on more equal terms with the doctor.

One of the patients said that he has been activating the statistical function of the service in order to learn more about the development of the clinical signals. He found the statistics readable, but he would prefer to have an option to print out statistics and graphs. As there are more data registered, it’s not so convenient to read the data on the screen of the smart phone.

The organisation of the Prescribe Health Service has been of major concern. The seniors want to have more regular feedback from the GP. Whenever the GP opens the prescribed health care service the patient should get a message. If values were under or above a critical value the GP should send a message to the patient.

Within NORTHERN IRELAND the service was not operationalised, instead it has been assessed in the form of mock up demos and scenario building. Through this it has been possible for the older users to explore the usefulness of such a service, and they found the concept of a remote health monitoring of chronic disease with regular review by health professionals much welcomed.

The professional participants

In SWEDEN the health care professionals have used the service on a more or less regular basis. How often the professionals have used the system is strongly linked to how the older users have used the system since the professionals mainly used the system as a reaction to an activity initiated by the older users, only on a few occasions did the professionals initiate interaction through the MyHealth@Age themselves.

Common for both the professionals participating in the project and actively linked to the prescribed healthcare service is also that they mainly take the perspective of the older users. This can be seen by the following statement.

“I have tested the system for the patients not so much for my own sake. … But the purpose with the project was to test the system from the patients’ point of view”.

The main benefit with the MH@A system for the GP is the availability of frequent measurements from her/his patients. To give an example s/he says that it is very common that people measure their blood pressure in their home and come to him with a piece of paper listing dates and values. This format of the information is very hard to grasp, and it is hard to know what mean value to enter into the system. But with the MyHealth@Age system and the diagram it is possible to get a good view of the values and to see how the values have developed over time. Graphs of different types are very useful since they illustrate the data clearer compared to a list of values. Having regular measures also makes the GP more aware
of values outside the standard, especially values just out of the norm. Ten values over a period of two weeks gives a much clearer and stronger measure compared with two-three measures over a period of a few months. With regular values it is easier for the GP to become aware of things s/he would not really think of before.

Within the prescribed health care service a relatively new type of ordination was tested during the project called the “Training diary”. This activity is based on recipes in the form of physical exercises. The older people get a reminder from their physiotherapist every day to walk 5000 steps and to monitor this with their step counter and then register the total among steps taken for each day in the health monitoring function of the system. The activity was carried out in collaboration between the physiotherapist and the GP. However, the physiotherapist felt that it was hard for her to get a response from the older group for this activity. Most older participants did not sign off (tick off) the reminder and by that indicate that they have carried out the activity (walked the 5000 steps for the day).

Many of the older participants felt that it was easier to just go for a walk compared to using the step-counter. This can be seen in questions such as the following asked to the physiotherapist “Is it OK if I just walk a few kilometres instead”. The physiotherapist have said that this is OK, but that it is good if they try to use the step counter to see what they think of it since the older might not always know how long they have been out. With the step counter they also get a stable and comparable value for their total exercise (walking) during a day.

In the discussions with the professionals and older users the difference in status between different professional roles also became clear. One of the professionals said: “the GP is seen almost as a holey person and to get a direct contact with him, especially for people in this generation, is very special”. This might to some extent have influenced which functions were used within the prescribed health care service. However, in this project the professionals pointed to other factors that seemed to have been more influential in explaining the older people’s use, such as the fact that many of the older users had an existing routine of taking tests such as blood pressure, glucose, etc. and these tests were linked to the GP not the physiotherapist. The self-tests were also the first activity the older users tested in the project. The professionals therefore thought that the older users might have seen this as the main activity for the prescribed health care service while the training diary felt like something on the side.

As for the general benefits with the MyHealth@Age system from the perspective of the physiotherapist s/he says that it has been hard to link her/his normal activities and training exercises to the MyHealth@Age system. The primary reason for this is that the job is very physical, the majority of the time is spent to actually physically touch the patients by assessing their movements, illustrating training exercises, giving massage, etc. However, s/he feels that there are parts of the work where the MyHealth@Age system could be a good supplement or support. Some general exercises, such as stretching exercises, could be illustrated using a film, pictures, sound, and/or text and for this the MyHealth@Age system would provide a good platform. However, this would require a device with a larger screen. The physiotherapist also says that s/he thinks distance communication would work well for some people but not for everybody.
A second benefit pointed to with the MyHealth@Age service is that they send a message to a patient and they know the older users will read it, they can write the message when they have the time and the patient can read the message when they have the time. This creates flexibility for both parts. This also creates the drawback, if they send a message and want a quick answer they have to wait until the patient answers. When they call they get an answer directly.

She thinks that the system would work well for follow-up and training diaries in general, for example to follow up if they carry out their exercises or not and their own reflection on how this goes. When it comes to imagining how a future work situation would look using the MH@A system the physiotherapist says that “I only have the time I have, that will not change”. So I think using the system would lead to new ways of working. “The time I work with the system I will not work with patients, but on the other hand the system might make some activities more effective and hence give me more time for meeting patients”. It creates the possibility for more diverse interaction models. For some patients it might be enough to send a training program and have regular feedback session to assess the progress, while other people will still need many physical meeting to get the exercises right as well as regular feedback meetings to assess the progress. However, the fact that today’s screens are two-dimensional makes it very hard, or impossible, to show and assess exercises, this requires three-dimensional views.

However, she does not think that the added flexibility of different interaction and communication modes and channels will effect her work situation too much. She thinks it can be a possibility where she can adjust her resources to a larger extent compared to today. But she also says that this type of technology is so new and it is therefore very hard to know what the consequences, benefits and drawbacks will be. When it comes to the relation with the patients s/he says that s/he thinks the relation will become more detached since their work today is so physical and always involves face-to-face meetings. However, s/he does not think that the work role as physiotherapist will change with this way of working, nor the culture or values linked to the profession. S/he says that many people call and want help as quickly as possible and if these requests come via the computer instead of via the phone does not make a difference. The problem is usually the same, s/he can seldom help people this way, s/he needs to meet them and touch them to know what the problem is and what treatment they need. But the people s/he can help over the phone s/he could help through the system and that way s/he would have the flexibility to help them when it fits her schedule the best and not the time scheduled for phone meetings or physical meetings.

The project as a whole has made her/him think more about how s/he could use the MH@A system and technology in general in the work. The project also raised her/his understanding and awareness of technology in general, and s/he thinks that technology will become more and more integrated even in her/his profession even if s/he does not have any concrete examples of how s/he things this will look.

The professionals point to the importance that any new system or service implemented in the health care system need to be integrated with already existing systems and have similar user interface.

In NORWAY, the GP recruited four patients. Two of patients have been measuring INR, one has been using system to measure the blood pressure, while a fourth patients have not been measuring clinical parameters during the field trial. The GP was also interested in recruiting
patients that could measure blood glucoses, as diabetics are big group, but he hasn’t been able to do that during the project period.

The patients have been reporting clinical measurements. They haven’t been using the service on a fully regular basis, but normally they have been able to fulfil the expectation to the use of the system. The GP said that maybe he and the patients should have made a schedule for the use of the system. To get access to the data the GP have to log into a program. The GP have logged in to the program to check incoming measurements once a week, but he thinks that it would be appropriate to establish routines for the use of the system, for example to log into the system every second day. Regarding the user interface of the service the GP said that the interface is better now than it used to be. In an earlier version of the program he had to search for specific patients. In the latest version all the new data can be found on the first window.

The GP has also used the communication option to send messages to the patients. The patient can access to the message via the smart phone. The communication option can be used for sending messages to patients regarding when they should be making clinical measurements. When the GP get clinical parameters he or she could send a message regarding when the patient should make a new measurements. Especially when the patient is to change medication doses he or she could make a measurement earlier than scheduled.

The GP doesn’t think that the use of the Prescribe Health Care service has changed the patient-doctor interaction. He thinks that’s the main benefit is for the patient. Not necessarily in a city because the travel distance to a GP office is short. The patients who can benefit most from the access to a service like this are the ones who are living in the periphery, patients who have to travel long distance to the GP offices. In a city the system could be used by patients have physical impairments, e.g. wheelchair users or older people. To the question if the system could be used for patients who are on a journey, the GP said that normally a patient will come to office to be tested and then he or she will be back for testing after he or she has come back from the journey, and today it’s not that many patients who are on journey for a very long period, although one of the patients have actually, on one occasions, sent clinical parameters via the service.

7.4 SOCIAL NETWORKING

The older participants

In SWEDEN very few of the older users have tried the social network and only one person is regularly using social networks such as facebook. The older person who uses facebook point to the difficulty of introducing new social networks since a network needs a critical mass to be useful. He also says that it is very hard, or impossible, to develop social networking sites that can compete with sites such as facebook.

Besides this, most of the older participants said that they did not feel a great need for social networking sites since they preferred to meet face-to-face or call people on the phone. What they could see a need for was social networks liked to specific services such as the mobile safety alarm or the prescribed health care, or for specific groups of people such as dementia or diabetes. That way you could meet people with similar needs, illnesses, and life situation as yourself and this would be good. It might be groups for people with diabetes or something
else and here you can talk with each other and share experiences and difficulties more open since you know that everybody share this together.

In NORWAY the participants have tested the Social Network during the group sessions. The usage outside the training sessions has been limited. There may be three main reasons for that. First, the screen and the fonts are very small so it’s hard for them to make a proper discussion forum. They prefer to use other tools for social networking like SMS on their own mobile phone. Second, even though seniors are engaged in lot of social activities most of them didn’t know the other seniors previously. There was a technology that could enable social networking but there was hardly any real social network, although some knew each other, between the participants prior to the start of the project. As one of the participants, after meeting the other participants for one, said, he would hardly recognize most of the participants in the group if met them on the street of Tromsø. Third, there is a difference between the social networking service and the two other services as both the mobile safety alarm and the prescribed health care are integrated with an organisation, the alarm centre and the primary health care sector.

In NORTHERN IRELAND the benefits of social networking could be appreciated by the older people who were a representative group of older people living in a rural community. The older people enjoyed a range of activities including art classes, dancing and visits to local sites of interest. Working closely with these participants for the duration of the project the close friendships and supportive relationships are very evident.

The older people required significant and ongoing support to enable them to use the social networking software. In-situ workshops and usability testing enabled each participant to demonstrate and understanding of how to register on the system and to send and receive a message. It was disappointing however that remote usage outside of the workshops was fairly limited.

The professional participants

In SWEDEN and NORWAY none of the professionals have used the social network and built services around the product. The main reasons for this it that the alarm professionals saw the mobile safety alarm as their main service while the health professionals saw the prescribed health care service as their main service. For the social network there was no directed professional group directed towards this product. Instead this product was directed to the older participants and their own initiatives.

The field trial leader in Sweden and the nurse in charge of the nursing home in Norway have on a few occasions used the social network to inform all the participants using the MyHealth@Age system about coming events and meetings.

8 CONCLUSION

A strong and faithful user group remained engaged with MyHealth@Age throughout the duration of the project. This enabled contribution to defining user needs, device selection, usability testing and some service evaluation. The qualitative approach of PAR and FormIT with a strong user engagement facilitated by qualitative research methods provided rich data to the technical partners.
There were three services included in the MyHealth@Age project: 1) Mobile Safety Alarm, 2) Prescribed Health Care 3) Social Network. The mobile safety alarm is a service that enables people to activate an alarm, either via the smart phone or via a fall sensor, wherever they are located, indoor or outdoor. In Norway the alarm was sent to the alarm centre, while in Sweden the alarm was sent to the alarm centre and then sent to professionals who normally are supposed to respond on an alarm. In Northern-Ireland the mobile safety alarm service was assessed in the form of mock up demos and scenario building. In Norway and Sweden the participants have been testing the mobile safety alarm, both individually and in group tests. They have been testing the service both in-door and out-door. The participants have not been using the service in real life situations and therefore only a few of the elderly found it meaningful to create daily routines for the use of this service.

The prescribed healthcare service enables people to take initiative and be actively involved in the management of their own healthcare and wellbeing. The service also enables people to interact and communicate in new ways with healthcare professionals. In Norway 4 of the older participants have used the service and sent clinical measurements to a GP, while in Sweden all of the older participants have used the service. In Sweden the service has also been linked to both a GP and a physiotherapist. About half of the participants in Sweden have been using the prescribed healthcare service in real life situations. In Northern-Ireland the service has been assessed in the form of mock up demos and scenario building.

The social network offered the older participants the possibility to interact with each other and it also gave the professionals an additional channel for communication with the older users. However, in both Sweden and Norway this service received limited interest by both user groups. Possible reasons for this are a lack of need among the users and the fact that no specific professional group was linked to the service.

8.1 USABILITY

In the MyHealth@Age project a smart phone has been the platform for all the three services. The usability of the smart phone has been of major concern for the participants throughout the whole project period, while in Northern-Ireland the variability of the mobile phone network along the border region of newry has also been of concern. The participants found that the smart phone was too heavy, the battery capacity was too low and the smart phone menu was too complicated. The participants were especially concerned with the weight of the smart phone and the battery capacity when they were assessing the mobile safety alarm. Very often they were comparing the smart phone with their own mobile phone which they found to have practical weight and size for carrying it around. As they also had been accustomed to the use of the menu they would prefer to have the MyHealth@Age products integrated in their own mobile phone. The participants found the Mobile Safety Alarm and the Prescribe Healthcare quite easy to use. During tests the participants was able to activate and cancel the alarm both via the mobile safety alarm menu and the fall sensor and participants in Norway and Sweden have been using the Prescribe Healthcare service. To use the mobile safety alarm the participants had to press a button or the alarm was activated by a fall and they used the Prescribe Healtcare service by registering measurements and reading messages from the GP. The participants found the social network to be more complicated to use. To use the Social Network they had to log in to a program and write and navigate through text.
When it comes to usability two important and interrelated levels can be identified: the device and the service. Everybody in the project agrees that the device have been hard to use and not user-friendly at all. For many of the elderly users it is hard to separate these two levels. When the device is hard to use the services also feels complicated to some extent. As we talk about these two levels the elderly state that the MyHealth@Age system in it self has been quite easy to use once you are in the system. However, the device has been so hard to use that the elderly users sometimes have chosen not to carry through an activity they planned. Some even say that this has happened often. That is, they have planned to use a function but it is so hard to get to the function that they do not carry through.

8.2 USEFULNESS

Usefulness is a concept that is strongly related to both a context and use situation since it assesses the ability of a system to help the user achieve a desired goal. Hence, the starting point is the desired goal or more loosely expressed a desirable state. To understand possible and different desirable states for the potential users of the MyHealth@Age system we started the project with defining and conceptualising user needs. Comparing these user needs with the three services of the MyHealth@Age system we can see a strong correlation. The mobile safety alarm links well to needs such as: need to feel that someone notice if anything would happen to me; need to feel safe both indoors and outdoors; need for easy communication and notification to professionals, relatives and friends. The prescribed healthcare service links well with needs such as: need to be able to take tests at home; need for monitoring and controlling ones own well-being and health; need for reminders related to treatments and medication; need to understand the information received, stored and sent regarding ones own health; need to communicate with healthcare staff in new ways (not only by physical meeting and through phone calls); and need to exchange information between elderly people – professional health care staff. The social networking product, on the other hand, did not link to the users expressed needs as strongly; such as the need of easy ways to create and share information with family and friends. Besides this, the needs expressed in relation to social networking were also to a large extent already fulfilled in somewhat satisfied ways for many of the voluntary participants. They had good possibilities to socialise when they wanted to and most of them participated in different social groups.

The expressed usefulness of the three services also link very close to the above description. Both the mobile safety alarm and the prescribed healthcare services were seen as very useful among the participants. They gave many illustrations of their use together with present and potential benefits linked to this use. The participants found that both a mobile safety alarm and the prescribe health care services are solutions that has the potential to help people in need of support while still allowing for an active and independent life together with an enhanced feeling of security.

More specifically the participants commented on the usefulness of the mobile safety alarm service by referring to their present or future need of the service as well as referring to people they knew who were in a need of such a service today. To them the service meant that they could feel safe and secure while they are at home or out-door, in the town, in rural areas or spending time out in the nature. The service meant that they would be able to live a more independent live and to stay in their homes longer. They would be able to live a more socially and physically active life. In relation to the prescribe health care service the users pointed to
the benefit of being able to take their own measurements without having to go the GP office, although they also stressed the need of both communicating with, and seeing, a GP. The possibility to take measurements at home was regarded as especially valuable for persons who had to travel long distances to visit a GP. For the social network the majority of participants thought they already got communications tools to interact with their present social network, for example SMS, e-mail and facebook. Hence, while the mobile safety alarm and the prescribe healthcare represented new services or added more value to existing services, the social network represented a service where the participants already got a number of well functioning tools and routines.

The project also confirms the flexibility and changing nature of needs and values. This was especially true in relation to personal integrity. One of the older participants said “In the beginning we talked about how things could be and the possibility to operate technological artefacts into the body. I would actually prefer to have a small chip operated in my body compared to having the fall sensor as it looks today. For him, the ability to have a service that was well functioning had priority over personal integrity. In relation to this both the elderly and the alarm personnel talk about situations where people they know have fallen and not had their fall sensor on them or having it on but not using it and instead tried to reach the phone. This highlighted the need for a fall sensor that is always present with the user and that is automatic, as the MyHealth@Age sensor is.

### 8.3 ORGANISATIONAL ISSUES

The differences in use and usefulness between the three services can also be explained with organisational factors. The first issue here is the possibilities for different organisations to participate in realistic test and use situations. Here, we see a clear difference in the experience of the users and also in the data gathered and lessons learnt dependent on the level of realism of a use situation. As the degree of realism increased the frequency of use among the voluntary users increased and so did the users felt experience of usefulness and the richness of their stories. Linked to this is also the value of the data gathering from the users. As the realism of the use situation increased so did the reliability of the data, since it was possible for the users to express personal and actual experiences and use compared to expected experiences and use. This is clear in relation to the prescribed healthcare, where it has been possible to understand the actual use frequency of the service, probe actual reasons both for high and low use frequencies, as well as actual consequences of the use. One example of this is the lesson that the use of prescribed healthcare among the older users often has lead to an increased awareness of their personal health while it has not led to behaviour changes. That is, it has usually not resulted in more nutritious meals, less unhealthy intakes, more physical exercises, etc.

When it comes to the frequency of use the importance of routines in order to establish continues use has become clear. The users who created routines for their use of the MyHealth@Age system are also the users who used the system most frequently. This is also true for the professional users. The use of the system has to be integrated into their work and organisational and linked to their defined roles and activities to be carried out. One example of this, related to the mobile safety alarm and discussed in the project, is who should be responsible for turning an alarm off, the professionals receiving the alarm or the professionals acting on the alarm.
It is also very clear that most of the voluntary users want the MyHealth@Age system to be linked to organisations and professional actor, even when other possibilities are available. This is particularly clear in relation to the mobile safety alarm. Here, the users strongly state that they want the alarm to go to an alarm central. As one persons said “All my children are old, they are over thirty, they live all over Sweden and have children of their own. What can they do and how long time would it take before they could do something? It is better that it goes to an alarm central”. Another person said that “What is the point of stressing a person who cannot do anything to help, besides calling the alarm central”.

8.4 BEING, BELONGING AND BECOMING

The rapidly increasing number of elderly people in the western world has been associated with an increasing demand for resources to provide services to elderly. The health care professionals involved in the MH@A project have been focusing on the benefit of the services first of all for the users when assessing the services. The users or the participants have been discussing both the benefits for the health care organisations and elderly people in a need of support.

The older participants have been emphasizing the services’ potential for improving the quality of life of elderly people. Researchers have been emphasizing that quality of life is a multidimensional concept including physical, psychological and social aspects. Many writers have been conceiving Quality of Health as constituted of three life domains that are important to people: being, belonging and becoming (http://www.gdrc.org/uem/qol-define.html Accessed 21.12.2010). Being is about who you are and includes both physical as well as psychological aspects. Belonging is defined as links with the social environments but also access to resources that normally is available to community members. The third domain, becoming, refers to activities carried out to achieve your personal goals or hopes.

The MH@A products have been targeting all of the three domains. The participants have emphasizing the mobile safety alarm as a tool that will make older people feel safe and secure, both indoors and outdoors. It is a tool that can help elderly people to remain in their homes for a longer period while still enable the elderly to continue their links with their social environment as they are getting more mobile. The Social Network tool was meant to strengthen the links to the social environment, but as the participants felt that they already got a number of communication tools, they didn’t use the tool very frequently. The Prescribed Healthcare service is a service that will enable the elderly to get access to resources in a more convenient way than the traditional way. The service will enable the elderly to communicate with health care personnel while remaining at home or traveling. When the participants were assessing and commenting on the Mobile Safety Alarm and the Prescribed Healthcare they were focusing on the present situations for elderly people and the future situations, also for themselves as they were getting older. The services can support people to achieve personal goals of maintaining independence and exert more control over their own health status.

9 REFERENCES


Larsen, Frank, Suzanne Martin and Maria Runelof (2008): Functional Design and Technical Assurance and Evaluation. Deliverable 5.4 of The MyHealth@Age project


Melander Wikman, A. Ageing well- Mobile ICT as a tool for empowerment of elderly people in home health care and rehabilitation. Doctoral thesis 2008:44. Luleå University of Technology.

