e·care@home

Understanding users of a future E-care@home system

E-care@home project

Technical Report no. 1, February 13, 2017

Annica Kristoffersson (Örebro University)

Maria Lindén (Mälardalen University)

A distributed research environment   Knowledge Foundation

Understanding users of a future E-care@home system

E-care@home project

Annica Kristoffersson

    Örebro University, Sweden
    Center for Applied Autonomous Sensor Systems
    School of Science and Technology, Örebro University
    Fakultetsgatan 1, 701 82, Örebro, Sweden
    Email: annica.kristoffersson@oru.se

Maria Lindén

    Mälardalen University, Sweden
    Embedded Sensor Systems for Health
    School of Innovation, Design and Engineering, Mälardalens University
    Box 883, 721 23 Västerås
    Email: maria.linden@mdh.se

This report should be cited as:
Kristoffersson, A. and Lindén, M. 2017. Understanding users of a future E-care@home system. E-care@home project. Technical Report no. 1. 36 p.

February 13, 2017

Abstract

This technical report contains personas based on the authors' earlier and ongoing research together with literature studies. The original aim of the work presented in this report was to provide the E-care@home research environment with an understanding of who the user of a hypothetical future E-care@home system is. The resulting personas are to be used as a tool to aid other work packages within the E-care@home research environment in their design processes. The project focuses on technological solutions and uses artificial intelligence for creating a semantic interoperability between sensor data, systems and humans. The release of this report is, however, a result of several requests of data and user specifications coming from both researchers and companies, who want to base their work on realistic situations of elderly people.

Several interviews have been performed with potential end users: with healthcare providers within geriatrics care at a hospital, within home care services, and with more-or-less-healthy elderly people, focusing on frail elderly people who may be in risk of falling, developing malnutrition and/or pressure ulcers, and also their closest relatives and their caregivers.

In this report, 15 personas are presented. There are five different elderly personas. Two of them live together with their spouses, one of which is presented as a persona. In addition, the report presents the personas of eight healthcare professionals, all of which are involved in Senior Alert risk assessments and prevention of falls, malnutrition and pressure ulcers. Three personas represent different professions working in the home care services, the other five personas work at a geriatrics hospital ward. Finally, one informal caregiver of an elderly, a daughter, is presented as a persona. These hypothetical and archetypical users shed light on a variety of different users that may interact with an E-care@home system, or other IoT technologies in the future.

It should be acknowledged that the work presented in this technical report has been extracted from one of E-care@home scientific deliverables, MSR5.1b. The original deliverable, that was authored by Mälardalen University, SICS East and Örebro University, features also personas representing elderly multi-morbid users with specialized home healthcare and a number of use cases that pose challenging scenarios that highlight a range of possible interactions with the E-care@home system.

Keywords: assistive technology, personas, e-health, semantic interoperability, interviews with users

Contents

1 Introduction

This technical report has been produced within the E-care@home research environment (Loutfi et al., 2016), a Swedish effort working towards increasing safety and security and a better health. E-care@home aims to develop sensor networks for domestic use which collect information on behaviors and health status. Such a sensor network could be used for, e.g., elderly and others with special needs. The project focuses on technological solutions and uses artificial intelligence for creating a semantic interoperability between sensor data, systems and humans.

The project also has the ambition to generate societal and economic benefit. Therefore, it is a necessity to keep the end user of a hypothetical future E-care@home system in mind throughout all the phases of the project.

This technical report is the result of a process aiming at providing the E-care@home research environment with an understanding of who the user of a hypothetical future E-care@home system is. The report presents personas that shed light on a variety of different users that may interact with an E-care@home system, or other IoT technologies in the future.

The personas, which are based on the authors' earlier and ongoing research together with literature studies, describe demographic qualities, goals, life circumstances, medical history, experience with and acceptance of technology (Cage et al., 2014; Floyd et al., 2008). To bring the personas more to life, each persona also features a photography. Several interviews have been conducted with potential end users: healthcare providers within geriatrics care at a hospital, within home care services, and with more-or-less-healthy elderly people. The research and literature studies have focused on frail elderly people who may be in risk of falling, developing malnutrition and/or pressure ulcers, and also their closest relatives and their caregivers.

The work has resulted in 15 personas representing caregivers, elderly people, relatives and spouses. There are five different elderly personas, three men and two women. Two of these elderly live together with their spouses, one of which is presented as a persona. In addition, the report presents the personas of eight healthcare professionals, all of which are involved in Senior Alert risk assessments and prevention of falls, malnutrition and pressure ulcers. Three personas represent different professions working in the home care services, the other five personas represent five different professions all of which are working at a geriatrics hospital ward. Finally, one informal caregiver of an elderly, a daughter, is presented as a persona. These hypothetical and archetypical users shed light on a variety of different users that may interact with an E-care@home system, or other IoT technologies in the future.

While these personas can be used as a tool to aid other work packages within the E-care@home research environment in their design processes, it is the authors' hope that these personas may serve as valuable input to other researchers working in the E-care for domestic use area but also for a range of other actors. The project, and also the personas presented in this technical report, are relevant for companies developing solutions aiming at improving safety and security in home environments but also for healthcare related companies and service providers.

Therefore, the personas presented within this technical report may be reused for other purposes than the ones they were developed for provided that a citation to this report is provided. This report should be cited as: *Kristoffersson, A. and Lindén, M. 2017. Understanding users of a future E-care@home system. E-care@home project. Technical Report no. 1. 36 p.*

The remainder of this technical report is structured as follows. Section 2 provides information on the methods used to collect information on potential users of the E-care@home system, the data sources, the interview guides used during the semi-structured interviews with caregivers and elderly people and how the data was analyzed. Section 3 provides a summary of the results achieved while Section 4 presents the 15 personas developed. Section 5 concludes this technical report. Finally, a glossary which provides information on a number of medical terms that have been used in this technical report, along with the interview guides are provided.

2   Methods

The purpose of the personas presented in this technical report has been to give a description of frail elderly people who may be in risk of falling, developing malnutrition and / or pressure ulcers, and also their closest relatives and their caregivers. The personas were to give a description of the characteristics of the target group in terms of: the social situation, health, physical and/or social impairments, interests, experiences with and attitudes towards IoT, their sense of safety and security, attitude towards being monitored, their participation in their own care and the compliance with the healthcare professionals' orders.

The choice of methods include active participation in workshops and test beds, user surveys, personas and use cases. User surveys were conducted through the running of longitudinal test sites in homes of elderly people, questionnaires, observations and semi-structured interviews, complemented with literature studies and analysis of Senior Alert[1] statistics, resulting in personas and use cases. Data from prior and ongoing research (see e.g., Baig et al.; 2015a; Baig et al., 2015b; Coradeschi et al. 2013; Ehn et al., 2015; GholamHosseini et al., 2014; Koshmak et al., 2014; Kristoffersson et al., 2014; Kolkowska & Kristoffersson, 2016; Orlandini et al., 2016; Vinnova Final report, 2005), workshops and literature studies, (see Baig et al., 2014; E-care@home deliverable MSR5.1, Appendix B; GiraffPlus, 2012; GiraffPlus, 2013; GiraffPlus, 2014; GiraffPlus, 2015; Koshmak et al., 2016), have been the basis for our personas.

Several interviews have been conducted with potential end users: with healthcare professionals working in geriatrics care at a hospital and at the municipality home care services level, i.e., with Subject Matter Experts (SMEs) in Örebro and Södermanland; and with frail elderly people who have various health related problems that may result in falls, malnutrition, and/or pressure ulcers if not treated properly.

The interviews have mainly been semi-structured, face-to-face interviews supported by interview guides that were tailored to the respondents and the purpose of the interviews. The interview guides served to support the interviewer's memory, to trigger the discussions (Kvale, 1996; Patton, 2002) and to ensure that a cross-interview analysis of the interview data could be conducted. Two different interview guides were used in the three interview studies conducted in 2016, the interview guides can be found in Appendix 1-2. A qualitative content analysis of the interview data was conducted to identify themes and patterns in order to extract the healthcare professionals', relatives' and elderly people's needs and attitudes.

2.1   Participants

The research groups at Mälardalen University and Örebro University have interviewed several frail elderly people and healthcare professionals with geriatrics expertise working at hospital wards and in municipal care. In a number of prior longitudinal research studies with elderly people testing different technologies, notes about situations that may occur in elderly people's lives have been taken. In addition, questionnaires were administered and interviews conducted. Finally, results drawn from observations, different workshops and test beds have served as input for the development of personas representing this user group.

---

[1] Senior Alert is a Swedish quality registry. More information is provided at the Senior Alert web "Senior alert - more than just a Quality Register" http://plus.rjl.se/infopage.jsf?nodeId=43617/ [last visited: Jan 2017].

- During November 2016, the researcher at Örebro University conducted three interviews with elderly people going to a day rehab. Osteoarthritis, Type 2 Diabetes, Stroke, Spinal stenosis were among the elderly people's problems. The interview guide used is found in Appendix 1.

- During September 2016, the researcher at Örebro University conducted five interviews with healthcare professionals with expertise in geriatrics hospital care. The interviewees represented five different professions involved in geriatrics care and in risk assessments of pressure ulcers, malnutrition and falls using Senior Alert. The different professions were assistant nurse, nurse, physician, occupational therapist and physiotherapist. The interview guide used is found in Appendix 2.

- During September 2016, the research group at Mälardalen University conducted five interviews with healthcare professionals working in the home care services in four different municipalities; two physiotherapists, two occupational therapists and one nurse. The interviews have mainly been semi-structured, face-to-face interviews with support of an interview guide tailored to the respondents and the interview purpose. The interview guide used is found in Appendix 2.

- On June 10th 2016, the researcher at Örebro University observed the work conducted at a geriatrics ward. During the day, she conducted two semi-structured interviews with healthcare professionals working there.

- In the research project "A method to measure a sensor network's impact on perceived safety and security" funded by the Länsförsäkringar Research Foundation (2014) and run by Örebro University, a sensor network aiming to support people with a cognitive decline was deployed in the home of seven elderly men with self-perceived memory problems. All of them lived together with their spouses. The elderly people and the spouses answered to questionnaires and participated in face-to-face interviews about their physical and mental health, quality of life, expectations on technology and perceived utility as well as privacy concerns in relation to sensor technology. A total of 35 interviews were conducted during the project (Kristoffersson et al., 2014; Kolkowska & Kristoffersson, 2016). A few of the elderly and relative personas are inspired by the results from these interviews.

- The researcher at Örebro University was the technical coordinator for the Swedish test sites in the FP7 project "GiraffPlus" (Coradeschi et al. 2013; www.giraffplus.eu), 2012-2014. A sensor network collecting environmental and physiological data and the Giraff robot were deployed in the home of six Swedish elderly people who all lived alone. For each test site, the sensor setup varied depending on what activities that needed to be recognized. Information about desired functionalities, privacy requirements and medical conditions were used in the development of the personas. Researchers from Mälardalen University also participated in GiraffPlus.

- The researcher at Örebro University was also the researcher responsible for the deployment of a number of mobile robotic telepresence robots (Giraffs) in homes of Swedish elderly people in the AAL project ExCITE (Orlandini et al., 2017), 2010-2013. There was one couple, one elderly person interacting with the son and grand children who lived on the Fiji Islands, and a few elderly living alone. Notes on daily routines and situations that may cause an alarm were taken.

The authors of this technical report are, or have been, involved in a number of Swedish initiatives. Annica Kristoffersson worked 70% within the Vinnova funded test bed *Smarta Äldre* from October 2015 to December 2016. Maria Lindén is the project leader for the KKS research profile *Embedded Sensor Systems for Health (ESS-H)* and has acted as a member of the steering group for the Vinnova funded test bed *Mistel*. Both have also worked in projects funded by Robotdalen. Their involvement in these initiatives have provided opportunitities to:

- discuss the need for innovations and appropriate methods for identification of needs and testing

- sharing results between different stakeholders including municipalities and counties

- perform four days of internship with the Västerås municipality home care services. Together researchers and home care services visited 15 patients in their homes

- the arrangement and/or active participation in workshops conducted in 2011 and 2015. The workshop in 2011 aimed at meeting end-users and identify their future needs and interest of technical support while the workshop in 2015 aimed to identify the needs of technical support in healthcare and home care in the future.

2.2   Materials

The interview guides used within E-care@home and the other research projects have been tailored to the specific studies and elderly groups. The purpose in "A method to measure a sensor network's impact on perceived safety and security" was to collect information about physical and mental health, quality of life, expectations on technology and perceived utility as well as privacy concerns in relation to sensor technology from elderly with self-perceived memory problems and their spouses.

The interview guides developed for healthcare professionals served to develop an understanding of:

− available, and currently used, subjective tools to assess the risk of pressure ulcers, malnutrition and falls and actions currently taken to prevent them from happening,

− healthcare professionals attitude towards using sensor data in risk assessment and for communication with elderly people and,

− information sharing processes when a an elderly person is hospitalized or discharged from hospital.

The purpose of the interview guide developed for the elderly was to collect information about elderly people:

− their background, their health status, symptoms, and everyday problems,

− their experience of using new technology,

− their level of physical activity and attitude towards measuring physical activity, their attitude towards receiving information about risks via technology,

− their attitude towards using sensors for various purposes (e.g., detect falls, provide physiological data to health care professionals, activity monitoring, and medicine reminders),

 – technology as inspiration while cooking and to motivate good nutrition habits, and

 – their sense of safety and security.

 – information sharing processes when an elderly person is discharged from the hospital.

2.3   Analysis

All interviews conducted during September-October 2016 in the above list of sources for data collection were transcribed and analyzed. The method of analysis varied depending on the data sources.

For each of the two data sources, healthcare professionals working in the home care services and elderly, a qualitative (cross-case) analysis was conducted. A content analysis was used to identify core consistencies and meanings in a volume of qualitative material, i.e. themes. For each of the two data sources, the interview material was reviewed through several iterations in which a number of themes were gradually identified. These were used as the basis for the construction of three elderly personas (Jan, Kathrine and Linda) and three personas working in the home care services (Carl, Anna and Stina).

A qualitative content analysis was conducted also of the material collected through interviews with healthcare professionals working at a hospital. However, rather than focusing only on finding core consistencies and meanings in the volume of qualitative material, the analysis was conducted with respect to the five different professions' responsibilities and knowledge in relation to the Senior Alert risk assessment and prevention of falls, malnutrition and pressure ulcers. Nevertheless, a number of themes were gradually identified also during the analysis of this data source. The Senior Alert risk assessment is a team based effort, therefore five different personas (Alice, Bruno, Cecilia, Doreen and Ed) representing each of the healthcare professions were constructed on the basis of the interview material.

In addition, a number of personas representing elderly people (Finn and Hans) and relatives (Gabby and Iris) were constructed with the ambition to create multi-person research challenges for the E-care@home distributed research environment. These personas, although constructed with more freedom, are based in part on experiences from running a substantial number of longitudinal test sites during 2010-2014.

3 Results summary

One of the main challenges which has been identified for this group of elderly people is to make safe "hand overs" of the persons/patients between different caregivers. These elderly people typically lives at home, but through their fragility they are at high risk to end up in hospitals. The E-care@home system has the potential to help both home care services (municipality based) and healthcare (hospitals and community health centers delivered by the county councils) to keep track of all "patient data". In addition, several other challenges have been identified:

- Different systems (e.g. electronical health records) are used in different municipalities and county councils, and since our travelling habits are changing, it is even more important that these systems can be compatible with each other. This is not the case today.

- Trustworthiness of the data captured at home, without the involvement of for example doctors and nurses (i.e., parts of the data captured by an E-care@home system) might be questioned by hospital staff etc. This is fully understandable since the decision makers at the hospital cannot guarantee the quality of the data. On the other hand, decisions can be more well-grounded if they are based on monitored trends of the health condition as measured on a daily basis rather than on one or two measurements performed at the hospital.

With this in mind, a number of themes have been identified by different groups and caregivers. The themes identified in the interviews with healthcare professionals with expertise in geriatrics hospital care were the following:

- Interest and preferences in using computers, cell phones and tablet-PCs
- The patient's needs for contacts with others
- Care procedures
- The discharging process and information flow to community health care and elderly
- Senior Alert - risk assessment (pressure ulcers, malnutrition, falls)
- Senior Alert - planned actions to minimize identified risks
- Using sensors to detect falls, and for assessing gait behaviours and postures
- Alternatives to meal- and beverages- registration on paper
- Communicating recommended actions and feedback to elderly, e.g., elderly's reaction to information about risk, and the need to avoid certain activities

The above themes were used in constructing the personas: Alice, Bruno, Cecilia, Doreen and Ed.

The themes identified in interviews with a nurse, occupational therapists, and physiotherapists working in municipal care were the following:

- Interest and preferences in using computers, cell phones and tablets
- Interest and preferences in using sensor systems to monitor patients (ethical aspects, use for the patients, etc)
- Care procedures, how information is handled between caregivers
- Senior Alert - risk assessment (pressure ulcers, malnutrition, falls)

- Senior Alert - planned actions to minimize identified risks
- Using sensors to detect falls, and for assessing gait behaviours and postures
- Team work between different care professionals with the aim to support the patient

The above themes were used in constructing the personas: Carl, Anna and Stina.

The themes identified in the interviews with the elderly people belonging to this group were the following:

- Living situation
- Routines
- Health problems
- Activity
- Importance for the everyday life
- Socializing
- Security/fall alarms
- Assistance and aids
- Mobility
- Attitude towards technology
- Learning new technology
- Attitude towards sensors and wearables
- Sharing sensor data with healthcare professionals
- Personal contact with healthcare professionals regarding sensor data
- Dosett medicine dispensers
- Patient discharging procedures

The same and / or additional themes were identified from the internship together with the home care services in Västerås:

- Living situation
- Health problems (many persons were multi-morbide)
- Diabetes was very common
- Heart disease and high blood pressure was common
- Need of digitalisation. Today all documentation was done by paper and pen in the homes of the patient.
- Relatives are important
- Activity
- Importance for the everyday life
- Socializing
- Security/fall alarms
- Assistance and aids
- Mobility
- Attitude towards technology
- Learning new technology
- Attitude towards sensors and wearables
- Sharing sensor data with healthcare professionals
- Personal contact with healthcare professionals regarding sensor data

- Dosett medicine dispensers
- Medication prescription

The above themes were used in constructing the personas: Jan, Kathrine and Linda.

In addition, a number of themes were identified in the subjective data collected within "A method to measure a sensor network's impact on perceived safety and security":

- Living situation
- Routines
- Health problems
- Activity monitoring
- Attitude to technology
- Attitude to sensor networks
- Perceived care burden among spouses and relatives
- Sensor-based information to elderly, spouse and relatives

These themes, that could also be extracted from the running of longitudinal test sites during 2010-2014, were used in constructing the personas: Finn, Gabby, Hans and Iris.

The elderly people from which input was collected is a diverse group encompassing frail elderly people who, for different reasons, may be in risk of falling, developing malnutrition and/or pressure ulcers. Years of running longitudinal test sites and recently conducted interviews with elderly people and healthcare professionals indicate that these elderly can have e.g. Arthritis, Angina Pectoris, Parkinson's disease, Spinal Stenosis, Type 2 Diabetes, but also mobility and memory problems after having had a Stroke. Some of these elderly have little contact with caregivers while others may have had several hospital stays or be in need of home care- and/or homemaker services.

This group of elderly people encompasses both those who live alone and those who are supported by their spouse. Common for a majority of them is the desire to live as independently as possible. Many of them try to follow all recommendations from their caregivers, but others do not understand (or do not want to acknowledge) that they are at large risk. Another portion of the elderly is very inactive for most of the time because of being too afraid of falling, and also because the inactivity has become a habit. This behaviour is counterproductive as it may result in a decreased balance, strength etc. This in itself increases the likelihood of falling.

Having access to a history of objective activity and physiology history when a person is being hospitalized could be beneficial for the healthcare professionals since it can provide important leads when determining the cause of ,e.g., a fall. Knowing the cause can be important when trying to prevent additional falls from happening. Similarly, having access to the objective history is an important complement to subjective, and not necessarily correct, information that may be provided by the hospitalized person or by their relatives.

Home care services and the physician working at the community health center could benefit from rules that provide the caregivers with a warning when an increased risk or a deteriorated health is detected. These rules could be set within the E-care@home system and lead to timely preventative actions.

4 Personas

In this report, we present 15 personas representing healthcare professionals with expertise in geriatric hospital care, municipal caregivers, elderly people and relatives. Because of the fact that Senior Alert risk assessments are done in teams, there are eight healthcare provider personas. Five of them combine their expertise when conducting the risk assessment on inward patients and planning the preventative actions while the patients are still hospitalized. Four of them are involved in the planning of the discharge and in providing information to the next caregiver in Meddix/Prator or other similar systems. The other three personas have different responsibilities within the home care services.

The healthcare professionals with expertise in geriatric care are:

- Alice (Assistant nurse)
- Bruno (Nurse)
- Cecilia (Occupational therapist)
- Doreen (Physician)
- Ed (Physiotherapist)

The municipal caregivers are:

- Carl (Physiotherapist)
- Anna (Occupational therapist)
- Stina (Nurse)

The elderly are:

- Finn
- Hans
- Jan
- Kathrine
- Linda

The relatives are:

- Gabby (daughter)
- Iris (spouse)

Alice is working as an assistant nurse at a geriatrics ward at a university hospital. She recently became an assistant nurse after having worked with administrative tasks previously.

Alice thinks that the forms currently used to assess the risk of pressure ulcers and malnutrition are good. The SKL fall risk form lacks the opportunity to enter patient specific facts, e.g., "*broke the hip so cannot walk*", which reduces the current risk of falling. She has noticed that the DFRI form collects additional information which affects the risk of falling, i.e., the ability to walk, medicines, cognitive and/or sensory impairments. Alice reasons that these factors would be important to assess regularly for elderly who are not hospitalized.

Alice does her best to reduce the risks when the patient is hospitalized. To reduce the risk of falling, she ensures that the patients are always wearing anti-slip socks or shoes. She instructs each risk patient that it is important to use the alarm button when they need to leave the bed to, e.g., visit the toilet. Overall, she finds that too many patients do not use this button. Learning to use it can be difficult for a person with a cognitive decline. Alice wishes that elderly were offered to use alarm buttons at an earlier stage. That way, they would know how to use it when becoming cognitively declined. Some elderly having fallen are undetected for too long.

A few actions that reduce the risk of pressure ulcers and malnutrition are related to the diet. The patients are asked to eat snacks three times a day and more than 11 hours must not elapse between meals. She registers on paper how much the patients eat. In addition, she registers the volume of beverages served and drunk. Alice finds this difficult since some patients never finish their meals or glasses of beverage. She also occasionally finds some food in the garbage bins in the patients' rooms. Alice imagines that it may be even more difficult to monitor that the elderly are following a proper diet when they are home. Alice wonders whether technology could help here.

Alice has a very positive attitude to ICT and believes that access to more technology could attract some people, who would not otherwise choose to work in health care. It is important to understand that even if many of the elderly people currently hospitalized at the geriatrics ward are novices with respect to ICT, the generation which is currently in the early 70s is much more used to technology. Alice informs that the current use of technology at the ward is typically limited to filling out the EHRs and care plans. Occasionally, it happens that the planning for discharging a patient is conducted via video calls. This reduces the time needed for travelling from remote areas in the county which are served by the hospital.

e·care@home

Alice

45 years
Assistant nurse, Geriatrics ward

Goals
- Provide ICT to those patients desiring/needing it.
- Stay informed.
- Ensure that the patients follow a proper diet.

Bruno is a district nurse working at a geriatrics ward at a university hospital. Bruno is mainly involved in the care of patients having dementia or Alzheimer's who are also often multi-morbid.

Making risk assessments on that group of patients is difficult, i.e., commonly they cannot answer the questions in the Senior Alert risk assessment form. Therefore, the risk assessment and follow-up are based on visual observations of the patient's skin and changes in weight, e.g.. by looking at the patient's pants and how they eat. There may be several causes behind the development of malnutrition. Reasons include lack of motivation but also bad mouth health such as blisters and oral candidiasis, against which medical treatment may be needed

For Bruno, it is important to create meal situations that support each individual patient. Some patients need a calm and quiet situation, others need music, company or chitchatting. It is also important to "sell" the meals, what is served needs to look tasteful. Serving dessert in a shot glass is common. Considering the patients' diagnosis, it is also important to remind them about eating. Reminders are also important regarding medication.

Often, the medication list is changed during the hospital stay. Bruno is paying close attention to whether this affects the patients. Therefore, he monitors the patients' walking to detect abnormal gait behaviours for these patients. Bruno informs the physician about his observations during a team round.

Some of Bruno's patients have alarm mats, others reside in rooms where motion sensors are installed. The reason for both sensors is similar; to ensure that the patients are monitored when leaving the bed and the room in order to minimize the risk of falling. The alarm mats are practical since they can be installed in any room. However, some patients realize that stepping on the mat issues an alarm. In order not to disturb the staff, they sometimes try to avoid stepping on the mat, and sometimes this results in a fall. Placing such patients in a room equipped with motion sensors ensures that an alarm is issued as soon as the patient leaves the bed. Thereby, some falls are avoided. Bruno's attitude towards technology is mixed. Technology is good if it is useful, such as the motion sensors. However, technology which just adds to the workload is not good. Bruno prefers Windows and Androids over Mac and iPads. Regarding technology for elderly, Bruno thinks that technology could be an aid in reminding some of the elderly to eat and take the medicine. However, he considers his own patients as being too confused for taking advice from computers. In these situations, Bruno recommends using the technology for monitoring whether the elderly is following the recommendations. A personal contact should be taken if behaviours need to change.

e·care@home

Bruno

38 years
Nurse, Geriatrics ward

Goals

- Patient-centered care
- Use technology in the right situations.
- Motivate patients when needed.

Cecilia is an occupational therapist working at a geriatrics ward at a university hospital. Many of the patients at the geriatrics ward are very sick multi-morbid elderly spending most of the time in bed, others have developed dementia. Some are more healthy but in need of rehabilitation after e.g., a fall. Their experience of using ICT is limited or non-existing.

Cecilia is involved in the risk assessment and prevention of pressure ulcers. Many of the patients have visible pressure ulcers when coming to the ward. She also assesses the physical activity and mobility of the patients and ensures that the patients' positioning in the bed, wheelchair et cetera is changed regularly.

Cecilia is also highly involved in the risk assessment and prevention of falls. This assessment is conducted in several ways; Cecilia speaks with the previous caregivers and interviews the patients regarding late falls. Being an occupational therapist, she can only see the patients during office hours. Cecilia finds this a limitation as a patient's ability to perform ADL activities, e.g., mobility, going to the toilet and personal hygiene often varies depending on the hour. Many of them are very unsteady and difficult to communicate with because of the daze associated with waking up during the night. Therefore, she needs to rely on documentation written by her colleagues when planning preventative actions that lower the risk of falling when the patient is discharged from the ward. Cecilia's has noticed that her perception of a patient's abilities often varies from her colleagues. Therefore, she wishes she had access to more objective information than only written information. For Cecilia, it is important to provide the occupational therapists working in the municipalities with sufficient information on activities where the patient who is to be discharged has problems and what assistance will be needed. Information is communicated in person, through the telephone and through the individual care plan.

Cecilia's attitude to technology is mixed, it needs to come natural if she is to use technology but it doesn't matter whether the technology runs on a PC, a MAC, iOS or Android. She acknowledges the importance of staying active and believes that wearables could provide healthcare professionals with useful information regarding gait characteristics and postures. Such information could be used when developing individual exercise plans and to determine possible causes of pain. Many elderly people feel lonely and depressed and Cecilia believes that more healthy elderly people could feel motivated and listened to if provided with positive feedback when recommendations are being followed. However, whether technology should be used for communicating information to the elderly or not depends on the context; more healthy elderly could appreciate, for example, step counters. Regarding the provision of information on increased risks, it is important to help the elderly to overcome the newly incurred problems rather than just informing about them.

e·care@home

Cecilia

30 years
Occupational therapist,
Geriatrics ward

Goals

- Make risk assessments and planning preventative actions in teams.
- Ensure that patients feel well informed when staying at the ward.
- Ensure that patients and relatives understand the care plan when being discharged.

Doreen is working as a senior physician specialized in geriatric medicine at a geriatrics ward at a university hospital. She has also worked as a general practitioner at one of the local community health services.

A majority of her patients are multi-morbid and/or cognitively declined. Filling out the Senior Alert forms to assess the risk for pressure ulcers, malnutrition and falls is common practice at the ward. Having collected the requested information, values are summed up and used to take proactive actions against the detected risk/s when the patient is staying at the ward. Important to consider for each new patient having fallen is to understand why the patient has fallen and in which context the fall occurred. Sometimes, the new patients report that it felt like something dragged them backwards, others experienced light-headedness, while others tripped. Today, Doreen receives information from the elderly, who may be confused, and their relatives. Doreen would find objective historical information regarding the diet and physiological parameters, e.g., blood pressure and blood sugar measurements, valuable when assessing a new patient's health and risks.

Typically, an in-ward patient's medication list is long. Doreen makes a medication reconciliation and analyses the patient's medication list by manually entering all medicines and dosages into miniQ. Thereafter she adjusts the dosages and/or removes medicines from the medication list. Doreeen is highly involved in the discharging process of a patient. She writes an epicrisis to the medically responsible primary care physician. In addition, she writes a care summary to the patient. The care summary includes information about the patient's hospital stay and the current medication list. She has a personal meeting with each patient to be discharged. During the meeting, she informs the patient what has happened at the hospital, what medicines to take and what medicines the patient is not to take anymore. However, this is not an entirely secure information process considering that many of the patients are cognitively declined. Ensuring that the patient keeps a recommended diet and that the right medicines are taken at the right times when the patient is discharged from the hospital is important in order to minimize the risks of pressure ulcers, malnutrition and falls.

Doreen is doubtful regarding elderly people's capability of receiving too much information regarding their health and physical activity via a tablet-PC. However, she thinks that installing technology that collects objective data in the home of elderly people could be a great support for those taking care of the elderly person. In addition, it is not uncommon that the patients react to medicines, having access to physiological measures gathered prior and after medication intake would be valuable.

e·care@home

Doreen

60 years
Physician, Geriatrics ward

Goals
- Conducting standardized risk assessments.
- Understanding the context in which a patient has fallen and why.
- Assessing medication list in order to reduce the risks associated with taking medicines.

Ed who is a physiotherapist since 2005, works at a geriatrics ward at a university hospital.

Ed is involved in the risk assessment and prevention of falls. He speaks with each patient in order to gather information about the frequency of falls during the past year, the context of each fall, e.g., whether the patient slipped or had a sudden dizziness. Ed informs the physician in cases where he suspects that the patient has fallen for medical reasons.

Ed finds that there are several categories of patients. Patients with a larger risk of falling are those who have already fallen and are afraid of falling again, and those who are not afraid of falling at all even though Ed knows they had a stroke and can observe that their walking is unsteady. He promotes physical activity and walking to those afraid of falling since this reduces the risk of falling. Ed finds those not acknowledging the fall risk more difficult, e.g., finding the right words when telling previously independent people to become more wary and not go out alone.

The patients who are healthy enough exercise walking and perform strength and balance training with Ed every day. It is Ed's duty to register how much they drink when conducting the classes. Ed says there is a risk that the patients adjust their way of walking when he is watching. He would like more objective information when assessing the gait characteristics and postures. In addition, Ed is conducting classes with some of the discharged patients who are still in need of rehabilitation of more advanced nature. Sometimes, these patients come to the training claiming they are very tired and cannot walk as well as usual. It is important to understand whether this is due to health deterioration or factors that can be affected, e.g. the blood sugar. Ed thinks the training would be more effective if he could offer those elderly something sweet to raise the blood sugar.

Most patients being discharged from the ward still need to continue exercise walking and to conduct strength and balance training. Ed has a few concerns with the current discharging procedure. Home rehab physiotherapists working in the municipality prefer reading the information in Meddix over phone calls. Ed considers the information that can be put in Meddix as insufficient when there is a high risk of falling and when a lot of training is needed.

Ed is positive towards using more technology (Androids in particular) and his perception is that elderly are becoming more and more interested in using the Internet for social networking and shopping. However, his experience is that the smart phones need to be adaptable to the individual needs of the elderly, i.e., reduced hearing, vision and/or touch, strokes and cognitive-/physical disabilities. Ed thinks that technology could help elderly in using postures that minimize the risk of blood pressure and pressure ulcers.

e·care@home

Ed

50 years
Physiotherapist, Geriatrics ward

Goals
- Finding the reason behind the falls.
- Make an individual training plan aimed to help patients conduct desired activities after being discharged from the ward.

Carl is a physiotherapist and has worked in the municipality of the middle sized town for 5 years. He has a large interest in technology, both privately and in his occupational role. Today, the first contact Carl gets with his patients most often is through telephone, unless the contact is initiated by the home care services. It is not always easy to reach Carl by the phone, and then he gets a message from the switchboard. Sometimes a message is lost. Carl has thought about the possibility to use a communication system with camera for some of his follow-up visits. Carl thinks that this would be useful both for him and the nurses, and that it would make them more available to the patients. However, he realises that it will be a challenge to educate the majority of his patients to use this equipment.

Carl thinks it is very important that different occupations collaborates and work in a team, with the patient in focus. However, one main challenge is to not lose any information, especially when the patient is transferred between the hospital care and the home, where the municipality is responsible for the homecare. Carl does not have access to the hospital's EHRs, and even though the transfer of the patient should be performed via telephone or the system Prator, it happens that information is lost.

Carl always focuses on his patients' capacity to move, and sense, in order to identify risks of fall and pressure ulcers. Carl is less focused on low weight patients, but this is hopefully caught by his nurse colleague. Carl works in a home care team with the nurse and an occupational therapist, and thinks this is important in order for early identification of risks among the patients. Risk of falling and pressure ulcer is very important to identify, and Carl also thinks it would be good to use wearable sensors in order to catch movement patterns, and follow the status and risks of his patients, although such systems are not used so often yet. He thinks it would give important information that is not revealed during home visits since many patients for example are more focused and move differently with their walker. Information overflow is however a drawback of such systems. Who should be responsible for all this new information? And what would happen if the sensors detect a risk of falling, but no one acts on it? Still, Carl thinks that the technology has a large potential also to interact with the patients, for example to remind them of how they should move and train.

Carl has also heard about projects providing remote physiotherapy training. The physiotherapist can see his patients and they can see her/him and thus know that they perform the exercise in a correct manner. Carl thinks that this sounds very interesting, and hopes that he will be able to try this in the future. In this way, he wants to offer his patients an extra opportunity to train, not only during the appointments he now has.

Carl

25 years
Physiotherapist at the municipality of a middle sized town

Goals

- to help his patients
- to work in a care-team together with occupational therapists and nurses
- to introduce technology for better care
- to investigate mobility capacity, sensing capacity in order to detect risks of his patients
- Individual treatment of each patient
- possibilities to prevent fall is very important

Anna is an occupational therapist that has been working for over 20 years in a small municipality of Sweden. Anna is a little bit afraid of technology, and thinks that the personal meeting between the healthcare professionals and patient is the right way to work. Most patients contact Anna through the telephone. Since Anna is working in a small municipality, she knows most of the persons that her patients get in contact with. The meetings are not always formal, but it mostly works good anyway. One problem is the transfer between the hospital and home care services. There is a system (Prator) that should be used, but sometimes this is not the case. However, summers are a bit more complicated with lack of staff and new persons not knowing their normal way of working.

Anna is always very focused on the risks of pressure ulcers and falling. For example, Anna asks her patients about if they have had a fall, and if so, she asks them how that happened in order to understand what the problem is.

Anna also thinks that wearable sensors would be beneficial in order to investigate and discuss with the patients. Many times, they are not fully aware about their risk or falling. However, a monitoring on a daily basis seems a bit unethical to Anna.

Anna also thinks that telecommunication platforms is a bit frightening. She realises their future potential in video calls with patients, patients that today do not get this extra visit, but she also worries about the security issues and the integrity of the patients.

Anna is collaborating with physiotherapists and nurses from the same municipality. The teamwork is very important, and works very well, especially when she works with the physiotherapist and the nurses that have been in the same municipality for a long time. When new staff is recruited, it has happened that some information about the patient did not reach them, which of course can be very serious. The reason was that everything had not been correctly documented in the patient's EHR.

e·care@home

Anna

40 years
Occupational therapist in a small municipality of Sweden

Goals
- to meet and help her patients
- to work in a team with other occupations

Stina is a nurse and has worked in the municipality for 10 years. Team work is essential for Stina, and she would like to give her patients as high life quality as possible. She is open to use technology in her private life, but is a little bit more cautious with technology use in her working role. The meeting between humans is what she really prioritises in her working role.

Stina is contacted by phone or fax from the home care services or from the hospital. The system Prator is also used, but mostly as a communication and planning tool. This system could be used more efficiently to make the care plan, this is something that Stina realises.

When it comes to deciding the risks of falling and pressure ulcers, Stina always tries to do a holistic judgement. She considers several parameters: how much can the patient move, moisture, change of weight, health of the mouth, etc.

Stina thinks that monitoring by sensors can be of value. However, the ethical aspects must be considered. If a patient accepts being monitored by sensors, she can clearly see the advantages. But considering the wish from the patient is of most importance for Stina. One important thing is to know whether a patient has taken her/his medicine, and to be able to remind about this. This could help an elderly person to actually stay at home longer. Stina also points out that it is just as important to give feedback to the patient, not only to the caregivers, if the patient is monitored. It is also important to adjust the information to the patient so that he/she can understand it. Thus, there are probably different user views of the system depending on who the user is, the patient/relative or healthcare professionals. She also realizes that there is a large risk of information overflow. If a lot of sensors are deployed and all the data is sent to the caregivers, someone needs to take care of the data. This problem must be solved.

Information could be transferred both as images and text, this is a new communication tool that could be of use.

e·care@home

Stina

49 years, nurse in a municipality

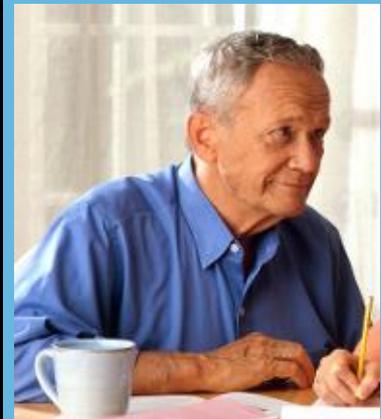## Goals
- personal meetings
- teamwork

Finn is an elderly widower living alone in an apartment in a small city. Three years ago, his wife Anna died and Finn decided to sell the house as it was too much for him to manage alone. Finn takes care of most of the daily duties himself, however a nurse from the home care services take care of filling his pill dispenser. In addition, the homemaker services clean his apartment weekly. Finn used to work as a chief at a pub and prefers continuing with his own cooking over readily-made meals. Potatoes and meat are among his favourite dishes.

Having developed type 2 diabetes and a high blood pressure, Finn's blood sugar and blood pressure values are followed up regularly during visits to the community health center. Finn has been informed that he needs to conduct physical activities at the gym twice per week, lower the intake of alcohol, eat more healthy, i.e., reduce the sugar intake significantly, and to eat less salt. The physician has subscribed a number of pills that Finn needs to take every day in order to keep the blood glucose level at appropriate levels. Finn has never liked taking pills and sometimes his nurse complains at Finn about that some dispenser compartments are still filled with pills. Finn is not sure why he sometimes does not take the pills but thinks it is just a bad habit.

The nutritionist has said that Finn can continue eating potatoes with skin on but avoid mashed potatoes and French fries. He should also increase his intake of dietary products, fibers and fat fish. Finn feels a lack of inspiration regarding what to cook when eating less potatoes. His daughter, Gabby, has told him that there are many recipes and dietary guidelines to find on the Internet. Finn would appreciate access to such information but he has never had a computer or a smartphone. He uses his Doro PhoneEasy when he goes out. Finn thinks it would be difficult to learn how to use a computer or a smart phone.

e·care@home

Finn

85 years
High blood pressure
Type 2 diabetes

Goals
- Eat healthy
- Feel well
- See friends
- Everyday life works
- Daughter is not worrying.

Gabby is Finn's daughter. She lives in a small city with her husband and two teenage children. Gabby is working as a key account manager and travels to meet with important customers two-three days a week.

Ever since Gabby's mother Anna died three years ago, she worries about her father's health and well-being. Gabby follows Finn to the community health services. From the encounters with nurses, nutritionists and physicians, Gabby has realized that Finn needs to change his lifestyle significantly in order to follow all their orders.

Knowing that Finn likes to eat salty snacks and salty food in general, Gabby has informed her father that there are many guidelines and inspiration available on the Internet. She is thinking about buying Finn a tablet-PC for Christmas. Gabby wishes that she had more control over her father's diet and a better understanding on her father's activities in general. Therefore, she tries to come up with different reasons for visiting her father at least once a week, e.g., offering to go shopping groceries together, play cards and to talk about what is going on in their lives. Often, she also bring a couple of healthy food boxes with her. "To give you some inspiration", she typically says. Gabby also checks whether Finn keeps the apartment clean and whether anything is missing in the fridge. Sometimes, she is surprised that the fridge is almost empty except for the healthy food boxes.

Gabby wonders why so much alcohol, food, and toilet paper is consumed. Finn does not seem to gain any weight and the community health services do not complain that Finn seems to drink too much. Therefore, Gabby suspects that Finn is not telling her about everything that is going on in his life. Gabby wishes that she could visit her father more often, but all the work travels prohibits her. Gabby wishes there was a way that allowed her to monitor Finn's daily activities and what he is eating. If possible, she would also like to be assured that Finn has taken all his prescribed pills rather than having to find out from the home care services nurse once a week.

Gabby also thinks that Finn has been very tired lately and is worried that he is conducting too many physical exercises based on his previous, non-existing, training background. Gabby is hesitant about buying Finn a wearable to keep track of his physical activities since he refused carrying a security alarm bracelet by saying "I can take care of myself".

e·care@home

Gabby

45 years
Finn's daughter

Goals

- Feeling less anxious about dad.
- Be aware of dad's activities and health measures.

Hans lives together with his wife Iris in a four room row house in the outskirts of a middle sized city. Together they have two children, Anette who is 40 years old lives in the same city with two teenage sons (Ludwig and William) and her husband Per-Arne. Hans' son Anders who is 35 years old lives in Stockholm with his girlfriend Stephanie and a two year old girl, Ida. Before Hans retired, he was working as a director of studies and lecturer in statistics at a university. Every day, Hans handled a number of errands related to his role as a director of studies. In addition, he had about 150 students in his courses every year. Hans' research publications are still highly cited and sometimes he is contacted by younger researchers at the department who want to discuss ideas for research proposals with him.

Two years ago, Hans had a stroke which resulted in a temporary paralysis on the right-side of the body and a memory loss. Hans has been training his muscles and coordination at a day rehab for a year and now his problems are less severe. His muscles on the right side are still weaker but he feels comfortable using his walker. Therefore, Hans still goes to the day rehab to exercise two times a week. He also has medication reconciliation twice a year at which dosages of medicines are reconsidered. Hans would prefer it if he could have more frequent check-ups by nurses and physicians. He would like to be able to discuss his progress from exercising and medical issues during video calls with healthcare professionals. He would like to receive feedback on whether his gait and postures are improving and he would be OK with wearing body sensors.

Hans still suffers from a short-term memory impairment. He has problems recalling details from conversations he had ten minutes ago and cannot answer questions such as what was the weather yesterday like. Hans feels embarrassed about his short-term memory impairment and wishes that he could easily record his conversations with prior colleagues and with his wife. For example, by knocking once in the table when there are episodes to record and knocking twice and keep the fist on the table while there are episodes which are very important to remember. Each recording could end with an additional knock. Hans thinks that such a recording would enable him to get back to his colleagues with constructive feedback after having thought about their ideas in private. In addition, double knock could be used for timed reminders to e.g., go to the day rehab or take medicine but they could also include listed tasks, e.g., a shopping list. Ideally, each reminder would be automatically added to his smartphone calendar which also receives the shopping list as a push message.

Considering his short-term memory impairment, Hans often feels worried when he is home alone. He worries that he may forget to take his medicines but also about forgetting to turn off electric appliances when they are not in use. For example, the fire alarm has went off twice when he lay down to rest while having the stove on. In addition, Hans has been unable to raise up without help a few times. So far, this did not happen when he was home alone but Hans would like others to know if he falls or cannot raise up so that he can get help.

e·care@home

Hans

70 years
Stroke
Short-term memory impairment

Goals
- Feel more safe and secure.
- Exercise to get stronger in right leg and arm.
- Remember to take medicines.
- Remember birthdays.

Iris lives together with her husband Hans in a four room row house in the outskirts of a middle sized city. Together they have two children, Anette who is 40 years old lives in the same city with two teenage sons (Ludwig and William) and her husband Per-Arne. Anders, who is 35 years old lives in Stockholm with his Italian girlfriend Natalia and a two year old girl, Ida. Iris is older than Hans and has taken care of most household duties since she retired from her work as a teacher in younger years twelve years ago. Hans retired three years ago, and during the first year (before the stroke), he did the vacuum cleaning and dishes. At the same time, Iris started learning Italian to be able to speak with Natalia. Iris still goes to classes between 2pm and 4pm two days a week and it takes her about 30 minutes to get to the classes by car. Iris does not feel comfortable with Hans being home alone after he had his stroke and developed an impaired short-term memory. Therefore, she tries to do all necessary grocery shopping in conjunction with the Italian classes. Being worried about Hans, Iris tries to maintain control over the situation. Rather than reminding Hans orally, she checks what he is doing and turns off any electrical device he has forgotten to turn off. She regularly checks that the door is locked, writes to-do lists and shopping lists as well as uses her smartphone calendar to remind her when there are activities that Hans should conduct. Being afraid that Hans should fall, she has the habit of pulling out the chair when she believes that Hans is about to sit down. In addition she takes care of the majority of household duties.

Iris has a high blood pressure and her physician and district nurse have informed Iris that she must worry less about Hans. They have told Iris that she needs to allow Hans to take care of himself and take better care of herself. Iris should stress less, conduct physical activities regularly and eat less salt. The physician has asked about what could bring Iris some piece of mind. Iris feels more happy and relaxed when she goes to see her grandchildren, particularly the two year old Ida. Therefore, the physician has suggested that she should try to spend one weekend per month with Ida in Stockholm. Iris does not feel comfortable with leaving Hans alone. So far, Iris has gone to Stockholm once. She enjoyed practicing Italian with Natalia and spending time playing with Ida. However, she could not stop worrying about Hans. Iris called him about ten times during her one-night stay. Iris had prepared meals that Hans could microwave and called to check that he felt ok, that he had fed the cat, locked the door, got out of bed, and to make sure he remembered eating dinner, breakfast and lunch. Therefore, Iris is not ready to take the physician's advice to spend one weekend a month in Stockholm if she does not receive some support that can assure her that everything is alright at home.

Iris

77 years
High blood pressure,
Hans' wife

Goals
- Support Hans in getting stronger and more independent.
- Feel comfortable with going away to grandchildren.

Jan is an elderly man living together with his wife Christina in a two room apartment located on the third floor in a small city. Jan had a stroke ten years ago, and since then, he is bound to his wheelchair. Nurse Stina cleans his hip ulcer every third day.

Jan was very physically active prior to the stroke. He biked everywhere and when he was not biking, he ran or played tennis. Jan has accepted his disability. The stroke has clearly affected Jan's mood, Jan is not hoping to get better and does not worry about being too inactive. His only regular activities are two weekly visits to the day rehab and a book circle at the local library in which non-fictional literature and articles are discussed. Participating in these activities are mainly important to get routines and to have somewhere to go. Jan finds it difficult to withhold good routines when being free to do whatever he wants. Sometimes, he spends the whole day watching TV, other days he spends lots of money on gambling in the local food store.

Jan has absolutely no interest for technology. He knows how to turn on and off the TV. Having diabetes type 2, he has also received a blood glucose reflectance meter. Jan always carries the reflectance meter with him and he is capable of self-monitoring his own blood glucose value when needed. Jan does not take notes regarding the measures, he only uses it to adjust his medication if needed. He is not interested in following his own values over time.

Jan is positive towards using sensors. They could be used to ensure that Jan is doing what has been decided by the healthcare professionals, i.e., eating enough calories and doing specific ADLs. It is ok to share information about conducted activities with the physician but Jan wants them to be honest with him when looking at trends. There may be reasons for why Jan is conducting less ADLs some days, therefore the physician should meet Jan in person and discuss what has been observed. Being wheelchair bound, John has no interest in wearing a bracelet measuring how physically active he is. However, he would like it if the security alarm bracelet could detect falls automatically and connect him to the alarm service operators.

Jan has been an inward patient at the hospital several times and for different reasons. He is satisfied with the way he is informed during the care planning and feels that he gets the opportunity to provide the healthcare professionals with information that Jan wants to reveal. Jan feels that the only problem is the medication reconciliations. It is difficult to remember exactly what medicines should be taken when dosages and number of medicines are adjusted. Home care services fill his pill box periodically.

e·care@home

Jan

70 years
Stroke,
Diabetes Type 2,
Wheelchair bound

Goals
- Get better routines.
- Follow physician's orders.
- Self-managing his diabetes.

Kathrine is an elderly widow living with her cat in a co-operative apartment situated on the ground floor in a middle sized city. She keeps the apartment in order (dusting, vacuum cleaning and washing) and cuts the lawn and takes care of her little garden by herself despite a need for a walker when moving inside and an electric scooter when taking the trash out or when going away from her apartment. The three children worry that Kathrine's desire to be so independent and fear that it might result in a bad fall one day.

Kathrine has always been very physically active. When she was young, she was an elite athlete and later she has been teaching both gym classes and qigong. The osteoarthritis, her worn out knee and last year's on-set of lumbar spinal stenosis limit her ability to stay as active as she would like. Therefore, she is very happy for her electric scooter which enables her to go wherever she wants independently. Twice a week, Kathrine goes to a day rehab to exercise and meet other elderly people. She uses the electric scooter to get there.

Kathrine has an iPad that she uses for reading the news, looking at Facebook, playing solitaire, checking the bank balance and for watching TV in bed. While she likes her iPad, Kathrine emphasizes that technology must be very easy to understand. It is too difficult if there are many steps and codes. In addition, she does not pay her bills over the Internet.

Kathrine has fallen badly a few times. Therefore, she always wears a security alarm bracelet through which she can get in contact with alarm operators by pushing a button. Fearing that she may hit the head in the next fall, she wishes that the bracelet could automatically detect her falls and connect her to the alarm service operators. In addition, she would appreciate if the bracelet informed her that she needs to be move through a buzz. Kathrine thinks that the physiotherapist Carl should order her to conduct balance training if he notices that the gait and posture data collected through Kathrine's bracelet indicated changes in behaviours.

Kathrine also suffers from Angina Pectoris, sometimes when she has been upset, sad or angry, she wakes up with a major chest pain. Therefore, she always bring a medicine spray with her.

Kathrine takes a combination of medicines and the number of medicines and dosages change every time she goes to the hospital. Sometimes, she needs to take more medicines and sometimes they are reduced through medication reconciliations. In addition, Kathrine has found that the pharmacy sometimes provide her with medicines similar to the one subscribed but of different brands. Hence, the pills can vary both in size and color. Sometimes, she takes the wrong medicine.

e·care@home

Kathrine

80 years
Angina pectoris,
Knee worn out,
Lumbar spinal stenosis.
Osteoarthritis

Goals

- Keep the independence.
- Feel safe
- Keep being physically active.

Linda is living alone in an apartment located in a sheltered housing in a small city. Being located in the center of the city, Linda has participated in many activities both within the housing and in the city center until early last spring. One evening, when she was going to lay down on the bed, she fell badly. After having laid on the floor due to being unable to move for a while, Linda reached the phone and called 1177. The queue was long so she tried to call several children who did not answer and finally 112. The rehabilitation process after the fall has been long and involved staying at the hospital for several months. Being discharged from the hospital, she received a security alarm bracelet and home care services. During the first month, she had to conduct strength and balance training with the physiotherapist Ed at the hospital a few times weekly. Currently, she sees the physiotherapist Carl every second week.

About two months ago, Linda fell again when out shopping with her walker. The fall made her realize that the security alarm button did not work. From then on, she is afraid of leaving her apartment. This has resulted in her becoming more physically inactive and mostly at home, she seldom goes to the laundry room in the basement. Linda wishes that the range of the alarm could increase and that alarms could be issued even without Linda pushing the alarm button. Linda is very afraid of troubling the home care services who gives her the insulin injections. She cannot do this herself because of her Parkinson related tremors. Periodically, they fill her medicine pill box. In addition, the homemaker services deliver food and clean her apartment. Linda is ashamed that she once happened to press the alarm button by mistake, and did not observe this until the home care services reached her home.

Linda has a large family consisting of four children, many grandchildren and great grandchildren but only a few of them live nearby. She communicates with each of them weekly either via the telephone, SMS or through video calls. Overall, Linda has a very positive attitude towards technology and uses her computer not only for video calls but also for checking her e-mail daily, to search for information, read book reviews and to make notes. Lately, she has noticed that the computer is malfunctioning. Therefore, she plans to buy a new computer and learn new features very soon.

Linda's attitude to sensors is positive. She would appreciate being able to visualize her physiological measures. This data should be presented both orally and visually. It is also ok for healthcare professionals to monitor her health trends and her ADLs. If they find something odd in her activities, she wants them to meet her personally. Overall, she finds that the follow-up after her latest hospital stay should have continued longer than it did. It should not stop so shortly after she came home as it did. Her perception is that the visits end after the occupational therapist has checked what she needs.

e·care@home

Linda

85 years
Arthritis,
Cervical spinal stenosis
Diabetes Type 1
Parkinson's disease

Goals
- Feel safe and secure.

5   Conclusion

The original aim of the work presented in this report was to provide the E-care@home research environment with an understanding of who the user of a hypothetical future E-care@home system is. The resulting personas are to be used as a tool to aid other work packages within the E-care@home research environment in their design processes. The release of this report is, however, a result of several requests of data and user specifications coming from both researchers and companies, who want to base their work on realistic situations of elderly people.

Personas and use cases are typically used before the first, macro-level design of the system (Torres et al, 2008) and should not be considered as being architectural design requirements. Rather, the purpose has been to support each work package in the E-care@home research environment in terms of their own design processes.

Presented in this report are five elderly personas (Finn, Hans, Jan, Kathrine and Linda). Two of them live together with their spouses, one of which is represented by the persona Iris. Another one has a daughter as an informal caregiver, she is represented by the persona Gabby. In addition, the report presents the personas of eight healthcare professionals, all of which are involved in Senior Alert risk assessments and prevention of falls, malnutrition and pressure ulcers. Three personas (Carl, Stina and Anna) represent different professions working in the home care services, the other five personas (Alice, Bruno, Cecilia, Doreen and Ed) work at a geriatrics hospital ward. These hypothetical and archetypical users shed light on a variety of different users that may interact with an E-care@home system, or other IoT technologies in the future.

6   References

Baig, M. M., GholamHosseini, H., Lindén, M., & Connolly M. J. (2014). Review of Vital Signs Monitoring Systems – Patient's Acceptability, Issues and Challenges. *Journal of Neuroscience and Biomedical Engineering*, 2(1):2-13.

Baig M. M., GholamHosseini, H., Connolly M. J., & Lindén, M. (2015a). Advanced Decision Support System for Older Adults. *In Proceedings of Wearable Micro and Nano Technologies for Personalized Health (pHealth 2015).* (pp: 235-240). IOS Press.

Baig, M. M., GolamHosseini, H., & Lindén, M. (2015b). Tablet-based Patient Monitoring and Decision Support Systems in Hospital Care. *In Proceedings of the 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC2015).* (pp. 1215-1218). doi: 10.1109/EMBC.2015.7318585

Cage, K., Santos, L., Scott, C., & Vaughn-Cooke, M. (2014). Personal Health Record Design Preferences for Minority Diabetic Patients. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 58, pp. 614–618). doi:10.1177/1541931214581131

Coradeschi, S., Cesta, A., Cortellessa, G., Coraci, L., Gonzalez, J., Karlsson, L., Furfari, F., Loutfi,, A., Orlandini, A., Palumbo, F., Pecora, F., von Rump, S., Štimec, A., Ullberg, J. & Östlund, B. (2013). GiraffPlus: Combining Social Interaction and Long Term Monitoring for Promoting Independent Living. *In Proceedings of the 6th International Conference on Human System Interaction (HSI 2013).* (pp. 578-585). doi:10.1109/HSI.2013.6577883

Danielsen, A., Olofsen, H.. & Bremdal B. A. (2016). Increasing fall risk awareness using wearables: A fall risk awareness protocol. *Journal of Biomedical Informatics*, 63:184-194.

Ehn, M., Hansson., P., Sjölinder, M., Boman, I-L, Folke, M., Sommerfeld, D., Borg, J., & Palmcrantz, S. (2015). User Perspectives on Interactive Distance Technology Enabling Home-Based Motor Training for Stroke Patients. *In Proceedings of Wearable Micro and Nano Technologies for Personalized Health (pHealth 2015).* (pp: 145-152). IOS Press.

Floyd, I. R., Jones, M. C., & Twidale, M. B. (2008). Resolving Incommensurable Debates: A Preliminary Identification of Persona Kinds, Attributes, and Characteristics. *Artifact*, 2(1), 12–26.

GholamHosseini, H., Baig, M. M., Connolly, M. J., & Lindén, M. (2014). A Multifactorial Model for Fall Risk Prediction among Hospitalized Older Adults. *In Proceedings of the 36th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC2014).* (pp. 3484-3487). doi:10.1109/EMBC.2014.6944373GiraffPlus (2012). *D1.1 User Requirements and Design Principles Report*

GiraffPlus (2013). *D6.1 Preliminary Evaluation Report*

GiraffPlus (2014). *D6.2 Intermediate Evaluation Report*

GiraffPlus (2015). *D6.3 Final Evaluation Report with included Cross Cultural Analysis Report*

Kvale, S. (1996). *InterViews: An Introduction to Qualitative Research Interviewing*. Thousand Oaks, CA: Sage.

Kolkowska, E. & Kristoffersson, A. (2016). Privacy by Design Principles in Design of New Generation Cognitive Assistive Technologies. In *Proceedings of the 31st International Conference on ICT Systems Security and Privacy* (pp. 384-397). doi: 10.1007/978-3-319-33630-5_26.

Koshmak, G., Lindén, M., & Loutfi, A. (2014). Dynamic Bayesian Networks for Context-Aware Fall Risk Assessment. *Sensors*, 14(5):9330-9348.

Koshmak, G., Loutfi, A., & Lindén, M. (2016). Challenges and Issues in Multisensor Fusion Approach to Fall Detection: Review Paper, *Journal of Sensors,* vol. 2016, Article ID 6931789, doi:10.1155/2016/6931789

Kristoffersson, A., Kolkowska, E. & Loutfi, A. (2014). Assessment of Expectations and Needs of a Sensor Network to Promote Elderly's Sense of Safety and Security. In *Proceedings of the Seventh International Conference on Advances in Human-oriented and Personalized Mechanisms, Technologies, and Services (CENTRIC 2014).* (pp. 22-28).

Loutfi, A., Jönsson, A., Karlsson, L., Lind, L., Lindén, M., Pecora, F., & Voigt, T. (2016) Ecare@Home: A Distributed Research Environment on Semantic Interoperability. In *Proceedings of the 3rd EAI International Conference on IoT Technologies for HealthCare (HealthyIoT 2016).*

Orlandini, A., Kristoffersson, A., Almquist, L., Björkman, P., Cesta, A., Cortellessa, G., Galindo, C., Gonzalez-Jimenez, J. Gustafsson, K., Kiselev, A., Loutfi, A., Melendez, F., Nilsson, M., Odens Hedman, L., Odontidou, E., Ruiz-Sarmiento, J.-R., Scherlund, M., Tiberio, L. von Rump, S., & Coradeschi, S. (2016). ExCITE Project: A Review of Forty-two Months of Robotic Telepresence Technology Evolution. *PRESENCE,* 25(3):204-221..

Patton, M.Q. (2002). *Qualitative research and evaluation methods*. 3rd ed. ISBN: 0-7619-1971-6. Thousand Oaks, CA: Sage.

Sonn, U, Törnquist, K., & Svensson, E. (1999) The ADL Taxonomy – from Individual Categorical Data to Ordinal Categorical Data. *Scandinavian Journal of Occupational Therapy,* 6(1):11-20.

Vinnova Final report (2005). Wearable sensors for medical monitoring.

Glossary

ADL – Activities of Daily Living. The performance of the basic activities of self care, such as dressing, ambulation, or eating. MeSH-term. Further information on the ADL taxonomy is available in Sonn et al. (1999).

Angina Pectoris - The symptom of paroxysmal pain consequent to MYOCARDIAL ISCHEMIA usually of distinctive character, location and radiation. It is thought to be provoked by a transient stressful situation during which the oxygen requirements of the MYOCARDIUM exceed that supplied by the CORONARY CIRCULATION. MeSH-term. Equivalent to the Swedish "kärlkramp".

Anticoagulants -Agents that prevent clotting. MeSH-term. Equivalent to the Swedish "blodförtunningsmedel".

Atrial Fibrillation - Abnormal cardiac rhythm that is characterized by rapid, uncoordinated firing of electrical impulses in the upper chambers of the heart (HEART ATRIA). In such case, blood cannot be effectively pumped into the lower chambers of the heart (HEART VENTRICLES). It is caused by abnormal impulse generation. MeSH-term. Equivalent to the Swedish "förmaksflimmer".

Blood Glucose Self-Monitoring - Self evaluation of whole blood glucose levels outside the clinical laboratory. A digital or battery-operated reflectance meter may be used. It has wide application in controlling unstable insulin-dependent diabetes. MeSH-term. Equivalent to the Swedish "Blodsockermätning, egenkontroll".

Caregivers – Persons who provide care to those who need supervision or assistance in illness or disability. They may provide the care in the home, in a hospital, or in an institution. Although caregivers include trained medical, nursing, and other health personnel, the concept also refers to parents, spouses, or other family members, friends, members of the clergy, teachers, social workers, fellow patients. MeSH-term. Equivalent to the Swedish "vårdgivare".

Community health center - Facilities which administer the delivery of health care services to people living in a community or neighbourhood. MeSH-term. Equivalent to the Swedish "vårdcentral".

DFRI –Downtown fall risk index, a form to assess fall risk

Epicrisis - a critical or analytical summing up especially of a medical case history

Home care services - Community health and providing coordinated multiple services to the patient at the patient's homes. These home-care services are provided by a visiting nurse, home health agencies, HOSPITALS, or organized community groups using professional staff for care delivery. It differs from HOME NURSING which is provided by non-professionals. MeSH-term. Equivalent to the Swedish "basal hemsjukvård".

Homemaker services - Non-medical support services, such as food preparation and bathing, given by trained personnel to disabled, sick or convalescent individuals in their home. MeSH-term. Equivalent to the Swedish "hemtjänst".

Hypoglycemic Agents - Substances which lower blood glucose levels. MeSH-term. Equivalent to the Swedish "hypoglykemiska medel".

Ischemic Attack, Transient - Brief reversible episodes of focal, nonconvulsive ischemic dysfunction of the brain having a duration of less than 24 hours, and usually less than one hour, caused by transient thrombotic or embolic blood vessel occlusion or stenosis. Events may be classified by arterial distribution, temporal pattern, or etiology (e.g., embolic vs. thrombotic). (From Adams et al., Principles of Neurology, 6th ed, pp814-6). MeSH-term. Equivalent to the Swedish "tia".

Meddix – Webbased IT support system for coordinated care between hospital, community, primary care and outpatient psychiatric care. There are several other systems with similar functionalities, e.g., Prator. *N.B.:there must not be notes from the medical health record in systems such as Meddix.*

Medication reconciliation - The formal process of obtaining a complete and accurate list of each patient's current home medications including name, dosage, frequency, and route of administration, and comparing admission, transfer, and/or discharge medication orders to that list. The reconciliation is done to avoid medication errors. MeSH-term. Equivalent to Swedish "Läkemedelsgenomgång".

miniQ – a Swedish decision support system for care professionals. Analyzes the current medication list and signals potential risks.

Oral candidiasis - a mycosis (yeast/fungal infection) in the mouth

Osteoarthritis - A progressive, degenerative joint disease, the most common form of arthritis, especially in older persons. The disease is thought to result not from the aging process but from biochemical changes and biomechanical stresses affecting articular cartilage. In the foreign literature, it is often called osteoarthrosis deformans. MeSH-term. Equivalent to the Swedish "artros".

Patient Care Planning - Usually a written medical and nursing care program designed for a particular patient. MeSh-term. Equivalent to Swedish "Vårdplanering".

Prator – see Meddix,

RAPS - Risk Assessment Pressure sores

Reflectance meter – see Blood Glucose Self-Monitoring.

Senior Alert – Swedish (national) quality registry that aims to ensure a preventative approach within the areas of; cases of falls, ulcers/pressure sores. Malnutrition, poor oral health, and bladder dysfunction/incontinence.

SKL – Sveriges kommuner och landsting, Swedish Association of Local Authorities and Regions

Spinal stenosis – Narrowing of the spinal canal. "In lumbar stenosis, the spinal nerve roots in the lower back. [..] Lumbar spinal stenosis often mimics symptoms of vascular insufficiency. [..] In the classic description, people with spinal stenosis will describe an onset of leg pain, or weakness with walking, "Spinal stenosis pain in the neck is called cervical spinal stenosis. This condition means that there is potential compression of the spinal cord. Unfortunately, the spinal cord compression can lead to serious problems such as extreme weakness, or even paralysis." [2]

---

[2] http://www.spine-health.com/conditions/spinal-stenosis/what-spinal-stenosis

Appendix 1 – Interview guide – elderly in Örebro (in Swedish)

Tema: personlighet
Vi börjar med lite bakgrundsfrågor!

1. Kan du ge mig ditt namn och ålder?
2. Hur ser din familj- och boendesituation ut just nu? (*eget boende, SÄBO, vårdboende, ensamstående, gift, sambo osv*)
3. Kan du beskriva en vanlig dag?
4. (Vad är viktigt för dig i din vardag?)
5. Kan du berätta om dina intressen?
6. Hur skulle du beskriva dig själv som person?
7. Vad har du arbetat med tidigare?
8. Är du nöjd och trygg med ditt boende eller skulle du vilja förändra det på något sätt?
9. Kan du berätta lite om din hälsa? (*begränsar den dig på något sätt?*)
10. Oroar du dig för att något särskilt ska hända dig?

Tema: teknikvana
Nu kommer jag ställa några frågor om hur du ser på teknik!

11. Är du intresserad av att använda tekniska produkter och i så fall på vilket vis? (*dator, dvd, pekplatta, mobiltelefon, TV, radio mm.*)
12. Hur skulle du beskriva din teknikvana? (*van/ovan, säker/osäker, använder många/ett fåtal produkter, använder dem ofta/sällan*)
13. Hur upplever du den teknik som du använder idag? (*enkel/svår, problemfritt/problematiskt, snabbt/tidskrävande*)
14. Om du fick möjlighet, vad skulle du tycka om att få chansen att lära dig en ny teknik som du kan använda hemma?

Tema: Fysisk aktivitet
15. En viktig åtgärd för att minska risken för fall är fysisk aktivitet. Fysisk aktivitet innefattar både normala dagliga aktiviteter och träningsaktiviteter.
    a. Hur fysiskt aktiv är du?
    b. Är du bekymrad över din egen mängd fysisk oktivitet under en dag/vecka? (*varför?*)
    c. Jämför du din egen mängd fysisk aktivitet över tid eller med andras? Skulle du vilja ha möjligheten?
    d. På vilket sätt anser du att det vore lämpligast att få information? (*t ex via dator, ipad, smartphone, journalsystem*)
    e. På vilket sätt ska informationen presenteras? *(dvs föredrar du grafer eller text)*
    f. Hur skulle du vilja att vårdgivare kontaktar dig för att följa upp mängden fysisk aktivitet?

Tema: Information om risk
Mängden aktivitet kan uppskattas med hjälp av sensorer. Dagliga aktiviteter såsom tvätt eller matlagning skulle kunna uppskattas med hjälp av sensorer som mäter elanvändning. Andra aktiviteter kan bedömas med hjälp av sensorer liknande dem som finns i ett hemlarmsystem. Dvs sensorer som känner av att någon rör sig i bostaden och att ytterdörren öppnas. Mängden träningsaktivitet skulle kunna mätas med exempelvis aktivitetsarmband. Denna information skulle kunna presenteras via t ex tv:n eller en iPad. Jag kommer nu ställa ett antal frågor kring detta.

Tänk dig nu att du vore en person för vilken en vårdgivare har bedömt att det finns en risk för trycksår, undernäring och/eller fall. Du befinner dig i din egen hemmiljö.

16. På vilket sätt skulle du vilja få information från din vårdgivare om risk och förslag på aktiviteter som minskar risken?

17. Tänk dig nu att du hade möjlighet att få denna information digitalt, på vilket sätt skulle du vilja få informationen?

18. Hur tror du att äldre i allmänhet skulle reagera om de fick förslag på aktiviteter (såsom balansträning) som kan minska risken att falla?

Tema: Använda sensorer
Nu kommer ett antal frågor kring din inställning till sensorer.

19. Tänk dig att din vårdgivare ber dig att bära en sensor för att mäta fysisk aktivitet.
    a. vad är din inställning till att bära en sådan sensor?
    b. var på kroppen skulle du helst vilja att sensorn var placerad?
    c. Tror du att du skulle du behöva hjälp för att använda en sådan sensor?

20. Tänk dig nu att en sensor också skulle kunna användas för att upptäcka att ett fall har intäffat?
    a. Vad är din inställning till att bära en sådan sensor?
    b. Vilka förväntningar skulle du ha på en sådan sensor?

Det finns idag ett antal olika sensorer som kan mäta värden såsom blodsocker, temperatur, vikt, blodtryck, puls, syresättning mm.

21. Vilket intresse har du själv av att få tillgång till denna information?

22. Vilken är din inställning till att dela med dig av denna information till en läkare eller sjuksköterska?

23. Hur tror du att äldre i allmänhet ställer sig till teknik i hemmet som övervakar och larmar vid behov?

24. Kan du identifiera någon/några grupper av äldre detta skulle vara lämpligt för?

Tema nutrition och läkemedel
Jag pratade tidigare om att det finns sensorer med vars hjälp vi kan bedöma mängden hushållsaktiviteter såsom tvätt och matlagning. En viktig åtgärd för att förebygga trycksår respektive undernäring är nutritionsbehandling såsom att äta mellanmål, förändra kaloriantalet och minska nattfastan.

25. På vilket sätt skulle sensorer och datasystem kunna hjälpa till här? (*t ex genom förslag på måltider med tillhörande recept, aptitliga bilder, påminnelser, kaloriräknare*)

Läkare gör idag läkemedelsgenomgångar i förebyggande syfte för såväl undernäring och fall. När man har många mediciner eller medicineringen förändras kan det vara svårt (tror jag) att ha koll på exakt vilka mediciner som ska tas och doseringen för dessa.

26. Vilka är dina tankar kring en digital dosett som påminner när det är dags att ta medicin och som fortsätter att göra det till dosetten vänts upp och ner?

Tema information:
Fråga 27-29 ställs i mån av tid.

27. Vilka kontakter anser du att äldre i allmänhet har behov av? (*t ex make/maka, barn, barnbarn, andra anhöriga, myndigheter, kyrkan*).
    a. På vilket sätt sker denna kommunikation för dig?
    b. Upplever du att dessa kontakter fungerar bra för dig eller finns det några hinder/problem?

28. Anser du att det finns information som du (men även andra äldre) skulle vilja ha men som ni inte får idag? (*från t ex apoteket, vårdcentralen, hemtjänst, vårdgivare, hemsjukvård samt nära och kära*)

29. Denna fråga gäller dig som har varit inneliggande patient på sjukhuset. Upplevde du att det fanns några problem gällande information till dig, och eventuella efterföljande vårdgivare, vid utskrivning från avdelningen? Och tror du att detta skulle kunna förbättras och stödjas av teknik?
    a. Vårdgivares information till dig
    b. Din information till vårdgivare
    c. På vilken typ av avdelning var du inlagd?
30. Det var de frågor som jag hade, men innan vi avslutar undrar jag om du har du några ytterligare tankar kring trygghet eller behov som du skulle vilja uttrycka innan vi avslutar intervjun.

Appendix 2 - Interview guide – caregivers (in Swedish)

Som jag förstått det hjälper ett vårdteam till kring de faktorer som tas upp i senior alert. Teamet består av SSK, USK, Läkare, Arb.ter. Fys.ter, dietist. De frågor som är tänkta att ställas till respektive befattning framgår i rött.

SSK = Sjuksköterska (Nurse)
USK = Undersköterska (Assistant nurse)
Arb.ter. = Arbetsterapeut (Occupational therapist)
Fys.ter. = Fysioterapeut (Fysiotherapist)
Läkare = Physician
Dietist = Nutritionist

Namn Alla, gäller dessa tre frågor
Ålder
Yrke (tidigare yrken)

1. Hur länge har du arbetat inom x? (och eventuella andra för intervjun relevanta yrken)

2. Anser du dig vara intresserad av att använda tekniska produkter? (Exempelvis dator, dvd, pekplatta, mobiltelefon mm.)
   Varför/varför inte?

3. En del datorer, telefoner och pekplattor kan eventuellt kännas mer bekväma att använda. *Föredrar du någon särskild teknisk plattform? Fabrikat?*

Inledning Alla
Som jag beskrev i inledningen så hoppas vi kunna öka äldre personers känsla av trygghet när de befinner sig i det egna hemmet genom att ta fram teknik som gör det möjligt att informera de äldre om uppkommen risk och/eller motivera de äldre att utföra aktiviteter som ni anser lämpliga för att minska risken för trycksår, undernäring och fall.

4. **Vilka kontakter har en typisk vårdtagare behov av under vardagar och helger?** (t ex make/maka, barn, barnbarn, andra anhöriga, myndigheter, kyrkan). SSK, USK
   a. *På vilket sätt sker denna kommunikation?*
   b. *Ser du något ytterligare behov av kontakter när vårdtagaren skrivits ut? (t ex med denna avdelning eller med hemtjänst)*
   c. *Tror du det finns något som hindrar vårdtagarna från att ta dessa kontakter om de skulle vilja?*
   d. *Ser du att dessa kontakter fungerar bra för vårdtagaren eller finns det problem?*

5. **Kan du kortfattat beskriva vård- och omsorgsbehovet hos vårdtagarna när de skrivs ut från avdelningen? Från det minsta till största behovet?** SSK

6. **Finns det några problem vid utskrivning som har med informationsspridning och/eller informationskvalitet att göra som skulle kunna förbättras och stödjas av teknik?** SSK
   a. *Information mellan utskrivande part/kommun*
   b. *Vårdgivares information till äldre*
   c. *Äldres information till vårdgivare*

Bedömningar – Senior Alert
Nu kommer ett antal frågor som är kopplade till Senior Alerts riskbedömningsformulär för trycksår, undernäring och fall. **Visa det formulär som används i resp region/kommun, i Örebro är det** RAPS, SKL-nutrition och SKL-fall Alla

7. Jag skulle nu vilja be dig titta på och kommentera följande tre formulär utifrån din yrkesroll. Alla
    a. *Vilken information i formuläret är viktigast att samla in för att kunna göra en riskbedömning gällande trycksår, undernäring respektive fall?*
    b. *Finns det annan viktig information som ni använder er av för att göra en riskbedömning?*

8. Jag skulle nu vilja att du istället tittar på DFRI i följande formulär (visa blanketten RAPS, SKLnutrition och DFRI) SSK, Läkare, Fys.ter., Arb.ter.
    a. *Vilken information i detta formulär är viktigast att samla in för att kunna göra en riskbedömning gällande fall?*
    b. *Har du några andra tankar kring dessa två formulär?*

Planerade åtgärder – Senior Alert
9. Jag skulle nu vilja att du vänder på bladet och tittar på de åtgärder som kan planeras för att motverka trycksår, undernäring respektive fall. Återigen vill jag be dig att du svarar utifrån din yrkesroll. Alla
    a. *På vilket sätt väljer ni åtgärder för att motverka en bedömd risk?*
    b. *Vilka åtgärder anser du att avdelningen generellt planerar?*
    c. *Tror du att dessa åtgärder skiljer sig åt mot de som planeras för att motverka risk när personer befinner sig i sin hemmiljö? (på vilket sätt och varför)*
    d. *Finns det enligt dig andra åtgärder som skulle kunna motverka risken än de som listas i detta formulär?*

Datainsamling
En del av de faktorer som används i riskbedömningen av trycksår, undernäring och fall samt en del av de åtgärder som föreslås i Senior Alert kan eventuellt uppskattas med hjälp av sensorer och frågeformulär. SSK, USK, Fys.ter., Arb.ter., Dietist.

10. Kroppsburna sensorer är vanligt för att upptäcka fall. Vad är dina tankar kring detta? Fys.ter., Arb.ter.

11. Kroppsburna sensorer kan även bäras för att bedöma sättet att gå. Vad är dina tankar kring detta? Fys.ter., Arb.ter.

12. Samt för att bedöma kroppshållningen. Vad är dina tankar kring detta? Fys.ter., Arb.ter.

13. Nutritionsbehandling föreslås som förebyggande åtgärd mot såväl trycksår som undernäring. Ett sätt att göra detta på är genom mat- och vätskeregistrering via exempelvis den blankett som används på USÖ. Har du några förslag på hur vätske- och födointag skulle kunna bedömas? SSK, USK, Dietist

Utskriven vårdtagare
Vi kommer nu tillbaka till frågor som liknar de frågor jag ställde i början på denna intervju. Tänk dig in i situationen där en vårdtagare skrivs ut från denna vårdavdelning och den informationsöverföring som då sker. Alla utom USK

14. På vilket sätt sker idag informationsöverföring till vårdtagaren om planerade/pågående åtgärder för att motverka respektive identifierad risk så att dessa fortsätter när denne befinner sig i sin hemmiljö? SSK, Arb.ter., Fys.ter., Läkare
    a. *På vilket sätt bokför den tidigare vårdtagaren att de planerade åtgärderna utförs idag?*

    b. *Anser du att det finns faktorer som kan påverka hur pass väl den tidigare vårdtagaren följer de åtgärder som planerats?*
    c. *På vilket sätt följs dessa åtgärder upp idag?*
    d. *Har du fler kommentarer kring informationsöverföringen (oavsett riktning) så som den ser ut idag?*

Kommunicera information till en brukare eller före detta vårdtagare

Analyserad sensordata skulle kunna användas för att föreslå förebyggande åtgärder för en brukare eller tidigare vårdtagare som befinner sig i en hemmiljö. Denna information skulle kunna presenteras via t ex tv:n eller en iPad. Jag kommer nu ställa ett antal frågor kring detta. SSK, Arb.ter., Fys.ter., Dietist, Läkare

15. På vilket sätt skulle du vilja att nya (men även redan planerade) åtgärder presenteras för äldre? SSK, Arb.ter., Dietist

16. Tror du att feedback kring efterlevnaden av planerade åtgärder kan motivera de äldre? SSK, Arb.ter., Dietist

17. Många personer som får tillgång till en stegräknare under sitt arbetsliv blir under en tid "fanatiska" och ökar antalet steg samt tävlar med andra. Tror du att tillgången till feedback kring fysisk aktivitet och/eller ett aktivitetsarmband skulle kunna ha samma effekt för denna grupp av personer? Arb.ter.

18. Hur tror du att äldre skulle reagera om de fick information om att risken för att falla har ökat? Arb.ter., Fys.ter., Läkare

19. Hur tror du att äldre skulle reagera om de fick information om aktiviteter de bör undvika för att minska risken för att falla? Arb.ter., Fys.ter.

20. Hur tror du att äldre skulle reagera om de fick förslag på aktiviteter (såsom en viss form av balansträning) för att minska risken att falla? Arb.ter., Fys.ter.,

Övrigt

21. Har du några ytterligare tankar kring hur information som vi diskuterat i denna intervju skulle kunna användas av vårdgivare samt vara till hjälp för de tidigare vårdtagarna (och andra äldre) själva? Alla