Requirements for Pathways and Integration Infrastructure

Deliverable D1.1

WP1 - Requirements and use case definition
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<tr>
<td>AAL</td>
<td>Ambient Assisted Living</td>
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<tr>
<td>BNP</td>
<td>Brain Natriuretic Peptide</td>
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<td>BP</td>
<td>Blood Pressure</td>
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<td>CBT</td>
<td>Cognitive Behavioural Therapy</td>
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<td>CHF</td>
<td>Congestive Heart Failure</td>
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<tr>
<td>COPD</td>
<td>Chronic Obstructive Pulmonary Disease</td>
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<td>CPR</td>
<td>Central Persons Register (Danish Social Security Number)</td>
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<td>CR</td>
<td>Care Recipient</td>
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<td>CVA</td>
<td>Cerebrovascular Accident</td>
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<td>DM</td>
<td>Diabetes mellitus</td>
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<tr>
<td>DSL</td>
<td>Digital Subscriber Line</td>
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<td>ECG</td>
<td>Electrocardiography</td>
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<td>EHR</td>
<td>Electronic Health Record</td>
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<td>EPR</td>
<td>Electronic Patient Record</td>
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<td>GP</td>
<td>General Practitioner</td>
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<td>GPS</td>
<td>Global Positioning System</td>
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<td>HCP</td>
<td>Healthcare Professional</td>
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<td>HFN</td>
<td>Heart Failure Nurse</td>
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<td>HSCP</td>
<td>Health and Social Care Provider</td>
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<td>ICP</td>
<td>Integrated Care Pathway</td>
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<td>ICT</td>
<td>Information and Communication Technologies</td>
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<td>I/FC</td>
<td>Informal/Formal Carer</td>
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<td>KPI</td>
<td>Key Performance Indicator</td>
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<td>LTC</td>
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<td>MI</td>
<td>Myocardial Infarction</td>
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<td>NGO</td>
<td>Non-Governmental Organization</td>
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<td>PDA</td>
<td>Personal Digital Assistant</td>
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<td>Social Care Provider</td>
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<td>SMS</td>
<td>Short Message Service</td>
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<td>TBC</td>
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<tr>
<td>TSCP</td>
<td>Third Sector Care Provider</td>
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<td>VPN</td>
<td>Virtual Private Network</td>
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1. Introduction

This report represents the first deliverable generated by the SmartCare project. It relies on work that has hitherto been pursued within the 1st work package of the project’s overall work programme. This work package consists of various tasks directed towards analysing and documenting user and service provider requirements for the implementation of the SmartCare pilot service, including the generation of contextualised use case scenarios concerning the implementation of two generic pathways for integrated care delivery as they have been developed in close cooperation with the SmartCare pilot regions.

Thus, the current report is intended to provide base line input to subsequent work packages, in particular service definition/modelling (WP2) and service specification (WP3). The information contained herein is based on work carried in the pilot regions as reported according to a common structure. Preliminary outcomes are presented in relation to contextualised use care development and related implementation requirements elicitation. These are currently being consolidated in line with the project’s overall work plan by each pilot region, and final results will be reported in a dedicated deliverable (D1.2).

The subsequent chapter 2 of this document focuses on the presentation of the process steps that together make up the two SmartCare pathways. Beyond this, the project’s approach towards a contextualised implementation of the generic pathways is presented, with a view to enable the overall project to appropriately cater for specific structural circumstances prevailing at each of the pilot regions.

Chapter 3 then summarises the main lessons that have been learned so far. This starts with an overview of the diverse key actors that will be involved in integrated care delivery at the various pilot sites. Subsequently, a summary of key implementation requirements as they have been identified so far is presented.

Following to this, a more detailed presentation of contextualised use case scenarios and related implementation requirements is done separately for each pilot site and separately for each pilot wave (Chapters 4 to 13). It is contextualised with information on the current service landscape at each pilot and how this landscape is likely to change upon introduction of the SmartCare services. By default, this information cannot be too detailed for the second wave pilot sites. At this stage in the project, for both the 1st and 2nd wave pilot sites the presented information has the character of a first draft that will be further consolidated and detailed by means of focus groups, key informant interviews and desk research, in line with the project’s workplan.
## 2. The SmartCare Pilot Service

The aim of the SmartCare project is to develop and pilot integrated care services delivered with help of a multifunctional ICT infrastructure. These services are to be based on care pathways cutting across boundaries which typically separate health care from social care. Such boundaries can be identified both on the level of service provision and technology. As far as meaningful, third sector organisations and informal carers are to be brought into the information loop as well, with a view to facilitating effective self-care and informal care. In this sense, SmartCare aims at achieving - with help of ICT - what has frequently been called “horizontal integration” of care delivery rather than “vertical integration”. While a horizontal integration approach aims at a better joining-up of care services across established domain boundaries (social care and healthcare) vertical integration approaches tend to put the focus on a better joining-up of services delivered within a single care domain (e.g. primary health care and secondary health care).

The quest for horizontal integration of care delivery in itself is anything but new. Only recently, however, policy and practice are beginning to fully recognise that fragmentation of care can threaten its quality and cost effectiveness. In particular, the potential of ICT-enabled support such as telecare and telehealth could be exploited in a more effective way if they were not, as today, embedded in healthcare and social care services delivered in “silos”.

Although ICT-based implementation of horizontally integrated care practices have remained comparatively scarce until now, experiences from earlier pilots suggest that successful service integration requires both technology innovation and service process innovation being pursued at the same time. In the care domain ICT-based services tend to be delivered within socio-technical systems, and value is frequently achieved by people applying technology for dedicated tasks rather than technology on its own. It has been frequently emphasised that ICT can effectively support well-designed care service delivery processes, but that it cannot substitute for them. During the start-up phase of the SmartCare project, work therefore has focused on the development of common integrated care pathways which are to be supported by the SmartCare digital infrastructure. These are presented in the following subsection.

### 2.1 The generic SmartCare pathways for horizontally integrated care

Two generic pathways for horizontally integrated care delivery were developed in close collaboration with the pilot regions. They refer to common themes in elderly care as they have been identified by the regions, namely:

- Integrated home support to people with long term care needs,
- Integrated home support after hospital discharge.

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2. The concept of socio-technical systems has been frequently used as an approach to complex organizational work design, thereby recognising the interaction between people and technology in workplaces. C.f. for instance William A. Pasmore (1988): Designing Effective Organizations: The Sociotechnical Systems Perspective; and: Jose Luis Mate and Andres Silva (2005): Requirements Engineering for Sociotechnical Systems.

Both care service themes are deemed to hold the potential for delivering significant benefits through a better joining-up of hitherto separated care delivery processes. A generic care pathway has been developed for each theme in collaboration with the pilot regions. The first pathway is directed towards people in need of joined-up home support in a long-term perspective, while the second one addresses needs for joined-up home support arising in a rather short-term perspective, in particular following a hospital stay.

In this context, it should be noted that the concept of ‘care pathways’ has been used quite differently in relevant research and practitioner circles in the past. For the purposes of this pilot project the concept is applied in a pragmatic manner being considered as useful tool to systematically describe a generic set of actions to be carried out by various parties collaborating in joined-up care delivery. In this sense, the SmartCare pathways present a high-level view on a typical SmartCare service process flow involving health, social and informal care.

As can be seen from the graphical representations presented below and overleaf (Figure 1 and Figure 1: Generic pathway for integrated long-term home care support (ICP-LTCare))

), each pathway is described as a sequence of generic steps to be performed when the SmartCare service is delivered in a particular instance. In practice, implementation of each generic step may require a range of subordinate tasks being performed with help of the SmartCare ICT infrastructure by different parties and according to different rules or protocols.

At a generic level, each of the pathway elements is briefly described in the following. For this purpose, generic terminology has been used whenever possible in order to avoid any biasing towards terminology typically used within the health care sector or the social care sector. This requirement stems from critical feedback received by stakeholders from both care domains in the framework of a dedicated pathways development workshop held during the start-up phase of the project.
2.1.1 Entry points

Entry points into both SmartCare pathways may vary according to individual service users and pilot regions. Individual end users may for instance be referred into the SmartCare service by health or social care professionals already working with them in other contexts. Depending on the “business” model intended to be adopted for mainstreaming purposes, direct subscription to the SmartCare services by older people and/or their family may be an option as well. Examples of the latter can for instance be found in countries where non-clinical telecare schemes (e.g. social alarms, home security and environmental sensing) are usually not provided as a public duty under the auspice of the municipality or regional government.

When it comes to hospital discharge in particular, the entry point is usually defined by an impending discharge event. Here, the SmartCare pathway would need to link into discharge pathways and processes already existing internal to a given hospital in an appropriate manner.

In the local versions of the SmartCare pathways, the entry point needs to be clearly defined and described.

2.1.2 Assessment of the service user’s need for integrated care

This step focuses on assessing the individual service user in relation to any home care needs he/she may have. This should be a systematic process which relies on pre-defined assessment criteria/procedures. These should enable identification of health related needs as well as needs for other forms of home support. Implementation of this process is thus likely to require involvement of multi-disciplinary expertise. Generally, it should focus on client-specific risk factors and clinical outcomes that can be realistically anticipated and informed from relevant professional perspectives for the individual service user.
2.1.3 Enrolment into the SmartCare service

This element stands for the process by which individuals register to become a participant in the service to be piloted. Appropriate eligibility criteria and consent procedures need to be available and applied respectively.

2.1.4 Initial integrated home care plan

This step focuses on an initial plan for joined-up provision of home support through the SmartCare service. It should respond to the previously identified care needs in a holistic manner. The documentation of the plan is an analytical process of activity designed to establish a course of client care, potentially establishing priorities and selecting a course of action from identified alternatives. The result should be documented in a systematic manner and set out inputs, delivery, management and organization of services and support delivery to the home.

2.1.5 Coordination of integrated care delivery/revision of the initial care plan

This element focuses on the continuous tracking of SmartCare users when they receive professional home care and/or informal support from different parties as identified in the initial care plan. It should enable professional and informal carers to coordinate delivery of required care interventions and utilise potentially available resources. In the sense of a cross-cutting task, the main aim is to effectively manage a system of targeted collaboration over time, thereby involving all relevant parties including the SmartCare service users themselves. A “link person” function may need to be established to ensure that any changing needs of the SmartCare users are identified. In response, the right mix of clinical, social and informal care in line with user expectations is delivered. Beyond the involvement of health and social care expertise, a clear assignment of responsibilities is required when it comes to decision making on any care plan adaptations potentially required.

2.1.6 On-site provision of clinical, social and informal care

It is likely that not all personal care needs can be met by ICT-enabled remote interventions. This step focuses therefore on the coordinated performance of care-related measures through professional health/social care staff and informal carers who provide care, services and support in the older person’s home. The range of tasks may require on the one hand clinical interventions or on the other hand non-clinical tasks or social care support, such as assisting with normal daily tasks like dressing, bathing, using the bathroom, provision of meals or befriending services.

2.1.7 Remote provision of integrated care to the home

The remote exchange of data and/or electronic communication between the SmartCare service user and health care professionals is one example of remote provision of care. This may be necessary to assist in the diagnosis and/or management of a health care condition. Examples include blood pressure monitoring, blood glucose monitoring and medication reminders. Potentially, remote transmission of patient information, e.g. symptom reports, to a clinician for an expert diagnosis and/or management may be involved as well.

On the other hand, remote care provision may include ICT-based services involving data exchange and/or electronic communications between the SmartCare service user and non-clinical professionals (telecare). Here, examples include (active) push-button alarms and...
automatic (passive) monitoring of changes in an individual’s condition or lifestyle, including emergencies, to manage the risks of independent living. The latter may require installation of one or more types of sensors in the service recipient’s home such as movement sensors, falls sensors, bed/chair occupancy sensors and the like.

2.1.8 Integrated documentation of home care provided / self-care measures

The documentation of any care-related measures performed for the patient needs to be available in an integrated manner. It serves as a basis for ongoing decision-making within the overall care process between all involved caregivers.

A number of aspects may deserve attention, such as the tailored presentation of information for the needs of health care professionals, social care professionals or informal carers. This may take the form of a client/patient summary. The eligibility for reimbursement under certain Government care Acts is another example. Documentation can also serve auditing purposes when it comes to the quality of care provided.

In addition to care interventions, documentation may also include information relating to various types of assessments performed at the point of care, e.g. fall risk assessment, restraint needs assessment, pain assessment for those with communication barriers and the like.

2.1.9 Monitoring / review / reassessment of the home care recipient

This step focuses on systematically monitoring documented care interventions, services and support and related outcomes, with a view to enabling meaningful adaptation of the initial care plan over time.

2.1.10 Temporary admission/re-admission to an institutional setting (e.g. hospital, day care centre)

Depending on the SmartCare service user’s status, a temporary admission or re-admission into a residential care setting may be required, e.g. a hospital or residential / nursing care home.

2.1.11 Exit point

Exit points from the pathways may vary according to individual service users. When it comes to the discharge pathway (ICP-Discharge) in particular, transition into the long-term home care pathway (ICP-LTCare) may happen at a certain point in time.

2.2 Contextualised implementation of the generic SmartCare pathways

All SmartCare pilot sites share a common view that a better joining-up of social care and health care delivery processes holds considerable potentials for better responding to a number of challenges in care of older citizens. These include for instance the need to respond to an increased number of frail people and people with dementia. Also, many regions are faced with changing social and family structures, often reducing the availability of informal care. At the same time, there are raising public expectations resulting in a need for improving the quality of care, and to develop more proactive approaches towards long term care of older people. Not at least, ensuring financial
sustainability of community care services in a difficult economic context represents an increasing challenge for many countries.

However, there is considerable diversity across the SmartCare pilot regions - as could be expected - when it comes to structural framework conditions within which integrated care service delivery is to be ultimately achieved. This concerns for instance the extent and nature of formal and informal support that is generally available to older people in the individual pilot regions according to structural characteristics of a given care system. Particular forms of support which are currently available in one region (e.g. preventative measures) may not at all be available in another one; or they may be available under different circumstances or be delivered in different ways. Also, key actors and organisations involved in social and health care delivery tend to vary quite a lot across the pilot regions, and these tend to work to differing work practices and commercial models. The care systems in the deployment sites range from comprised of entirely public sector organisations, insurance based service provision with a mix of public and private provider organisations, and both with or without the involvement of not-for-profit providers. They may for instance operate within the public sector, as private care organisations or not-for-profit providers. Also, sub-contracting of some specialist provision to commercial providers may sometimes be involved. As a consequence, the health and social care sectors across the SmartCare pilot regions are serviced by many and varying organisations, with different ICT systems and infrastructures that have been put in place already. In general, this situation does not come as a surprise as it largely reflects the historically grown variety of care system traditions in the EU.

In view of this situation, a context-sensitive service integration strategy needs to be pursued for the purposes of SmartCare, both technology wise and service process wise. In operational regard, this requires SmartCare being able to accommodate diverse requirements on the new pilot service which stem from historically grown legacy service processes and infrastructures prevailing at the various pilot regions. A simplistic approach towards the adoption of new integrated service models - and ICT platforms supporting these respectively - could easily be interpreted as the wholesale migration to entirely new service processes and ICT platforms. However, such an approach poses major budgetary problems for service providers, and introduces risks in terms of system delivery and potential loss of service (and data) continuity. To avoid these risks, a controlled migration from existing work practices and technologies towards a common approach will be pursued by SmartCare. Almost by definition, this means that the project encounters a great deal of legacy technology along the way which was created to support a range of processes and pathways prior to the SmartCare concept.

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3. Synthesis of regional implementation requirements

An important lesson that can be drawn from comparable pilot projects as well as relevant literature concerns the need for carrying out a thorough requirements analysis if successful service piloting of the integrated SmartCare services is to be ultimately achieved. According to the project’s overall work plan, a multi-method requirements analysis and contextualised user case development is therefore being conducted at all pilot sites in an iterative manner. As graphically summarised in Figure 3 below, outcomes serve as an input to subsequent service process modelling (WP2) and work on technical service specification (WP3). This work strand then informs prototype development and testing (WP4) to be successfully concluded at each of the pilot sites before field testing under day to day condition with larger number of users can ultimately start (WP5/6).

The following subsections present a synthesised overview of the main lessons learned so far. It is worth to be noted that these represent an interim outcome which is to be further consolidated during the remainder of WP1 work and finally reported in D1.2

3.1 Regional points of departure for SmartCare

While there is clear commitment by each of the pilot regions to put integrated care into practice, points of departure vary across individual pilot regions in terms of health/social services and ICT infrastructures that have been put in place prior to SmartCare. As a consequence, there is some variety when it comes to key actor groupings that are to be involved in integrated care delivery at the individual pilot sites:

- Care recipient (CR): Groups of older people who are ultimately to be supported by the SmartCare pilot service range from people with particular chronic conditions (e.g. cardiovascular, pulmonary) to those who are suffering from general age related decline and frailty (and particular age-related risks such as the risk to fall respectively).

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Informal / family carers (I/FC): Individuals providing informal social and/or health care as well as other types of informal support to the older person on a regular basis are to be involved in all pilot regions. These may include family members, but also friends and neighbours.

Social care provider (SCP): A range of organisations providing social care are to be involved in SmartCare service delivery across the pilot regions. Although social care is often provided under the auspice of the municipalities, different provider organisations and staff categories may be involved across the pilot regions, e.g. social workers, occupational therapists, dedicated home care organisations and social alarm centres.

Health care provider (HCP): Again, diverse organisation and staff are to be involved when it comes to the provision of health care within the integrated SmartCare approach. These may for instance include hospitals and their staff, general practitioners, physical therapists, community nurses and dedicated health monitoring centres.

Third sector care provider (TSCP): Depending on the structural characteristic of the given care system, so called Third Sector organisations tend play a more or less strong role in care delivery across the pilot regions. Examples of Third Sector organisations providing care and support to older people include self help groups, charity organisations and social enterprises. These may employ paid staff and/or rely on volunteers as well.

3.2 Overview of regional implementation requirements

In a first step, all pilot regions have developed a contextualised use case for the implementation of the generic SmartCare integrated care pathways under the particular circumstances prevailing at their individual pilot sites. They have also started to analyse key requirements on implementing these for piloting purposes under day-to-day conditions throughout the later stages of the overall project. As was expected - and catered for by the project’s overall work plan respectively - outcomes generated by the 2nd wave pilot regions so far tend to be less mature when compared with those generated by the 1st wave pilot regions. Nevertheless, both types of pilot regions are currently in the process of further consolidating the contextualised use cases for the generic SmartCare pathways, and the related analysis of the implementation requirements as well. The consolidated results will be presented in the subsequent D1.2.

Some key lessons learned so far can be summarised as follows:

- A considerable share of the core target population addressed by the SmartCare pilot service can be expected to have little experiences with the use of ICT, and the level of digital skills they posses can be assumed to be at lower end of the scale respectively. Beyond this, a subsection of the SmartCare target population may also be affected by sensory and cognitive restrictions, at least to a certain degree. These aspects deserve appropriate attention during the prototype development and testing stages of the overall project, with a view to optimising system usability and accessibility for end users with different capability levels.

- As in the case of older end users, acceptance of the SmartCare system by professional health and social care staff and family carers will - at least in part - rely upon the level of usability ultimately achieved. Here again, diverse degrees of ICT-related competences and usage contexts deserve attention during the prototype development and testing stages of the overall project. As a general rule, system
components and devices applied should require a minimum of effort and time for the envisaged users groups to achieving the desired goal and minimise the risk of human error.

- The comparatively low levels of ICT skills that can potentially be found among the main target populations also deserve attention when it comes to developing a suitable recruitment approach in each of the pilot regions. Appropriate briefing materials and training measures are likely to be required at all pilot sites, with a view to effectively aiding recruitment and effective targeting of pilot users.

- From the perspectives of the various organisations to be involved in joined-up service delivery within SmartCare, adaptation of existing workflows represents a key requirement and a challenge. Workflow processes currently in place in the pilot regions do support collaboration across organisational boundaries only to a limited extent, if at all. Rights and responsibilities of each party (e.g. health care provider, social care provider) need to be defined in an unambiguous manner, thereby taking adequate account of any restrictions that are potentially imposed by any regulation and/or quality standards that apply to individual health/social organisations in the individual pilot regions (or countries).

- Existing job roles of social care staff and health care staff need to re-defined - at least partially - in all pilot regions. The development of carefully targeted training and capacity building measures therefore needs to deserve sufficient attention during the pilot preparation stage, with a view to enabling smooth service operation right from the beginning when staring field piloting.

- A number of technology related requirements have been identified by the pilot regions so far. As a recurring theme, interoperability of the new SmartCare ICT infrastructure with one or another existing system/platform implemented by participating service provider organisations prior to SmartCare represents an issue deserving attention. In fact, a diverse range of actors need to be able to access the SmartCare ICT infrastructure at the regional level. Thus the SmartCare solution needs to be focused on the integration with existing systems and databases as far as required.

- In the framework of SmartCare, personal data will be collected, stored and used in electronic formats. Ensuring data privacy as required by law and protection of this personal data is therefore of central relevance for the project. Three guiding principles have been set out in binding EU legislation in this regard, and these have been transposed into national legislation in all EU Member States by now. In fact, personal data must be used, transparently, with legitimate purpose and with the right degree of proportionality. Operational issues that deserve attention at each pilot site include the following aspects:
  - How will the consent for data collection be obtained?
  - How long will the consent be valid for?
  - How will patients clearly be informed about what data are to be collected, who will get access to the data, and for what purposes?
  - How will patients be given access to the collected data?
  - Will patients be able to correct or delete data collected about them in the trial?
  - Who will have access to data and for what purposes?
  - How will access to data be controlled?
  - With whom will data be shared?
  - How will the data be stored, what security measures will be implemented?
o What measures will be taken to ensure integrity/non repudiation of transferred/shared data?
o What measures will be taken to ensure accessibility of data by all appropriate parties?

• Beyond general data protection requirements, more specific requirements may need to be met in accordance with existing regulation and/or organizational policies that are in place in the individual pilot regions (or countries). Aspects that may be of relevance here concern the question whether or not health care providers or devices involved in the SmartCare pilot may have to undergo a dedicated accreditation process to demonstrate compliance with standards developed by an official agency. Also, some EU member states have implemented dedicated legal frameworks concerning professional liability. Operational questions potentially arising in individual pilot regions in this respect include for instance:
  o Will all the actors of the system envisage liability problems?
  o Will the accreditation regulation of each actor of the system envisage liability problems?
  o Will professional liability be insured?
  o Who will be responsible for what in the system (think about every event)?
  o Will there be any element of patient liability involved?
  o Will existing liability insurance mechanisms - if available at all - be sufficient for the application?
  o Will any new insurance or other mechanisms have to be adopted?
  o How will liability between different actors be balanced?

• Health and Social Care Professional Ethics refer to how the implementers of SmartCare at the pilot sites are to administer care in a professional, competent and humane manner. Existing professional codes of practices and reputable recommendatory guidelines are to be followed in order to ensure this. Such professional conduct is a basic obligation of health and social cares and their work in the context of SmartCare does not change this. Ethical issue that are frequently addressed by professional/occupational codes of conduct include for instance:
  o Access to services
  o Creating balance between responsibilities of parties
  o Shared liabilities
  o Relevant education and support

• Over the last decades, there has been an increasing interest in protecting the rights of individuals participating in research more generally and in health research in particular. Legal and regulative frameworks and operational practices do however vary considerably across the EU Member States. It may thus be required by regulation enacted in some pilot countries that the local SmartCare pilot needs to seek formal ethical approval of the planned piloting activities from relevant ethics committees, whereas others won’t be required to do so.
4. 1st wave pilot site #1 - Aragon

4.1 Point of departure: The current service landscape

Servicio Aragones de la Salud (SALUD) runs a screening program at Barbastro’s Hospital to detect situations of frailty or risk of lack of attention of their patients. This program starts when a patient is admitted and a healthcare professional (usually a specialist, but open to all professionals) detects the need of care for a patient upon his/her discharge. The healthcare professional then alerts the social staff working at the Hospital. If the requirement is considered as a required need and after the patient’s consent, the social agent initiates the procedures to attend the request of care upon the patient’s discharge. From that moment on the social services provider will be responsible for providing care to the patient, and the healthcare provider remains outside the patient’s continuity care plan, remaining as a provider of services upon the physical presence of the patient into a healthcare centre. At the same time, the social care provider owns a database which holds the patient’s data referring to social attention, but has no access to the patient’s health records or information that may be useful and in some cases important, on the decision making. In the same way, social providers and healthcare providers maintain separated records of the assistance procured and services consumed by patients, without access or data sharing among them, therefore, there is no horizontal inter-organization integration, making the coordination of activities more difficult. Against this background, the contextualised implementation of the SmartCare pilot service aims to provide a common framework that allows the coordination of health and social professionals, along with common patient data set that permits to provide an integrated type of care, not only for discharge cases but with monitoring chronic patients at home and long term care.

4.2 Contextualised use case scenario for the SmartCare pilot service

4.2.1 Overview of regional / local actors involved

Table 1: Overview of the client domain at the pilot site in Aragon

<table>
<thead>
<tr>
<th>Type of actor</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description of actor</th>
<th>Description of role</th>
<th>Information handled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elders suffering from any chronic disease, living at home, autonomous or in dependency situation, with home care needs or in exclusion risk due to illness or disability of any condition and living at the populations within the Barbastro Healthcare Area. From a clinical point of view the inclusion criteria include elders suffering from a chronic disease (COPD, DM, Heart problems -Myocardial infarction (MI), cerebrovascular accident (CVA), over 65, and who are clinically stabilized</td>
<td>The care recipients will be consumers of the care services. Their main role is to be consumers of telemonitoring services and/or social services.</td>
<td>Information from their vital signs measurements, care agenda and care needs and providers. They will also have available information on the care plan.</td>
</tr>
</tbody>
</table>
should be fragile old people, socially or physically excluded due to illness or disability of any condition with home care needs.

| I/FC | Relatives and caregivers employed by the care recipient | Their main role is to help elder people on their daily tasks and participate on the care plan. | Information on the CR vital signs measurements and care agenda upon CR consent form. |

Table 2: Overview of the service provider domain at the pilot site in Aragon

<table>
<thead>
<tr>
<th>Type of actor</th>
<th>Description of actor</th>
<th>Description of role</th>
<th>Key information handled</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCP</td>
<td>Local and regional public entities and private National Organization providing social care services. Staff working for public organizations that provide social services. These can be local, county or regional institutions. Staff working for local and private national organizations that provide social services as the Red Cross</td>
<td>They provide assistance of any type to elders that are in need of attention. Their main goal would be to provide social care and vital signs taken to dependent users, support on health education programs, control and monitoring of clinical treatments, filling out forms to detect clinical alerts...</td>
<td>Coordination information. Detailed information related to the social care received / requested Information related to the monitoring vital signs taken Minimum set of patient clinic information</td>
</tr>
<tr>
<td>HCP</td>
<td>Regional public organization provider of health services including: - Primary Care doctors and nurses from several sub-areas from Barbastro’s Healthcare Sector - Primary care emergency units - Specialized care health services at Barbastro’s Hospital - Barbastro’s Hospital emergency unit staff Community Pharmacists: this new chemists profile shifts the profession from medication managers to the provision of professional services to the patients taking medications</td>
<td>They provide health services to citizens</td>
<td>Information handled by health professionals: - Coordination information Detailed information related to the health carers received / requested - Information related to the monitoring vital signs taken - Patient EHR Information handled by community pharmacist: List of prescriptions</td>
</tr>
<tr>
<td>TSCP</td>
<td>Local Associations that provide support to the care recipients or have a technological desk available to users.</td>
<td>Their main role is to provide with technological counter desks available for users and provide help on the vital signs taken. They act also as social services providers</td>
<td>They have no access to the CR data.</td>
</tr>
</tbody>
</table>
4.2.2 Contextualisation of the generic SmartCare pathways

4.2.2.1 Entry points

The starting point of this integrated-care pathway would be when a patient has been suggested to be included on the SmartCare program, either upon a visit to Primary Care Attention or during a stay at Barbastro’s Hospital. There are two ways to identify potential participants. First is during a hospitalization of a patient. If any healthcare professional supposes that the patient is in social risk of any type, then he notifies the social worker working at the Hospital. This social worker evaluates if the patient is in a real threat. Second channel would be when a patient visits a doctor or a nurse at Primary Care Attention. If the GP/nurse suspects a patient to be at risk, then he refers the patient to the SmartCare Evaluation Committee who will evaluate if the user is a potential participant on the program.

4.2.2.2 Assessment of the service user’s needs for integrated care

HCP, either GP or nurse, will define the health attention that the patient may need in relation to any home care; the frequency of the needs, his inclusion on a telemonitoring program, the clinical parameters to monitor, and other assistance services as adherence to treatment etc. This decision will be made upon the patient information collected from the hospital records and the EHR.

The SCP, either the local SCP or the Hospital social worker, will define the social attention that the patient may need in relation to any home care. In order to identify these needs, the SCP will have an interview with the patient, and will rely on the notes taken by the HCP that identified the risk and recorded on the SALUD Information Systems on the identification moment.

4.2.2.3 Enrolment into the SmartCare service

A key element on the SmartCare program is the SmartCare Evaluation Committee. The SmartCare Evaluation Committee will be formed of a representative of every care provider and technical staff. The Evaluation Committee will act as the SmartCare project manager and will be responsible to manage and coordinate the actions within the SmartCare program. The procedure of enrolment into the SmartCare program will be as following:

1. Patients identified by Primary Care. The patient visits the GP at Primary Care. If the doctor supposes the patient to be at risk and could be participant of the SmartCare pilot, then he refers the patient to the SmartCare Evaluation Committee. This Committee will check the clinical criteria and if he is a potential candidate it will ask for information to the social worker of the local SCP who will evaluate if there is a real risk and is in need of social care. If he does the SmartCare Evaluation Committee will evaluate if the user fulfils the SmartCare inclusion criteria, and if that is the case, the patient will be included on the program.

2. Patient identified at the Hospital. During a patient stay at the Hospital, any healthcare professional can have suspected the patient to be at risk. In that case, the healthcare professional records the suspicion on the SALUD Information System and notifies the social worker working at the Hospital who evaluates if the patient is in real need. If he is, he refers the patient to the SmartCare Evaluation Committee. This SmartCare Evaluation Committee will evaluate if the user fulfils the SmartCare inclusion criteria, and will decide together with the healthcare Specialist in charge of the discharge the inclusion of the patient onto the program.
The criteria from a clinical point of view to elect patients to be included on the SmartCare program would be:

- Aged +65
- Chronic disabled disease (COPD, DM, Myocardial infarction history (MI) + heart failure, cerebrovascular accident (CVA) history)
- Stabilized (for long-term cases)
- Terminal neoplastic or neoplastic illness
- Dementia and / or psychic handicap
- Hip Fracture
- Situation of temporary dependence at discharge time
- Loss of autonomy due to age without pathology
- Health problems of appearance during hospitalization requiring continuity of care

The criteria from a social point of view to elect patients to be included on the SmartCare program would be:

- +75 living alone
- Living with partner, siblings or elder relatives
- Living with dependent people at home
- Lack of support at home
  - Lack of resources at home
  - Main carer at hospital
  - Communication problems with immigrants
  - Other problematic due to immigrant condition
  - Lack of relatives during hospital admission or during the first 2 days.
- Minor at risk
- Alcoholism
- Drug dependency
- Abuse or suspected abuse

When a patient has been identified as potential participant, he is informed of the program either by the GP and local SCP worker or by the Specialist and the Hospital social worker. The patient has to give written signed consent to participate on the pilot.

4.2.2.4 Initial integrated home care plan

Next, an initial plan will be defined to provision the home support through SmartCare. First of all and if the user is included in the telemonitoring program, the process of taking vital signs will be defined. The patient will be either provided with biomedical devices and technology, referred to a technology counter owned by a TSCP or I/FC or included on the SCP agenda for home visits. This decision will be taken according to several criteria as the patient’s clinical profile, if having an active social role or living in dependency situation. A coordinated agenda will be defined between the patient, the HCP, the SCP, the TSCP and/or I/FC that will be agents in providing care to the patient, along with a schedule of actions and personnel responsible of the tasks. The patient will also be provided with a contact point to be able to communicate with his carers when needed. Patients will use this Integrated-Care Coordination point of contact (Contact Centre) to request care needs and to access to the programmed agenda. The IC home care plan will coordinate the agents working on the territory and cities involved on the project, those being: Servicio Aragonés de la Salud (Hospital, emergencies, and Primary care Centers), several councils of the Cruz Roja Española on the area, the regional and local SCP acting on the cities, a
Community Pharmacy located in Barbastro, several Patients Associations and the patients relatives.

4.2.2.5 Permanent coordination of integrated care delivery/revision of the initial care plan

When a user is included in the SmartCare program he will be provided with a set of services that may not be consumed at the same time or during the whole duration of the pilot. Therefore, there will be an essential continuous revision of the services provided and requested by the patients and the coordination plan. In order to ease this task, a platform will hold all the information and attention provided to the patients. This platform will register the coordinated action plan, the IC agenda and schedule and agents responsible of providing the care, the services provided and the new services requests. This platform will permit to identify needs, assign responsibilities, coordinate cares and register actions and the information related to the care provided will be registered on this platform. More over the HSCP will be supported by the SALUD IS that holds all the patient data, EHR, the clinical activity and the monitoring portal. The SCP will also be supported by the patient’s data records. And the contact centre will be able to access a common set of the patient’s data provided by the HCP and SCP. The SmartCare Committee will receive all notifications and will evaluate if the user still fulfils the inclusion criteria. If that is the case, the Committee, together with the SCP and HCP, will decide the provision of the services to fulfil the demand or cancellation if there is no longer need of a service, modify the care plan if needed and/or review the tasks and responsibilities assigned.

During the life of the pilot the user may change his needs due to several conditions: enhancement or deterioration of their health, to be no longer in risk situation, in need of more services, etc.. Therefore, it is important that the patient has a procedure to communicate with the Pilot to review his requirements. The entry point may be the GP at the Primary care centres, or the notification by the TSCP or SCP or I/CP or patient to the Contact Centre available through the telephone that will be redirected to the SmartCare Committee. The Contact Centre will be formed of SCP and HCP agents.

More over the telemonitoring program will need a very close coordination of actors, as there may be plenty of changes on the schedule and initial plan due to changes on the clinical status and evolution of the CR. Telemonitoring of users with the aid of social associations and volunteers is a clear example of integrated care that responds to a planned social/health care intervention and that will need constant review.

4.2.2.6 On-site provision of formal social care

According to the clinical profile of the patients, mainly for patients with social needs and or in clear situation of dependency or included on the telemonitoring program it may be necessary to provide services at the patient’s homes. These tasks can be performed by the SCP, as for instance, taking the vital signs parameters in defined cases, accompaniment at home, home care or home support tasks as cleaning or helping to get up from bed. From a social point of view the services that a user may be provided in accordance with the existing social care system can be those of:

- Accompaniment for administrative purposes
- Accompaniment to /in hospital
- Accompaniment at home
- Administrative tasks
- Home tasks
- Shipment of support products
• Installation of products of energy consumption reduction
• Follow-up agenda
• Home care Support
• Home care Private Support
• Telecare
• Orthopaedic support management
• Travel expenses reimbursement among regions
• Wheel chair loan
• Loan of crutch
• Loan of articulated bed
• Submission of reports to court in case of gender related or domestic violence
• CARITAS volunteering service: Accompanion
• Translation for foreigners
• Coordination with CARITAS
• Support for Impairment recognition Applications
• Other support, information or resources management
• Coordination Healthcare centre / Hospital
• Coordination with NGO

4.2.2.7 On-site provision of formal healthcare

According to the clinical profile of the patients, mainly for patients with social needs and/or in clear situation of dependency or included on the telemonitoring programme, it may be necessary to provide services at the patient’s homes. Some of the clinical tasks to be performed at home for patients with reduced mobility are as cure of wounds, participation on educational programs on health issues through different communication channels, pain management, and adherence to treatment programs or GP/nurse visits. From a clinical point of view the services that a user may be provided in accordance with the existing health care system can be those of:

• Health Transportation
• Emergency transfers
• GP or nurse home assistance
• Remote telemonitoring
• Education programs in health issues
• Pain management
• Wound care
• Forms filling to detect alert signs
• Adherence to treatment programs

4.2.2.8 On-site provision of informal care

Informal care tasks provided by informal carers can to perform telemonitoring tasks as those of taking vital sign constants, or those onto the contractual relationship with the patient, as for instance cleaning, cooking and the like.
4.2.2.9 Remote provision of health / social care to the home (telecare, telemonitoring)

One of the main goals of this pilot is not only to provide an integrated care to patients, but also the coordination of actors to avoid duplicities on the activities provided. Other goals are the tracking of the patient wellbeing and to promote the empowerment of the users on the management of their own health, making them co-responsible to maintain and keep good practices on health issues. Therefore, some of the services can be provided on a remote manner. Some examples are the self-telemonitoring of vital signs by the patient or IC at home and the provision of those measurements to the HCP, the reminder of events (as HCP visits or others) thanks to the shared agenda, calls made by the SCP to know about the CR health status, or alarm calls thanks to push-button devices or geo-positioning devices provided to users.

A telemonitoring service is being piloted and under evaluation in Aragon. Since 2009 there is a telemonitoring pilot implemented thanks to the European project called Dreaming http://www.dreaming-project.org. This service is oriented to autonomous patients, who actually collect their vital signs with biomedical devices at home, and send the measurement via DSL to a monitoring portal. This portal creates alarms that are checked by healthcare professionals and react to the user’s needs when a decompensation occurs giving a response to the need by mobilizing the resources properly.

A second telemonitoring project is ongoing oriented to dependent users and with the collaboration of the Red Cross. Several Red Cross teams visit the patient at home and collect their vital signs, provide the information to the HCP and respond to health needs. In SmartCare these two models will be extended to cover more population, more targeted people, and making technology available to a wider number of users (involving other care agents and bringing technology to other places that elders frequent). This is possible thanks to the unique identification of Aragon’s population through the health card.

4.2.2.10 Integrated documentation of home care provided / self-care measures

The central point will be the platform that will hold the information on the services that a user can have benefit from, the actions provided, the designation of tasks to agents and the coordination between agents. This platform will be the managed by the Contact Centre and will provide all the information that is required to provide an integrated care. (See section “Coordination of integrated care delivery/revision of the initial care plan” above).

4.2.2.11 Control / reassessment of the home care recipient

Telemonitoring services need of a follow-up of the measures taken, usually in the form of tracking the alerts and alarms. This control will be performed by the HCP that according to the seriousness of the alert will evaluate the need of providing special cares, new services or emergency services as i.e. ambulance transport. Furthermore, the HCP will review periodically, through the documentation, the conditions of the CR that are benefiting from the telemonitoring service to check whether changes and / or revisions are to be done on the service provided or initial care plan. Similarly, the SCP will also review periodically the documentation to check the use of the services by the CR, and identify if they are really consumed or there are deficiencies that require a reorganization of the attention provided. If that is the case, the SmartCare Committee will be notified and will act as in step ongoing coordination of integrated care delivery/revision of initial home care plan
4.2.3 Temporary admission/re-admission to an institutional setting (e.g. hospital, day care centre)

According to the changes on the condition of the patient (either social or worsening of the clinical status) there may be an admission to a hospital or social institution. Those cases will be evaluated by the SmartCare Committee as it may imply the temporary suspension or disenrollment of the patient from the SmartCare project.

4.2.4 Exit point

The end point of this pathway would be when the patient is no longer in need of health or social attention or excluded from the health programmes, the patient revokes consent or his participation on the program is closed, the patient is exitus or the pilot causes concerns or bothers patients or relatives.

4.3 Overview of expected impacts on local / regional actors

<table>
<thead>
<tr>
<th>Type of actor</th>
<th>Positive impacts</th>
<th>Negative impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR</td>
<td>Enhancement of the QoL</td>
<td>Loss of privacy/ Incommodation for receiving visits at home/Feeling of worsening of health status due to constant help needed</td>
</tr>
<tr>
<td>I/FC</td>
<td>Empowerment of people permitting them to better perform their care role.</td>
<td>Taking over new tasks.</td>
</tr>
<tr>
<td>SCP</td>
<td>Enrichment of their role through the acceptance of the low-value HCP tasks.</td>
<td>Taking over new tasks</td>
</tr>
<tr>
<td>HCP</td>
<td>More specialization and lighten of the low-value tasks thanks to the transfer of these tasks to other roles.</td>
<td>Effort of adaptation to the new more specialized role. Fear to lose competences. Fear of unauthorized practice of the health profession.</td>
</tr>
<tr>
<td>TSCP</td>
<td>Enrichment of their role making them participant in the care act of elders.</td>
<td>Assuming a new role and new tasks.</td>
</tr>
</tbody>
</table>

4.4 Summary of key implementation requirements

4.4.1 End user requirements

Identification of users is prior to any development must comply with the legislation and organisation normal procedures. Digital certification through the patient electronic ID must be established.

4.4.2 Organisational, staff and business related requirements

Existing workflows at the part of the service provider organisations involved may need to be adapted, at least partially. Staff concerned may need to be qualified and trained respectively. The social provider and health providers already have information systems to coordinate the attention they provide. It will be necessary to create an upper layer that
permits the interoperability among these systems. Agents involved on the SMARTCARE project will have to follow a training program on the use of the technological devices.

4.4.3 Legal / regulatory / contractual requirements

Apart from general data protection requirements, specific requirements concerning privacy and security of health related data imposed by national regulation need to be met. The individual service provider organisations involved may need to enter into a contractual relationship with each other in order to determine rights and responsibilities of each party involved, including liability related aspects. The service needs to comply with quality requirements set out in the co-funding rules established under the national care funding/insurance schemes. Established consent procedures currently followed at the part of the service providers involved need to be followed and where necessary adapted. In any case, patients have to give their written consent. The SmartCare project has to be evaluated by the Clinic Research Ethics Committee of Aragon (CEICA) that evaluates all research made in the territory.

4.4.4 Technology / functionality related requirements

Data transmission over secure connections may be required, at least when health related data are concerned. Interoperability of legacy systems operated at the side of the various service provider organizations involved needs to be ensured (e.g. call centre software, hospital information systems). Interfacing with different end user devices used across the different service organizations involved may be required (e.g. mobile phones used by staff of the rescue service and desk top PCs used by the social care manager). The portal will have to have different views according to the user profile login in.

4.4.5 Any other requirements

The need for developing/purchasing required technology components that are not available ‘off the shelf’ may time wise conflict with the project schedule

4.5 Key steps to follow

The locally adapted use cases for the SmartCare pathway are now completely defined. Regarding the actual service process model, a number of steps are planned to fulfil already identified requirements:

- The patient consent form is designed and awaits approval by the Ethics Committee (due by Sept13)
- Alliances with Informal carers. There is a collaboration agreed with some Local Associations (Red Cross + Alzheimer Association + Chemists), some others under negotiation. Expected by Sept13
- Alliances with some healthcare centres (Laforunada) ongoing. Expected by Sept13
- Administrative tasks
  - Availability of Budget ( 2months since prefinancing received, expected Oct13)
- Equipment provision
  - Quantification of technology needs completed
  - Procuring technology: need to launch and resolve a public tender (expected by Dec 13)
• System specifications ongoing  
  o meeting with RedCross on M2,  
  o working team created,  
  o planned to be ready by M6(Sept13)

• Prototypes to be tested with a confined number of users (planned to be ready by February 2014)  
  o Service can be tested already  
  o Need to further develop IT infrastructure (planned completion by Feb14)  
  o Staff available (if no new hirings are required)

• Deployment of pilot system and pilot service kick-off  
  o planned to be ready in April14
5. 1st wave pilot site #2 - Friuli Venetia Giulia

5.1 Point of departure: The current service landscape

Friuli-Venezia-Giulia (FVG) is an autonomous Italian region and, as such, has developed, over the years, a coordinated healthcare sector with some pilot implementations of ICT solutions. However, the system is still partially fragmented and shows room for further integration both in terms of ICT and inter/intra-team communication.

The public FVG Health Service is divided into 6 Health Authorities, 2 Hospital-University bodies and 1 Hospital Authority; 20 Districts acting as reference centres for all the services provided by the NHS Authority, besides ensuring the integration between health and social services, and coordination of Social Workers as well as private and volunteer organisations.

Within this framework, GPs and most specialists are an integral part of each District. A spoke hospital may act as the intermediate health reference point of one District. Within the District Services, a District door (Single Access Point) has been established to guarantee access to welfare facilities. This entrance point is being managed by healthcare and social care staff. Home health services are being provided by nurses and rehabilitation therapists in collaboration with GPs, social workers, home assistants, physiotherapists, specialized physicians, volunteers and other health and social operators.

District medical residential facilities (RSA) for intermediate care provide assistance for the rehabilitation of hospitalized patients suffering from serious multi-pathologies (e.g. orthopaedic, neurological, pneumological, cardiovascular pathologies, etc.) as well as for patients with stable, or temporarily major social problems requiring ‘relief’ for family members and/or patients with prevailing end-of-life issues, i.e. terminally ill patients. A territorial cardiology service attends to patients discharged from different hospital structures (e.g. ER, Cardiology, 118, etc.).

5.2 Contextualised use case scenario for the SmartCare pilot service

5.2.1 Overview of local / regional actors involved

Table 3: Friuli Venetia Giulio: Overview of the client domain

<table>
<thead>
<tr>
<th>Type of actor</th>
<th>Description of actor</th>
<th>Description of the role</th>
<th>Information handled</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR</td>
<td>Patients age &gt;50 with a chronic disease (cardiovascular, pulmonary, diabetes, orthop. surgery, Parkinson), with high chances of complications and/or instabilisation. Multiple comorbidities are the rule in this</td>
<td>Patient-centred care is the main focus. Depending on the level of patients' self-care capabilities, they will take an active role in their treatment by viewing and entering relevant health data. If the patient cannot take an active role, caregivers may be actively involved.</td>
<td>Patients will be able to access relevant information as well as add further information both in text form, e.g. questionnaires and notes, as well as measurements from home monitoring devices. Information may include diagnosis, measurements taken by professional caregivers, relevant data on lifestyle and social issue, filled out questionnaires, notes, activities, goals, emotional</td>
</tr>
</tbody>
</table>
population. Inclusion criteria should be multiple (≥2) admissions in the last 12 months (included index hospital admission). Dementia and psychiatric conditions are exclusion criteria.

Demen
tia and psychiatric conditions are exclusion criteria.

<table>
<thead>
<tr>
<th>Type of actor</th>
<th>Description of actor</th>
<th>Description of the role</th>
<th>Information handled</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCP</td>
<td>Social care workers are employed by municipalities</td>
<td>The social care workers will provide home-based social care such as cleaning, food delivery, bathing, shopping, etc. as well as help in the procedures needed to obtain financial support from the municipality/state.</td>
<td>Social care providers will be able to see relevant and selected information about the patient’s disease and self-care capabilities. They will also be able to write down notes, set up goals together with the patient and fill out relevant questionnaires. Data may include notes, plans, goals, questionnaires and activities. They will also be able to see selected information provided by different actors such as patients, hospitals and GPs.</td>
</tr>
<tr>
<td>HCP</td>
<td>This group is made up by the multi-disciplinary team (specialists, GPs, nurses, psychologists, physical therapists,</td>
<td>The healthcare providers play different roles. The hospital is in charge of acute heart problems, specialised treatment as well as discharging. Upon discharge, territorial services take on patient care through the</td>
<td>The actors involved will be able to share data from their individual systems and use the portal to support their workflow across sectors as well as to view data from all other care providers. The information shared may include lab-results,</td>
</tr>
</tbody>
</table>
D1.1 Requirements for Pathways and Integration Infrastructure

| TSCP | Non-profit organisations, including volunteers, citizen association, “active citizenship”. We consider social cooperatives belonging to the third sector; they are able/allowed to participate to the provision of services, taking in charge some parts of the personal project. They are active members of the local community and they represent a resource of the system. | Trained volunteers from these organisations may provide support to the patients if needed, such as participation in multi-disciplinary meetings, or entering (not accessing) data relevant to patient’s holistic well-being (e.g. home support, social support, emotional changes in well-being, etc.) The can have precise expertise and can contribute to the whole comprehensive approach. | Volunteers could provide home-based support as for example cleaning, food delivery, shopping, transportation, etc. They can play an important role in the self-empowerment process, too. |

5.2.2 Contextualisation of the generic SmartCare pathways

5.2.2.1 Entry points

Currently, heart failure patients (NYHA IV) with COPD on continuous oxygen therapy are admitted in Hospital Ward for worsening of dyspnea due to 5 kilos weight increase in five days. The staffs working in the Hospital alerts the relevant District. The District sends a nurse within 48 hours to meet the patient and his/her relatives and Hospital staff to start gathering all the relevant information needed on discharge. The Smart Care platform will allow to improve and enrich information about previous healthcare pathways (i.e. identification of previous needs and actors involved in patient’s care) so as to activate prompt action upon discharge. This process would help decrease re-hospitalisations rates. The District nurse will carry out a pre-assessment on the basis of the information available. At this time, patients may be asked to sign a pre-enrolment consent form.

5.2.2.2 Discharge from hospital

According to current practice, the patient goes home and usually finds all the needed equipment available (bed, wheelchair, etc.). Follow-up and continuous home care is being activated upon discharge as well. The Case Coordinator will provide home-care services according to patient needs. In SmartCare, the multidisciplinary team will be led by a Case Coordinator chosen to meet prevailing needs. Monitoring of vital parameters (BP, HR, weight, SO2, etc.) as well as environmental data o videoconferencing device (only for selected cases) will be made available on a daily basis through external service or integrated platform to all care providers. Questionnaires and notes will add up to the clinical information thus providing thorough information.
5.2.2.3 Assessment of the service user’s needs for integrated care

Currently, no data collection shared network system exists. The District nurse activates the relevant healthcare services according to identification of specific clinical and psycho-social needs. There are different systems for electronic storage of patients’ data (clinical and social). In SmartCare, the District Nurse will be in charge of completing the assessment by contacting all parties involved in the multi-disciplinary team approach. Subsequently and according to specific needs, a Case Coordinator will be appointed among the members of the multidisciplinary team, who will act as the reference person for the home care integrated plan. At this point in time, no SmartCare platform is available, yet. Patient’s final consent will have to be signed.

5.2.2.4 Enrolment into the SmartCare service

No ICT-based enrolments procedure dies currently exist. At present, pre-discharge individuation of case and provisional clinical and social risk stratification allow to send to the District the request for “protected discharge”. In SmartCare, during the first meeting at the hospital if the patient is deemed eligible for SmartCare enrolment the District Nurse will ask consent to enter patient’s data and to share them with other relevant actors within the SmartCare platform. She/he will also provide the patient and/caregiver with all the basic information on the SmartCare platform and the possibility to access it directly from home. The nurse will also evaluate the patient’s ability to perform home monitoring; if deemed eligible, they will be given the opportunity to receive home monitoring equipment. An order will subsequently be sent to the dedicated Service, who will send their employees to set up the devices at the patient’s home while simultaneously introducing the relatives to the use. Through regional Registry of Birth, the nurses will collect available information (health and social) from different database. After collecting and entering the available information, the nurse will update the disease information and relevant health and social care data.

5.2.2.5 Initial integrated home care plan

Today, on discharge a discharge plan is made by the District Nurse, or the Case Coordinator who will complete the Val. Graft multidisciplinary, multidimensional, longitudinal assessment and evaluation form. In SmartCare the ValGraft assessment will be planned to be subsequently shared with all the participating actors who will be able to proactively start a planned and individualized healthcare integrated care plan. This plan will be periodically reassessed and adjusted by the multidisciplinary team. Depending of clinical and social needs and according to the Integrated Home care plan, for any case there will be specific target and priority of care (health care i.e. hemodynamic stability for heart failure etc; social care: i.e. food delivery, preparing meals, home sensors, etc),

5.2.2.6 Permanent coordination of integrated care delivery/revision of the initial care plan

A multidisciplinary team will be activated, led by a Case Coordinator. Data and information will be constantly shared among the different parties. Goals and needs will be adjusted accordingly.

5.2.2.7 Coordinated delivery of integrated care at point of care/revision of the initial care plan

The district nurse (case-manager of CR) coordinates home-care. He/She supports the GP (and/or specialists) on delivering health care and keeps in touch with social workers,
family and volunteers for other needs. District nurse activates different care providers in presence of unmet or urgent needs of CR/family.

5.2.2.8 On-site provision of formal social care

Today, social care is being activated upon request by the District nurse. In SmartCare social care actors will be able to access and update SmartCare platform. Depending on social needs and according to the integrated home care plan, for any case there will be specific target and priority of care (i.e. food delivery, preparing meals, home sensors, etc).

5.2.2.9 On-site provision of formal health care

At the moment, the patient’s Case Manager arranges for and provide formal healthcare. In SmartCare health care actors will be able to access and update Smart care platform. Depending of clinical needs and according to the Integrated Home care plan, for any case there will be specific target and priority of care (i.e. hemodynamic stability for heart failure etc).

5.2.2.10 On-site provision of informal care

Even though the caregiver’s presence and collaboration is vital for the patient’s care, at present, caregivers (family members, or friends) play a secondary role within the care plan and don’t have access to the patient’s information, nor are they able to help adjust the care plan, unless through individual contacts with physicians, or nurses. The family is directly and formally involved only in the case of meetings aimed at establishing need and eligibility for economic support. Through Smart Care, family members and/or friends will be able, upon patient’s request, to access the system and share information on their loved one. This will allow them to feel more secure, less isolated and will provide them with better tools to monitor and contribute to the patient’s maintenance of health and QoL and be more directly involved in the provision of services.

5.2.2.11 Remote provision of health / social care to the home (telecare, telemonitoring)

For all FVG region, remote Home health and social care services will be provided by external company with ad hoc 24/7 Call Centre. Smart Care services will provide full support to cooperative delivery of care, integrated with self-care and across organizational silos, including essential coordination tools such as shared data access, care pathway design and execution as well as real time communication support to care teams and multi-organization access to home platforms.

5.2.2.12 Integrated documentation of home care provided / self-care measures

Any intervention made by the various parties are documented in the ICT SmartCare system and made available to other parties. Depending of Home care plan (targets, criticisms, needs, intensity of monitoring) the case coordinator plans periodic meetings with District Team. Daily update from CR and home monitoring (clinical and environmental) will be provided as well as periodic update by care team according to care priorities, CR needs, roles of actors.
5.2.2.13 Control / reassessment of the home care recipient

Integration of data into care planning and management processes will be updated at 3 months to decide whether to end Home care plan or prolong it up to 6 months. Sharing and analysis of clinical, scheduling, monitoring information will continue.

5.2.2.14 Temporary admission / re-admission to an institutional setting

An Integrated Care Record will allow sharing of updated clinical information of in-hospital and out-of-hospital care. Updated information provided in emergency situations by a Call Centre will be available through a pre-defined printed version. Exit of patient from Smart Care platform will be evaluated at the time of readmission according to specific parameters.

5.2.2.15 Exit point

At the end of program District Team, on the base of global review of persistent CR needs and results obtained with ICT program will decide about exit from SmartCare pathway.

5.3 Overview of expected impacts on local / regional actors

<table>
<thead>
<tr>
<th>Type of actor</th>
<th>Positive impacts</th>
<th>Negative impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR</td>
<td>The patients will no longer need to re-discuss their clinical/social information with every contact person they meet because that information will be made available and constantly updated in the Smart Care record. Hence, all actors involved in the patient’s care will be able to have a better understanding of the patient’s situation prior to meeting the patient. They will also be able to access the patient’s own notes and get a holistic insight into the patient’s life, making coordination and implementation of care more efficient and effective. Those patients who wish to play a more active role in the management of their own disease will be able to do so. This will reinforce the therapeutic alliance, increasing patients’ self-efficacy, empowerment and promote self-management skills (including better adherence). Windfall effects are expected also on the patients’ caregivers, who may feel less isolated and less burdened by the stress of caring for a seriously ill-loved-one; this will make patients feel less guilty about their own inability to provide for themselves, helping them maintain their sense of self. Other advantages could be: Shorter hospital stay. Avoiding admission in intermediate care.</td>
<td>Some patients may feel ill-at-ease about entering and accessing information in the system. They might feel confused and uncomfortable when presented with a lot of information presented in a matter specifically intended for use by healthcare professionals. Some patients may feel uncomfortable having to share their personal information with different actors inside different organisations. Some patients may not be proficient in using a pc or a tablet and may feel more isolated. Patients may have access to an amount of technical data which they do not understand and which may potentially make them feel even more unsecure, increasing anxiety and misconception about their health condition. Some health/social information may be sensitive in nature and cause psychological distress. Hence, access to patient’s data will have to undergo filtering in regard to data-access (input and output). Other disadvantages could be: Reduce of time of “intensive care” by shortening hospital stay or avoiding intermediate care admission.</td>
</tr>
</tbody>
</table>
### 5.4 Summary of key implementation requirements

#### 5.4.1 End user requirements

So far, the experience we have acquired on integrated hospital-territory care allowed identifying a number of requirements that can be summed up as follows:

- **Communication:** There is a need for quick and easy access to relevant patient’s health and -social information both by healthcare providers and patients/caregivers. Communication flow needs to be made easier, integrated and comprehensive through a coordinated Smart Care platform. A better communication will undoubtedly improve the active role played by patients/caregivers/volunteers.

- **Education:** Each actor involved in the multidisciplinary team, CR and caregivers needs to be formed/educated and kept updated on system use and different modalities of data access and integration.

### Table

<table>
<thead>
<tr>
<th>Type of actor</th>
<th>Positive impacts</th>
<th>Negative impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/FC</td>
<td>Relatives and friends will be able to better assist the patient, gain insight and feel better supported</td>
<td>Emergent intervention delayed (in comparison with hospital stay)</td>
</tr>
<tr>
<td>SCP</td>
<td>Social care workers will have easier and updated access to their patients’ environmental and social needs</td>
<td>Some relatives may feel overwhelmed by the amount of data and get confused. Some may feel the platform and devices as an extra burden Delivery of prompt intervention if needed High Workload</td>
</tr>
<tr>
<td>HCP</td>
<td>Integrated health care plan Real timesharing of information</td>
<td>Compliance with devices and monitoring and EPR Delivery of prompt intervention if needed Health care workload and responsibility</td>
</tr>
<tr>
<td>TSCP</td>
<td>If involved, they will be able to better assist the patient and heighten their sense of purpose and of belonging to the social/healthcare team</td>
<td>They might feel uncomfortable entering data and might not feel qualified to use the platform. Delivery of prompt intervention if needed High Workload</td>
</tr>
<tr>
<td>Other</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

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**Definitions:**

- **I/FC:** Integrated, Real Time, Monitoring and Sharing of Information
- **SCP:** Social Care Workers
- **HCP:** Integrated Care Plan
- **TSCP:** Other health/territory care professionals
D1.1 Requirements for Pathways and Integration Infrastructure

- Monitoring: Continuous monitoring of clinical, social and environmental parameters plays a paramount role both in care and self-care process. Improving quality and intensity of monitoring allows to keep people at home, preventing instabilizations and re-hospitalizations.

- Technical accessibility of the platform: In order to reach an effective process both from health and social point of view, an integrated platform needs to be easily accessible and easy-to-use.

Focus groups will better help identify, clarify and integrate specific needs arising from the implementation of the Smart Care platform

5.4.2 Organisational, staff and business related requirements

The use of ICT supporting integrated care needs first to be experimented and adopted into the regional framework of integrated care and thus to inform the Local Plans for integrated care of each local health authority. Also, the use of SmartCare implies the definition of specific tasks and goals for the care providers in their existing service model and the implementation of their skills and competences. Adoption of ICT personal devices (smartphones, tablets and other devices) among caregivers in order to allow the data sharing will be vital as well. The promotion of the use of (already existing) public funds for autonomy and independent living in to the SmartCare service model will be an important issue. In a business oriented perspective SmartCare will be adopted by the regional and national cluster on AAL, as an innovative tool in order to reduce the gap between industrial research and provision of integrated services (which represents also a regional commitment into the D4 working group “age friendly cities and environments in the EIP-AHA). In particular a strong effort has already been ensured in order to assume the “ICT driven care services” in to the regional process of implementation of a smart specialization strategy as requested by the rules regulating the use of EU structural funds 2014-2020.

5.4.3 Legal / regulatory / contractual requirements

Because of the very complex framework of national and regional legislation and legal aspects (mainly related to data ownership and privacy), an institutional panel will be set up made up of legal representatives of local health and social facilities, public authorities in charge with privacy issues, and local patients’ as well as human rights’ representatives. An incentive plan for adoption of integrated care into the regional health authority framework and for continuous education and training of different actors involved in patient’ care will be asked to regional authorities.

5.4.4 Technology / functionality related requirements

Aspects relating to definition of the technologies and their integration into care services are currently being finalized in the context of the public requirements that will be published in the public services platform in October. In summary the main components of building blocks of ICT-based integrated care model are:

- Integrated, Electronic, Web-based Care Record
- Input from health and social care actors
- Interfaces to (or at least update from) different ICT tools
- Sharing clinical, scheduling, monitoring information
- Integrated into care planning and management processes
D1.1 Requirements for Pathways and Integration Infrastructure

- Training delivery/learning pathways / plans for professional and/or patient self-care training

5.4.5 Any other requirements

Further issues that have arisen are related to ethical issues include the following:
- Should the patient pass away, protocol to shut down platform access should be drafted
- Timing of access to lab data on the platform should be carefully assessed so as to allow sensitive information to be appropriately delivered to the patient/caregiver by the healthcare provider.

5.5 Key steps to follow

Focus groups will be activated according to specific requirements from September 30th onwards. Participants will be chosen among those who are already part in the process of local integrated care planning (mainly referring to older people and people with disabilities). Participants will be divided into groups representing the different actors of the multidisciplinary team. Before implementing focus groups, Smart Care project will be shared with and communicated to the public through media involvement. Multidisciplinary meetings both of carers and end-users will take place before arranging focus group activation, in order to draw up a grid of specific topics to be addressed so as to identify needs/requirements/critical issues to be met by the Smart Care integrated platform.

At a minimum three further focus groups are planned to take place, of about 10 participants each. Each focus group will last up to 2 hours. There will be a focus group leader and an observer per group. A grid of needs/requirements/critical issues will be drawn up prior and following each focus so as to allow tailoring the service needs to the healthcare/social/cultural targets. Further focus meetings may be scheduled should the need arise. The focus groups will be held at local district or municipality facilities (one focus group per 55,000 inhabitants). Participants of focus groups will include representatives from hospital, healthcare districts, municipalities (social services), GPs, private sector providers, volunteers, informal care providers, legal/human rights/union organizations. A multidisciplinary meeting will be held at the end point of focus group implementation to summarize and draw up a final list of needs/requirements/critical issues. At the current stage it is expected that the following themes will deserve further attention:
  - Platform use accessibility and usability
  - Identification of end-users
  - Benefits
  - Data protection
  - Costs and benefits
  - Reimbursement
  - Legal framework
  - Informed consent/privacy
  - Specific needs to be met
  - Interoperability
  - ICT-based requirements/critical issues
  - Potential ancillary services
6. 1st wave pilot site #3 - Scotland

6.1 Point of departure: The current service landscape

Scotland intends to use the prevention and management of falls as the focus for our SmartCare pilot across 7 local health and care partnership areas. With an ageing population, falls and the consequences of falls are a major and growing concern for older people and health and social care providers. Recurrent falls are associated with increased mortality, increased rates of hospitalisation, curtailment of daily living activities and higher rates of institutionalisation (ref Dept of Health Economic Evaluation, 2009). Falls are the leading cause of accident related death in older people (ref WHO, Europe 2004). Falls are a common problem amongst older people with long term conditions, including dementia.

Falls and fractures, in people aged 65 and over, account for over 18,000 unplanned hospital admissions and 390,500 hospital bed days each year in Scotland. Average lengths of stay for falls and hip fracture admissions exceed those for other emergency admissions in the same age groups: average lengths of stay for falls and hip fractures in the 75+ population are 25 days and 36 days respectively (compared to an average stay of 13 days for a COPD admission in the same age group) (2010/11 data provided by ISD Scotland).

Department of Health (DH) data (2009) reports that 30% of the population aged 65–79 years and 45% of those aged 80 years and over fall annually. Applying these assumptions to the Scottish population gives an absolute risk of 0.34 falls per person for those aged 65 years and over.

Around 1% of falls result in hip fracture (ref Cumming, Neville and Cummings 1997); although the percentage is low, this amounts to over 6,000 hip fractures in Scotland each year. The acute management of hip fracture alone costs NHS Scotland in excess of £73 million each year. Twenty percent of older people who sustain a hip fracture die within six months (ref: SIGN 2009); approximately half will never be ‘functional’ walkers again (ref: WHO, 2004).

In addition, in the over 65 population, falls cases are the largest single presentation to the Scottish Ambulance Service (over 35,000 presentation each year), one of the leading causes of Emergency Department attendance, and are implicated in over 40% of Care Home admissions (ref: American Geriatrics Society, British Geriatrics Society, 2001). Post - fall syndrome, a combination of fear of falling, anxiety, loss of confidence and depression is prevalent, leading in many to an inability to carry out day to day activities and social withdrawal and isolation.

Despite these statistics, falls are not an inevitable consequence of old age. An individual’s risk of falling or fracturing is determined by a complex interaction of multiple risk factors relating to the ageing process, the presence of long term conditions, lifestyle choices, risk-taking behaviours and the surrounding environment. Well-organised services delivering evidence-based care can help to prevent future falls. Recognising and modifying an individual’s risk factors is crucial in preventing falls and injuries, including fractures. In many cases early identification of risk and timely intervention can prevent falls and fractures and improve outcomes for older people, retaining or restoring independence and reducing health and social care needs.
Prior to SmartCare being introduced, Scotland has in place a National Falls Programme to support local health and social care partnerships to implement a co-ordinated, evidence-based and person-centred approach to falls and fracture prevention as described in the 2010 NHSQIS resource, Up and About. A national Programme Manager is in place who currently works with a network of mainly health staff e.g. local Falls Leads, Rehabilitation Co-ordinators, AHP Directors/Leads and other key stakeholders to support the development of local falls and fracture prevention care pathways in the community setting. Partners in this work have already included the National Telecare Development Programme.

Scotland also has a national eHealth Strategy and a National Delivery Plan for Telehealth and Telecare. We have an established Scottish Centre for Telehealth and Telecare (SCTT) which will support SmartCare activities and the expanded use of telehealthcare and ICT within integrated care and to support informal carers.

Currently within the majority of Health Boards in Scotland, falls prevention and management is provided by generalist assessment and rehabilitation services for older people, such as community multidisciplinary teams and day hospitals for older people. Even where dedicated falls services exist, other members of the health and social care team have an important role to play in falls and fracture prevention and management. It is essential that a more integrated approach to care is developed which address the key components of the Up and About resource and other related good practice guidance such as “Telehealthcare and Falls”.

A national mapping exercise of local arrangements for falls prevention and management and fracture prevention for older people was undertaken in 2011, which aimed to;

- Identify the extent to which recommended practices to prevent and manage falls and fragility fractures are built-in to the wider systems of care for older people in Scotland.
- Capture good and promising practice as well as common gaps in service organisation and provision, and where possible, identify developments and changes since a previous mapping in 2009/10.
- Inform recommendations for the improvement of services in Scotland.

A 100% response rate was achieved, with all 35 CH(C) Ps in Scotland participating. The findings of this exercise were published in May 2012 and identified that in some areas modest steps have been taken since a previous mapping in 2009/10 and that there is much improvement work in progress. However, the findings also showed that there is still unacceptable variation in service provision and quality, and in some localities services remain poorly developed. Scotland still has much to do to provide older people with equitable, high quality services for fall and fracture prevention.

The aim of SmartCare in Scotland is to focus the current activity on falls prevention/management and ICT development, and to use this to develop more robust local pathways which support integrated care across health, social care and informal carers. SmartCare in Scotland will focus on improving data sharing, co-ordination and communication and will involve;

- Building on evidenced good practice and local mapping to implement four care bundles for secondary falls prevention in the community. This approach is based on an approach first developed and introduced in Wales. The bundles aim to ensure that falls prevention and management activity is clearly aligned with the 2 high level SmartCare pathways, and that appropriate assessment and interventions are
delivered consistently and in line with current guidance. The introduction of the bundles, in combination with a Model for Improvement, a local measurement framework, and the SmartCare evaluation will help services to systematically monitor, evaluate and improve the quality and effectiveness of the care they provide.

- Expanding the use of telehealthcare technologies and other ICT systems to support efficient delivery of effective and integrated care pathways for falls prevention and management across different organisations and locations. This will improve access to home based technology solutions, assist with the early identification of people who are at risk of falling, support self care and self management, enable effective responses to those who do fall, and improve care co-ordination, communication and service planning.

- By joining these elements up and by expanding the care pathways and interventions to a large scale population, we anticipate positive impacts on our organisational resources, and the health and wellbeing of our citizens.

In summary, falls prevention and management has been identified by Scotland as the focus for SmartCare as;

- This activity area is already clearly recognised as an important area for integrated care in Scotland at an individual, local and national level i.e. there is a common desire for improvement across all the key stakeholders and willingness to be involved in achieving shared benefits. The project will be used to inform and refine a roll out of robust falls prevention and management activity right across Scotland;

- There has been significant good practice developed around care pathways, care bundles and the effective use of technology services within Falls prevention and management in Scotland which can be built upon and expanded to evidence quality integrated care;

- It will provide an ‘added value’ contribution to the EIP on AHA Action Groups on Integrated Care (B3) and Personalized Health Management starting with a Falls Prevention Initiative (A2).

6.2 Contextualised use case scenario for the SmartCare pilot service

6.2.1 Overview of local / regional actors involved

Table 5: Scotland: Overview of client domain

<table>
<thead>
<tr>
<th>Type of actor</th>
<th>Description of actor</th>
<th>Description of the role</th>
<th>Information handled</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR</td>
<td>Care recipient who has a history of falls or who is at significant risk of falling, who live in the identified geographic areas and who are aged 50+</td>
<td>These people will be the main beneficiaries of the service and will be consulted and involved in the service redesign</td>
<td>Information from telecare/community alarm services Assessment and care co-ordination/planning Access to generic self management and self care information.</td>
</tr>
<tr>
<td>I/FC</td>
<td>Family members, neighbours and friends of the CR who provide</td>
<td>The informal carers will be involved in the service pathways. They may also be responders or key holders of CR which will enable them to play key role. Access to</td>
<td>Information on care co-ordination with consent of CR which will enable them to play key role. Access to</td>
</tr>
</tbody>
</table>
D1.1 Requirements for Pathways and Integration Infrastructure

| care and support. | telecare service. | generic self-management and self care information. |

Table 6: Scotland: Overview of service provider domain

<table>
<thead>
<tr>
<th>Type of actor</th>
<th>Description of actor</th>
<th>Description of the role</th>
<th>Information handled</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCP</td>
<td>Social workers, care assistants, Occupational Therapists, home care and care home providers, telecare staff involved with people who fall or who are at risk of falling. Part of multidisciplinary teams where established. Staff involved in ICT services.</td>
<td>Assessment of care, care coordination, care planning and care delivery. Delivery of advice, frontline care services and care coordination. Telecare and ICT service support.</td>
<td>Communication and co-ordination of assessment, care and risk management plans (electronic or paper), data from telecare services and response services. Cross organisational referral for services. Provide access to self management/self care information and resources.</td>
</tr>
<tr>
<td>HCP</td>
<td>NHS 24, specialist and multidisciplinary teams, falls leads, GPs, Allied health Professionals community nursing (other community health services), Scottish Ambulance Service.</td>
<td>Diagnosis and treatment of fall related issues. Prevention and assessment activities. Care integration, data processing and specialist advice/support/care service provision.</td>
<td>Communication and co-ordination of assessment, care and risk management plans. Cross organisational referral. Provide access to self management/self care information and resources.</td>
</tr>
<tr>
<td>TSCP</td>
<td>Third sector voluntary and independent sector providers delivering care and support to people who fall or are at risk of falling.</td>
<td>Delivery of advice, support and care services. Input to care reviews.</td>
<td>Agree intervention, outcome, review and discharge plan or ongoing care management responsibility where required.</td>
</tr>
</tbody>
</table>

6.2.2 Contextualisation of generic SmartCare pathways

6.2.2.1 Entry points

SmartCare in Scotland involves 7 local health and care partnerships who have developed different local services and pathways, and there is not a robust baseline of ‘fallers’ currently in place. A key challenge will be to secure robust engagement across such a complex and large group of stakeholders, and establish a clear baseline from which progress can be evidenced. SmartCare will identify common elements where a positive contribution can be made across all of the partners and each of the different geographies. In terms of the Entry Point, a challenge will be to ensure that all referrers are aware of SmartCare pathway and that relevant parties have access to data or are notified of CR needs and follow up requirements. Another challenge will be the CR’s being agreeable to receiving and paying for service elements. Integrated or shared ICT will be the most significant challenge to identifying and managing service recipients.

To identify potential care recipients, the entry point for SmartCare will integrate into mainstream assessment and referrals processes across health and social care. To support this, SmartCare will:

- Undertake awareness raising and training: some of which will be enabled via electronic means. An existing Telehealthcare learning portal is in place in partnership with NHS National Education Scotland and the Scottish Social Services Council which will help support professional activity in this area.
- Establish a baseline of number of fallers in each area to inform ‘before and after’ considerations, this will require information to be collated consistently from similar data producing areas e.g. telecare monitoring centre information.
D1.1 Requirements for Pathways and Integration Infrastructure

- Develop a common minimum data set for people who fall or who are significant risk of falling. This will be used to identify the target population within local systems. (Note: This may support the development of a comprehensive register of fallers.).

Using this minimum data set, Health and Care professionals will identify the target population (Stage 2 of Up and About Pathway) via a range of means:

- Reactively when they present either at GP surgery, hospital or via the emergency services with a fall or an injury due to a fall (‘Trigger’ care bundle implementation).
- Opportunistically by health and social care practitioners e.g. osteoporosis clinics, home care visit, during implementation of a care package, mainstream assessment processes.
- Proactively via existing databases e.g. Scottish Patients at Risk of Readmission or Admission (SPARRA) database can usefully identify some high risk fallers, along with information from telecare/community alarm databases (e.g. 3,000 fallers identified in Lanarkshire), social care and health databases.

Once identified, SmartCare will support the implementation of a simple, common referral process at a local level which links all access points to a single point of contact for Falls Prevention & Management. This will include people who wish to self-refer or their carers, voluntary sector, Scottish Ambulance Service, fire service, A&E. In summary, the process will follow a number of general principles as follows:

- Concept: “Push a button to report a fall and get referral into system”.
- Process for referral by health care professional: Referral form completed. New referral routed through Single Point of Access. If already known, pass to existing case/care manager. If not known pass to identified local contact for completion of mini screening process.
- Process for referral by social care professional: Referral form completed. New referral routed through Single Point of Access. If already known, pass to existing case/care manager. If not known pass to identified local contact for completion of mini screening process.
- Process for self referral: Self referrals or carers referrals will be encouraged to the Single Point of Access via a range of means e.g. local information and advertising. Self referrals can be made by telephone or by completion of referral form available on local websites. If already known, the CR will be passed to existing case/care manager. If not known pass to identified local contact point for completion of mini screening process.

6.2.2.2 Discharge from hospital

SmartCare will need to effectively integrate with (and perhaps adjust) existing hospital discharge procedures. These are likely to differ between hospitals.

6.2.2.3 Assessment of the service user’s needs for integrated care

There are current challenges around resource requirements and waiting times for assessment. There is a need to ensure that SmartCare does not inadvertently push everyone down a formal statutory care assessment route which will compound existing issues by increasing demand within additional resources to respond. Once the referral is received by the Single Point of Access, it should be confirmed that the SmartCare project would be of benefit to the individual and that they meet the eligibility criteria (this should
have been done previously at entry point, but will be confirmed at this stage). At this stage, open eligibility criteria are envisaged to be applied as follows:

- Age 50+ (banding into 50-64, 65-74, 75 - 84, 85+) and living in the identified Clyde Valley and Ayrshire area
- People with history of falls (defined as: evidence of at least one fall in the past year, SPARRA risk score)
- People at significant risk of falling (defined as: concern expressed by user/patient/carer, via mainstream assessment processes in health and care)
- Carer of someone with a history of falls or at significant risk of falling
- Involvement in the SmartCare project would bring benefit to the individual or their carer and would cause no harm

Contact will then be made with the potential CR and a mini screening will be undertaken to identify the key contributory risk factors to their falling. (Note: SmartCare will investigate the potential for the mini screening to be undertaken electronically, remotely and by non-professionals). SmartCare will develop a common approach to mini screening to provide consistent, good quality initial assessment within and across the 7 local partnership areas. The mini screening will identify if there is a need to;

- refer on for a full multifactorial assessment (Level 2 - URGENT or Non-URGENT).
- notify senior colleague/onward referral for other reason.
- recommend common sense precautions, provide information and advice.

As part of this initial introduction to SmartCare, CR and I/FC will be introduced to a range of Information and Self Management resources which will;

- Enable access to ‘trusted’ Information and Advice: e.g. National Falls Training Pack for Care Homes. It is anticipated that this will be provided via the Living it Up Portal which will be able to record contacts achieved via the SmartCare project.
- Develop single point of information to support falls prevention and self management. Also to be used for dissemination of training, awareness raising of referral routes. Data hub which could be fed into and accessed by all services. One single repository that enables other systems to feed information in. Could include a data base of simple technology, equipment, share experiences and services available to healthcare providers to use as part of patient care e.g. telehealthcare, befriending services etc. It is anticipated that this will be provided via the Living it Up Portal.
- Promote access to healthy activity: Get up and Go, Invigor8 (700 people participating in exercise classes) partnerships with leisure services (50 week courses), Seniors Together Group, Active Lanarkshire, makinglifeeasier website. It is anticipated that this will be provided via the Living it Up Portal.

Care recipients and their carers will have opportunities to engage in health promotion and lifelong learning around health improvement and minimising falls and fracture risk e.g. build information on Slips and Trips, South Ayrshire pack for sheltered housing. They will also have opportunities to access appropriate services and organisations e.g. local falls and telecare services, which aim to support the maintenance of health and wellbeing, a safe home environment and a safer community environment. (Stage 1 of the Up and About Pathway/Level 1 SmartCare) Information, advice, peer support groups and access to appropriate services will be enabled as part of SmartCare and are likely to be provided
within the Living it Up ICT portal (which will link to a range of resources and info sources) and other appropriate formats.

6.2.2.4 Enrolment into the SmartCare service

Only those CR requiring a multifactorial assessment will be formally enrolled into the next level of the SmartCare project (Level 2). This is likely to include people who are requiring more tailored and specific interventions or investigations, and who are likely to be requiring services from both health and social care. The mini-screening will identify if the need for the multifactorial assessment is

- URGENT or
- NON-URGENT

The multifactorial assessment will be used to identify specific risk factors for falling, this will include a comprehensive falls history (data from telecare and other ICT systems), medication review, fracture risk assessment and assessment of gait and balance, assessment of their home environment, postural hypotension, vision, cognition and feet/footwear (‘Assessment’ care bundle implementation). Where appropriate and with the consent of the care recipient, communication and exchange of relevant data will take place between secondary and primary care, social work, and informal carer and is likely to be paper based initially or facilitated by telephone/email contacts.

The multifactorial assessment will be completed and stored (Note: Further clarification will be required on access, storage, consent to share), and will be used to guide tailored interventions for the CR. (Note: Common KPI to be agreed for the completion of the multifactorial assessment.)

Following the multifactorial assessment, the individual and/or their carer will be provided with detailed information about the SmartCare project e.g. via leaflets/discussions with health, care professionals and voluntary sector providers (Note: Style and language of information to increase potential uptake and minimise concerns will be carefully considered). Benefits of the SmartCare Project will be explained, discussed and agreed with the individual and his/her carers and any decision to decline involvement will be respected. Where they wish to participate, the care recipient will be enrolled onto Level 2 of the SmartCare project, along with their informal carer if agreed.

At this point, where appropriate an assessor or co-ordinator/case manager will be provided from either health or social care to co-ordinate the elements of any care package. This will help support co-ordinated management including specialist assessment (Stage 4 of the Up and About pathway). A summary of relevant care recipient information and the multifactorial assessment will be provided as background to the project with the prior consent of the care recipient.

6.2.2.5 Initial integrated home care plan

Although there is ad hoc communications and many examples of good practice there are no integrated care plans today for people who fall or who are at significant risk of falling. Once the multifactorial assessment is completed and the CR has agreed to be enrolled onto the SmartCare project, they will then be put forward for an individualised, multifactorial programme i.e., the integrated care plan or personal plan (‘Intervention’ care bundle implementation). This will be integrated where appropriate with other mainstream care planning processes, and will aim to identify and then minimise an individual’s risk factors.
for falling and sustaining a fracture. The Personal Plan will consider the role of any informal/family carers (I/FC) and is aimed at;

- minimising the identified risks for falling and/or sustaining a fracture;
- promoting independence via a self management and self care programme;
- and improving physical and psychological function.

This may include e.g. strength and balance exercises, telecare/community alarm service provision, telehealth home monitoring, interventions to mitigate home hazards and promote the safe performance of daily activities, self management coaching, information, peer groups and support via the Living it Up portal.

Prior consent from the CR and I/FC will be obtained to enable the Personal Plan to be shared as necessary, and appropriate elements are anticipated to be integrated with the care recipient’s Key Information Summary (KIS is an electronic record which is currently being rolled out across Scotland and captures important information on an individual’s care needs and situation) and any individualised Anticipatory Care Plan’s (ACP’s).

SmartCare will identify opportunities and mechanisms to support better communication and share relevant data more effectively (e.g. care diaries such as Ayrshire system for Children Services, falls summary Anticipatory Care Plan, Key Information Summary). The Scottish Ambulance Service has identified they would benefit from a system for when they attend a fall and the person is not transported to hospital that provides reassurance that the person is not left unmonitored. Referral/Links to local social/leisure services will also be further considered at this stage.

6.2.2.6 Permanent coordination of integrated care delivery/revision of the initial care plan

Input from the key stakeholders will inform the delivery and revision of the Care Plan for Level 2 SmartCare CR. At every stage, accurate and relevant data will be collected and shared where appropriate to support direct care and provide information for service and resource evaluation, planning and improvement (‘Monitoring’ care bundle implementation). This will identify any hospital admissions/readmissions or significant care incidents. The best mechanisms for this have yet to be agreed across the partnerships along with the timescales for the review/reassessment of the care recipient. However, the care diaries mechanism may be one means of doing this, e.g. East Renf’s IT Manager and Carenet Manager developing a mandatory field for fallers which will support data integration.

Local health and social care stakeholders have already agreed that at all points where local pathways might connect with the high level pathway the best service can only be achieved with adequate communication and data sharing between the teams and between health and social care organisations. This view is also likely to be shared by informal carers.

6.2.2.7 On-site provision of formal social care

The Care Plan (and potentially the care diaries) will provide detailed information on the on-site social care provision. This will include mainstream social care services such as home care which are identified and commissioned via the care planning process.
6.2.2.8 On-site provision of formal health care

The Care Plan (and potentially the care diaries) will provide detailed information on the on-site health care provision.

6.2.2.9 On-site provision of informal care

The Care Plan (and potentially the care diaries) will provide detailed information on the on-site informal care provision.

6.2.2.10 Remote provision of health / social care to the home (telecare, telemonitoring)

Improved access will be provided to home based technologies to support early identification of fallers, self management and care, and enable effective and timely responses to those who fall. The technologies and their associated data will be investigated to identify how best they can improve care co-ordination, communication and service planning, e.g. NHS 24 can investigate the extent to which home health monitoring information should be included within the Key Information Summary.

6.2.2.11 Integrated documentation of home care provided / self-care measures

Currently there is a limited awareness around remote provision of telecare and telemonitoring services and how these can be accessed. SmartCare will provide a great opportunity to address this. The pilot service will support improved access to home based technologies which can provide early identification of fallers, support self management and care, and enable effective and timely responses to those who fall. The technologies and their associated data will be investigated to identify how best they can improve care co-ordination, communication and service planning, e.g. NHS 24 will investigate the extent to which home health monitoring information can be included within the Key Information Summary. Referrals to telecare services and telemonitoring services will be enabled. For example, Hospital discharge with a home pod may enable patient/carers access to support for assessment/case management over a short time frame. Current telecare monitoring stations or NHS 24 could be utilised as part of this programme to ensure outwith 9-5pm coverage. A common KPI will be identified to facilitate early installations for URGENT cases e.g. hospital discharge. Low intensity CBT trail via pods could be used to support confidence and activity for those in fear of falling.

6.2.2.12 Control /reassessment of the home care recipient

Today, there is a statutory requirement to formally review care packages within social care in Scotland. However, for the large number of small care packages this can be undertaken from an administrative perspective due to resource issues and pressure on assessments and care planning. In SmartCare health staff will utilise additional information from telecare and telemetering and link these in to inform the mainstream reassessment/review processes.

6.2.2.13 Temporary admission / re-admission to institutional setting

Today, care providers are not often aware when a service user/patient is admitted by another provider to an institutional setting for a short period of time. Improved communication and co-ordination could help to address this. SmartCare will identify a mechanism to record known short stays in institutional settings.
6.2.2.14 Exit point

After formal review, the care recipient will either continue in the ‘At Home Service’ with appropriate adjustments or exit from the service with a self management plan where it no longer meets care recipient needs or preferences. SmartCare will identify common outcome measures for individual and system. IoRN could be adapted for this purpose and measured at entry and exit. The Talking Points Personal Outcomes Framework is envisaged to be included.

6.3 Overview of expected impacts on local / regional actors

<table>
<thead>
<tr>
<th>Type of actor</th>
<th>Positive impacts</th>
<th>Negative impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR</td>
<td>Improvements in health and wellbeing</td>
<td>Less individual people visiting them at home</td>
</tr>
<tr>
<td></td>
<td>Timely access to appropriate services.</td>
<td>Lack of confidence or initial unease about technology applications</td>
</tr>
<tr>
<td></td>
<td>Comprehensive and integrated approach to care</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Better informed and more confident in self managing their health and care</td>
<td></td>
</tr>
<tr>
<td>I/FC</td>
<td>Less stress and concern for the person they care for</td>
<td>May feel excluded or less important</td>
</tr>
<tr>
<td></td>
<td>Enabled to manage the other priorities in their lives</td>
<td>Need to understand and learn different ways of doing things</td>
</tr>
<tr>
<td></td>
<td>Their needs are better considered and their contribution better recognised in the care planning process</td>
<td></td>
</tr>
<tr>
<td>SCP</td>
<td>Better informed about the wider care contributions</td>
<td>May be less involved in the individual cases</td>
</tr>
<tr>
<td></td>
<td>More effective and targeted use of limited resources</td>
<td>May have to learn different ways of doing things</td>
</tr>
<tr>
<td></td>
<td>More integrated care provision</td>
<td>An increase in the number of identified fallers which could be perceived as a service failure</td>
</tr>
<tr>
<td></td>
<td>More efficiently managing case load</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A clearly established baseline of ‘fallers’ from which improvements can be measured</td>
<td></td>
</tr>
<tr>
<td>HCP</td>
<td>Better informed about the wider care contributions</td>
<td>May be less involved in the individual cases</td>
</tr>
<tr>
<td></td>
<td>More effective and targeted use of limited resources</td>
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<td>More integrated care provision</td>
<td>An increase in the number of identified fallers which could be perceived as a service failure</td>
</tr>
<tr>
<td></td>
<td>More efficiently managing case load</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>ICT support services will need to be closely involved in designing and developing pathways so clear where the role of ICT contributes best. Adapt and develop solutions</td>
<td>Concerns about increasing workload or additional costs and competing priorities.</td>
</tr>
</tbody>
</table>
6.4 Summary of key implementation requirements

6.4.1 End user requirements

An information pack on SmartCare and training programme/processes for end users, carers and community based staff will require to be developed to aid recruitment and effective targeting. This will include eligibility criteria and referral/enrolment process. Self management and care information needs to be easily found, easy to understand and use and be presented in ways which are positive and engaging for users and informal carers. We anticipate using the developing Living it Up portal for this element, and will need to ensure appropriate localised information and tools are included. End users should not be treated as a ‘burden’ but are also interested in contributing their experiences and skills to develop effective, integrated care solutions that work for them. The published results and reports from the Living it Up Community Engagement events will help inform end user requirements and preferences.

6.4.2 Organisational, staff and business related requirements

ICT support colleagues need to be engaged and involved from the outset to identify opportunities or technical challenges to be overcome. All key stakeholders need to develop and ‘sign up for’ a common vision, objectives and feel involved or the project will be very hard to deliver at scale. This can take some time at the initial stages of a project, but ultimately make implementation easier. The current SmartCare project timescales may not accommodate this adequately across a large scale project involving multiple organisations and stakeholders, and is a matter for shared learning. Scotland is implementing SmartCare at a significant scale, across a complex range of service providers and geographies. This will require detailed project planning, end to end processes aligned to the 2 high level pathways to be developed in partnership with all key stakeholders, building on existing strengths, identifying common gaps and the most effective ICT role. A degree of local flexibility will be important. Changes in organisational responsibilities and workflows will be required.

6.4.3 Legal / regulatory / contractual requirements

Any data to be exchanged will need to conform to local information governance requirements and local tendering process followed for procurement requirements. Develop a common format for undertaking multifactorial assessments and sharing a summary as part of SmartCare recruitment requirements.

6.4.4 Technology / functionality related requirements

Negotiation on Key Information Summary data to be undertaken to record relevant information and associated processes e.g. who will complete the SmartCare elements of the KIS? Likely that existing information on telecare systems will need to be cleansed to ensure consistency and accurate reporting to aid identification of fallers, and support service planning.

6.4.5 Other requirements

Development and/or linkages to supported self management and care information and resources to be developed e.g. strength and balance training and classes.
6.5 Key steps to follow

A first focus group workshop was organised on 26th June 2013, gathering representatives from all Health Boards and Local Authority partners involved in the project plus Scottish Ambulance Service and Community Health Partnership representatives.

The workshop programme included:

- A broad introduction to the SmartCare Project (Aims, Objectives, Anticipated Benefits)
- Local Summaries of existing Falls Prevention and Management Activity, highlighting some opportunities for SmartCare
- Review of Care at Home high level pathway with 3 local area workshops held to develop further detail.
- Review of Hospital Discharge high level pathway with 3 local area workshops held to develop further detail.
- Initial consideration of Selection Criteria

Feedback sessions were held after each workshop break out to review the individual discussions and identify common opportunities across the 7 partnership areas which would support improved practice and service delivery. It became clear that current achievements on use case definition and requirements elicitation need to be further consolidated. For instance, there are lots of pathways already developed at a local level with many of these evidencing good practice and user/patient benefits. However not all of pathways are complete, some are not integrated across health and care or linked to other resources to best effect e.g. community, voluntary services. It was agreed that SmartCare can provide a strategic view across Scotland - joining best practice together effectively and identify common ‘touchpoints’ in the pathways where integrated care and technology can be used to good effect. Difficulties in communication and the absence of data sharing was identified as the key area where SmartCare could possibly make significant improvements to the process, service and the service users journey.
7. 1st wave pilot site #4 - Region South Denmark (RSD)

7.1 Point of departure: The current service landscape

In many ways Denmark is a front-runner when it comes to ICT solutions and coordinated care in the health sector. However, the Danish healthcare system today is as many other systems with many actors a partly fragmented one. There are three major care deliverers; the hospitals managed by the regions, the general practitioners and the municipalities, each with their own organisation and IT systems. For patients with a chronic disease or patients with many contacts in the three sectors this means that they experience a somewhat fragmented treatment. Even though the Danish healthcare system has a well-established system of electronic messages each actor typically has their own IT system and not all are able to share and see relevant patient data. Especially the municipalities are large organisations with difficulties in communicating across departments even though they share the same patients.

The patients can be roughly divided into two groups. Patients with low self-care ability or issues of both physical and social character have many contacts in the three sectors and have to carry much of the information themselves. The second group, patients with high self-care ability are expected to take an active part in their disease and treatment and need access to information in order to do that.

A strong ICT infrastructure in the Region of South Denmark (RSD) creates the foundation for interoperability in health and social care, as 65,000 standardised electronic messages are transmitted daily in RSD. In order to IT-support the care of the patient and the cross-sectoral cooperation, the transfer of information, and aggregation of data, standardisation is required. This is based on the nationally adopted standards and wherever possible on internationally recognised standards.

The electronic communication today consists mainly of the secure Danish Health Data Network, where standardised electronic messages are shared according to a joint agreement based on the patients flow between the three major actors. Examples of such messages are:

- **Message of admittance to the hospital send to the GP and the municipality.**
- **Report send from the municipality to the hospital with additional and relevant information on the patient.**
- **Rehabilitation plan send to the municipality when the patient is discharged.**
D1.1 Requirements for Pathways and Integration Infrastructure

- Prescription send from the GP to the pharmacy

In addition to this messaging system there are a wide array of national databases and standards for exchanging data between systems. At the same time there are a number of national initiatives such as the newly implemented shared health record, where the patients’ medicine is kept updated and shared to the actors centrally, in order to make sure that only updated health information is available to the actors. The patients today have access to parts of their health data through the public web portal Sundhed.dk, where they can see appointments, test results and other information.

The purpose of the SmartCare service in the Region of Southern Denmark is to supplement the existing system with the Shared Care platform. The platform’s purpose is to gather all the relevant data in one overview, to support the health agreements on how to share treatment of patients with a chronic disease and to make data available at any time to as many actors as possible, including the patient. It is designed for the patients that are in need of more than what the existing system is able to provide. The platform is highly focused on integration with the existing systems and databases, so that information only should be entered once, but shared with more people. So the Shared Care platform offers an opportunity to collect data from the patients’ homes and to involve the patient and their relatives more in the care and collaboration between the parties. It is also a way to share data more dynamically between organisations, such as municipalities regardless of their other IT-systems. The two schemas presented on previous page illustrate the existing data, the need for the SmartCare platform and the role of the Shared Care platform. SmartCare will allow for coordination to become more fluent and will be based more on the patient’s needs than on the standardized agreements. It will also allow care professionals to see a more complete picture of the patient across multiple diseases as these are all collected in the Shared Care platform. Today many electronic messages are sent between the caregivers, however not including the patients themselves. This means that each actor has their own part of information in the entire puzzle of information about the patient.

The Danish healthcare system is tax-based and builds on the welfare state. As the Regions cannot collect taxes themselves, the health expenses of the Region are financed through subsidies from the state and the municipalities of the Region:

- Block subsidy from the state: 75%
- Payment by the state - depending on the activity: 5%
- Basic contributions from the local authorities: approx. 10%
- Local authority payment - depending on consumption: approx. 10%

The economic framework for the Regions is decided on in the yearly financial agreement between the government and Danish Regions. The provision of care is divided between the regions and the local municipalities. The Region is responsible for the hospitals (including psychiatry and social services) and the practices (general practitioners and dentists) of the region. Also, the Region prioritises the various areas of treatment, and establishes principles for the management of hospitals, quality assurance, service levels, etc. It has the responsibility for the working relationship between the hospitals and private clinical practices. On account of their responsibility for prevention, rehabilitation and subsequent care at home, and their share in the joint financing system, the local authorities (municipalities) are key partners in the area of health. The Region advises the local authorities on prevention.
Further to this the Danish health and social care system can be characterised by the following features:

Governance: The development of the healthcare system in Denmark has always been a collaborative effort between all parties involved. In 2010, the Danish Regions and the Danish Government agreed on a number of changes in the organisational setup in the field of eHealth. The main focus of the agreement is to ensure a clearer division of labour between all parties involved including the Ministry of Health and the five regions. The agreement states that the Ministry is responsible for overall development and national coordination and prioritisation. Within this framework, the regions are responsible for investments in and the implementation of specific eHealth solutions.

Primary care: Most primary care in Denmark is provided by general practitioners, who are paid on a combined capitation and fee-for-service basis. The regions determine the number and location of general practitioners, and their fees and working conditions are negotiated centrally between the physicians' union and the government. The municipal health services provide health visitors, home nurses and school health care.

Secondary care: Hospital care is mainly provided by hospitals owned and run by the regions. There are also private hospital providers in Denmark, but these are only used to a very limited extent.

Central government role: The central government’s main functions are to regulate, coordinate and provide advice, and its main responsibilities are to establishing goals for national health policy, determining national health legislation, formulating regulation, promoting cooperation between different health care actors, providing guidelines for the health sector, promoting quality, and tackling patient complaints.

- **Regulatory framework**: As a part of the structural reform in 2005 the Health Act was established. The Act regulates the responsibilities of treatment, prevention, and health promotion in the Danish healthcare system.

- **Guidelines for the treatment of chronic diseases**: In 2008, an agreement was signed between healthcare and social care professionals (the region and the municipalities) in the Region of Southern Denmark in the area of chronic conditions, which is considered to be one of the largest groups of patients. This agreement ensured development of pathways and a consistent workflow for each disease defined as a chronic condition.

- **The chronic care pathways support a unified process. Included in this is a generic model, which stems from SAM**: BO that describes how a unified cross-sectoral, cross-disciplinary, and coordinated health effort is crucial. The pathways are supporting integrated care and the cooperation between the different healthcare and social care sectors and the patient.

- **SAM**: BO is based on the need for introducing programmes for the continuity of care for the patient groups that enter the hospital and when leaving need services from home care. In addition, there is a need for supporting patients' ability to care for themselves in their own home. The chronic care pathways have been developed to ensure coherence between the different health-related interventions in the course of a disease. Thus, the pathways aim at achieving high quality interventions and patient safety in the entire course of the disease as well as an appropriate utilisation of resources.
Health outcomes are improved through the cooperation between the different sectors of the healthcare system. This cooperation is enabled through the IT-infrastructure of the Region. The infrastructure is described below and is a huge factor when it comes to standardised electronic communication and interoperability. All players in the healthcare sector use ICT as a tool of their trade; a large proportion communicate electronically via the health data network: 98% of laboratory orders and resorts are electronic; 89% of all prescriptions are electronic. The five Danish regions are responsible for regional IT solutions. A number of public-sector IT organisations develop joint solutions nationally, which the decentralised players undertake to implement. ICT is very commonly used throughout all branches of the Danish health service, and today IT supports a great many work processes, including processes that reach across organisations and sectors. This has also helped to make a large number of services available for citizens and healthcare professionals alike.

Alongside personal contact with the GP, the web portal sundhed.dk (sundhed = health) is the citizen’s most important interface with the healthcare sector. Here citizens have direct access to knowledge and advice about their own condition and treatment, and about illnesses and health in general. Digital services to citizens are based on the fact that a considerable amount of communication between healthcare professionals - hospital wards, GPs, specialist doctors, laboratories, pharmacies, and physiotherapists - has become digital over the past 15 years.

It began with electronic exchange of messages between healthcare professionals via MedCom standards, nationally agreed upon standards (www.medcom.dk). Communications such as prescriptions, referrals, laboratory orders and responses, etc., are exchanged daily. In the month of January 2010, more than 5 million communications were exchanged. Over the years, the repertoire of communications has expanded considerably, and the infrastructure has been extended to include more and more aspects of the healthcare services. Concurrent with this, Internet technology has been adopted, so now communications also include web services, and telemedicine solutions are rapidly being developed. Throughout the development process, efforts have remained focused on giving healthcare professionals access to flexible knowledge searches and internal communications, and, at the same time, enhancing the quality of the services that the healthcare sector is able to offer to citizens.

The history of MedCom - the Danish Health Data Network (DHDN) - goes back to the late 1980s, when interest in electronic communication among healthcare providers grew. It is a long-term project that enables effective data transfer between several actors of the health service, including stakeholders of the community-based social care system. This national network allows fast information flow in the form of reliable data exchange of EDIFACT or XML-based messages among the respective software systems of the participating healthcare providers. Agreements on interface specifications as well as certification of software compliance with agreed upon standards and syntax allow for optimal interoperability. Data transfer begins at the point of care for patients and GPs. From there, services that citizens may need access to include pharmacists, diagnostic services and specialist consultation at hospitals, referral to and discharge from a hospital, and transfer to home care and residential care services. Effective access to these by citizens depends on the efficient exchange of
messages between health and social care providers and other actors. One of the main prerequisites for establishing a coherent and cooperating health care system is to ensure that all health care professionals dealing with a patient have easy access to relevant patient information where and when it is needed. This strengthens the base for decision making and enhances patient safety.

Digitalisation is the key element in achieving this goal by giving health care professionals access to data and examination results across the entire health sector. eHealth is also vital for leveraging secure, efficient work processes, high productivity, and high standards of health care delivery. The Region used this as a back-drop to invent and to innovate new services, such as the collaboration agreements SAM:BO and the Shared Care solution.

In order to give the best patient care and to ensure a high quality of life for the citizens in the Region of Southern Denmark, the Region has implemented SAM:BO, which is an agreement on collaboration between all players in health and social care, based on new innovative ways of providing services and new ways of communicating electronically. The goal of the regional cooperation is to ensure consistent citizen/patient care pathways between health sectors in the region and thus achieve higher quality, efficiency, and patient satisfaction with the health services provided. It is also to strengthen the cooperation between GPs, local authorities, and hospitals regarding the individual citizen/patient and his/her progress through the healthcare system, and ensure dialogue and coordination between them and with the greatest possible involvement of patients and relatives.

SAM: BO entails requirements and expectations concerning content and timing of the electronic communication sent between the municipality and hospital during a patient's hospitalization. The overall objective of this exchange of information is to optimize hospitalization with a particular focus on discharge, enabling continuity once the patient is discharged and the municipality/home care takes over the care.

The citizen must experience consistency from the very beginning in the process where the general practitioner is contacted, to the diagnosis and treatment at the hospital and until the citizen is back in his/her own home for the follow-up rehabilitation therapy. The starting point is the individual's needs, so that treatment is offered on a needs basis.

For the complex patients with one or several chronic diseases, the Region of Southern Denmark is in the midst of implementing an innovative solution that runs on the backbone of SAM:BO. This solution supports the integrated approach as outlined and is established on the basis of the chronic care guidelines that have been issued both nationally and internationally. The Shared Care system is an ICT system that supports the Danish “programmes for the continuity of care” and thereby also supports the cross-sectoral collaboration (communication and sharing of data) for patients with chronic diseases.

The Danish National Board of Health has issued “chronic care guidelines” to support a unified process for patients with a chronic disease. Included in these is a generic model that describes how a unified cross-sectoral, cross-disciplinary, and coordinated health effort is crucial. Therefore, a process has begun to underpin this model with electronic communication and shared care records, thus connecting all the stakeholders in the health and social care continuum in a collaborative
effort to secure that the right information is available for authorised caregivers anywhere and anytime. This is what the SharedCare supports. The process involves the primary care sector, the regional hospital sector, the municipal social care sector, and the patients themselves.

The solution thereby supports the integrated care approach and adopts the common and nationally agreed upon dataset standard for citizens with a chronic disease. In addition, the solution utilizes the existing national infrastructure and optimises the workflows among the players in the health care sector, and care service delivery processes.

7.2 Contextualised use case scenario for the SmartCare pilot service

The following is based on patients with a chronic heart condition as this is the patient group we have focused on as the pilot group. To clarify the existing system (Sam:Bo) and the new system (SmartCare) we have divided the use-case into two subsections when relevant under each headline.

7.2.1 Overview of local / regional actors

Table 7: South Denmark: Overview of the client domain

<table>
<thead>
<tr>
<th>Type of actor</th>
<th>Name of actor</th>
<th>Description of the role</th>
<th>Information handled</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR</td>
<td>Patients with a chronic heart disease and over the age of 18. Patients who are in need of both health and social care elements on a long term basis.</td>
<td>The patients are the main focus of the delivery. They are at the centre of the care and depending on their level of self care abilities they will be able to take an active role in their treatment by viewing and entering important health data.</td>
<td>The patient can see relevant information and also add information in both text, such as questionnaires and notes, and measurements from home monitoring devices. Information regarding the patients disease such as diagnosis, measurements taken by the professional carers, relevant data on lifestyle and social factors, filled out questionnaires, goals, notes, activities, symptoms and contact persons.</td>
</tr>
<tr>
<td>I/FC</td>
<td>Relatives to patients/care recipients</td>
<td>It will be the patient themselves that include the relatives in the treatment and may also give them access to the electronic data in the SmartCare platform. They will serve as a support for the patients themselves.</td>
<td>The relatives will have the same rights as the patients themselves, and can see relevant information and also add information in both text, such as questionnaires and notes, and measurements from home monitoring devices. Information regarding the patients disease such as diagnosis, measurements taken by the professional carers, relevant data on lifestyle and social factors, filled out questionnaires, goals, notes, activities, symptoms and contact persons.</td>
</tr>
</tbody>
</table>
### Table 8: South Denmark: Overview of the service provider domain

<table>
<thead>
<tr>
<th>Type of actor</th>
<th>Name of actor</th>
<th>Description of the role</th>
<th>Information handled</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SCP</strong></td>
<td>Home care department, care coordinators and the health centres in the municipalities</td>
<td>The social carers will deliver care elements such as education in lifestyle, including diet, exercise, alcohol and smoking in healthcare centres in the local communities. There will also be a number of the patients that will receive social care in the home such as cleaning, food delivery, bathing, shopping and other daily tasks. Finally some of the patients will have a care coordinator from the municipality, who helps the patient navigating in the system and helps them to implement lifestyle changes where necessary.</td>
<td>Social carers will be able to see relevant information about the patient’s disease and self-care ability. They will also be able to write notes, set up goals with the patient and fill out relevant questionnaires with the patient. Data that can includes notes, plans, goals, questionnaires and activities. They will also be able to see the information provided by the different actors, such as patients, hospitals and GPs.</td>
</tr>
<tr>
<td><strong>HCP</strong></td>
<td>This group primarily consists of hospitals and general practitioners, however some health care services are also by the municipalities, including physical therapy and home nurses helping with measurements and nursing care.</td>
<td>The health care providers have different roles. The hospital is in charge of acute heart problems, specialised treatment as well as discharging and following up on the patient after discharge for a period of typically a year. The general practitioner is responsible for the long term check-ups yearly and the general communication with the patient about their health. The municipality is responsible for rehabilitating physical therapy, education in lifestyle factors and homecare activities related to healthcare.</td>
<td>Care professionals from the different relevant clinics in the hospitals as well as staff in the general practitioners offices and selected staff from the municipalities will be able to share data from their individual systems, use the portal to support their workflow across sectors and to view data from the different caregivers. Information shared from the hospitals and GPs could be lab-results, measurements, notes, symptoms, diagnosis, goals set with the patient, activities, questionnaires, reports and self-care indicators. They will also be able to see the information provided by the different actors such as patients and municipalities.</td>
</tr>
<tr>
<td><strong>TSCP</strong></td>
<td>Non-profit organisations</td>
<td>The organisations may provide support and counselling to the patients if needed, such as joining them in meetings or accessing the</td>
<td>Their role remains unidentified at this point - it is not yet clear if these organisations will have</td>
</tr>
</tbody>
</table>
7.2.2 Contextualisation of generic SmartCare pathways

7.2.2.1 Entry points

Today, a heart failure patient’s typically first contact with the health care system is when he or she has an acute heart problem that needs admittance into the hospital. Either that or the patient expresses their symptoms and their concerns to their general practitioner. In that case the GP sends an electronic admittance referral to the hospital. When a patient is admitted to the hospital the system sends a message to the patient’s municipality informing them of the admittance. Today, the municipality’s system sends back a message containing detailed information on the patient. In SmartCare, either the social care professionals or the GP or the hospital staff may choose to enter the patient into the SmartCare platform at any given time. All these actors will evaluate the patient and see whether or not he or she is a candidate for sharing information in the platform between the actors. This will be relevant if the patient receives both health care and social care services. If the patient already has a heart plan, with specific goals and appointments, this will also be entered into the platform by the caregiver entering the patient into the SmartCare platform. Typically the patient will be entered into the SmartCare platform at discharge from the hospital.

7.2.2.2 Discharge from hospital

According to current practice, the patient is discharged and the hospital nurse send a discharge report to the municipality stating the patient’s needs in terms of home care and a notice to the general practitioner. She also sends a rehabilitation plan to the municipality for physical rehabilitation. She gives the patient a paper-based edition of the heart plan after the first check-up meeting. With SmartCare, instead of filling out the heart plan in paper she fills it out in the SmartCare platform. As the heart plan is available in the platform adjustments are easily made at any point in time and shared with the other involved caregivers and the patient. Seeing that the patient has access to the information and can add measurements and notes, revisions can be made more on a need-basis rather than on a plan-basis. She can also give the patient access to home monitoring and videoconference possibilities making some of the visits to and from care professionals unnecessary. This also means that she has the opportunity to discharge the patient earlier and keep contact via telemonitoring/telecare services in the patient’s home.

7.2.2.3 Assessment of the service user’s needs for integrated care

Currently, all patients with a heart failure are included in the Sam:Bo system automatically. When the patient is ready to be discharged the responsible nurse fills out a discharge report in the hospitals IT-system, which she sends to the homecare department in the municipality. In this report she includes information such as:

- General information on the patient and their relatives contact information
- Information on the cause of the admittance and the treatment delivered while in the hospital
- The patients current need for further treatment and medicine
- An evaluation of the patients functional level and a description of which social care elements that need to be put in place in the patients home.

<table>
<thead>
<tr>
<th>Data of the patient if the patient allows them to</th>
<th>Access to the portal</th>
</tr>
</thead>
</table>

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The text above talks about the requirements for pathways and integration infrastructure in a healthcare context, specifically focusing on heart failure patients. It describes the typical entry and discharge processes, as well as the assessment of the service user's needs for integrated care. The table highlights data that can be shared with access to the portal. The text elaborates on how SmartCare can improve the care process by facilitating access to patient information and streamlining the discharge process, enabling caregivers to make necessary adjustments and provide more personalized care.
Today, a distinction between how significant the change to the patient’s functional level is made. If there is a significant change the hospital is urged to host a videoconference between the hospital professionals, the GP, the municipality and the patient. In the conference a coordinated plan for the level of care after discharge should be made and the responsibility between the caregivers is divided. If the change is not significant it is the hospital nurse evaluates the need for at home care and sends this in the abovementioned report. So in this phase the hospital nurse decides which care services the patient needs when discharged from the hospital both health care and social care services. She also sends an electronic report to the general practitioner with relevant information on the patient’s treatment. The hospital nurse also sends a plan for physical rehabilitation to the training facility at the municipality, where she describes the patient’s need for training. These messages are all automatically sent to the specific IT-systems in the different sectors.

With SmartCare, if the patient is already entered into the SmartCare platform at the time of the assessment the hospital nurse will be able to see the information when assessing the need for home-care based on the history of the patient. She will also be able to see the contacts in the municipality and the GP and so will be able to contact them for further information if needed. She will also be able to take into account the possibility for the caregivers to follow the patient closely through the platform combined with the possibility for home monitoring - this might have an impact on the assessment and might make the patient more independent.

7.2.2.4 Enrolment into the SmartCare service

Currently Sam:Bo is agreed and accepted as the way to communicate electronically between the actors and the patients are automatically enrolled into the existing pathway when they are admitted. With SmartCare, at the first meeting in the clinic the nurse will ask consent to enter the patients data and to share it with other relevant actors surrounding the patients treatment in the SmartCare platform. She will also give the patient information on the SmartCare platform and the possibilities for getting access themselves. The nurse also evaluates the patient’s ability to perform home monitoring and if they are considered eligible they are given the opportunity to get home monitoring equipment. This is then ordered at the Region, where employees set up the devices at the patient’s home and at the same time introducing the patient to the use. The nurse simply enters the patients CPR (personal security number) and the SmartCare platform retrieves the basic information on the patient from the national database. After entering the basic information, she chooses the disease and follows the predefined form to enter relevant data together with the patient.

7.2.2.5 Initial integrated home care plan

Today with Sam:Bo, at the point of discharge a rehabilitation plan is made by the hospital staff where the patient’s needs are described. The information needed in this plan includes:

- Full name and address of the patient

- The rehabilitation plan has to include a description of the patient’s ability to function just before the event/disease that led to the current hospital treatment. The plan also includes a description of the patient’s usual ability to function related to body function, activity and level of participation.

- The rehabilitation plan has to include a description of the patients’ ability to function when discharged which includes the patient’s current ability to function
related to body function, activity and participation that can involve both the patient’s resources and limitations.

- The rehabilitation plan has to include a description of the patient’s need of rehabilitation at the time of discharge. The description has to include a clarification of which limitations the rehabilitation should focus on. Furthermore this description has to consider the patient’s disabilities and possible limitations regarding participation in activities and the rehabilitation in general.

- The rehabilitation plan has to state if the patient needs rehabilitation in the hospital after being discharged.

- The rehabilitation plan has to state the timeframe within the municipality of residence has the first contact with the patient with a view to plan the course of rehabilitation. This also includes the patient’s right to be guided regarding the possibility of choose between different rehabilitation offers. In cases where the patient needs specialised rehabilitation in the hospital after being discharged, the rehabilitation plan has to state a timeframe within the hospital has to have the first contact with the patient.

- The rehabilitation plan has to include information about how the region of residence and the municipality of residence can be contacted.

The nurse also sends a discharge report stating the patient’s treatment, discharge date, functional level and need for assistance including medication and need for personal remedies to the municipality. From this report the municipality can assess the patient’s need for social care.

With SmartCare, when the patient returns to the hospital after a discharge the nurse fills out a personal heart plan in the SmartCare platform. This heart plan is a questionnaire developed in collaboration with the municipalities and is the patient’s tool for setting goals and keeping track with the agreed treatment. If the patient is not yet included in the SmartCare platform she enters the patient’s social security number and chooses the patient’s condition. This enables her to fill out the heart plan in the platform with the patient after they have given their consent. Afterwards they fill out the questionnaire together setting goals, entering measurements and scheduling check-ups after 3, 6 and 12 months.

7.2.2.6 Permanent coordination of integrated care delivery/revision of the initial care plan

At each point of contact with a care professional the patient or the care professional has the opportunity to revise the needs of the patient and the services accordingly. In the existing system however this revision is only made by request from the patients themselves or at planned contacts with caregivers. The heart plan is paper-based, which makes it hard to revise. As the heart plan is available in the SmartCare platform adjustments are easily made at any point in time and shared with the other involved caregivers and the patient. Seeing that the patient has access to the information and can add measurements and notes, revisions can be made more on a need-basis rather than on a plan-basis. The SmartCare platform has an alarm-mechanism that allows the care professionals to be alerted when a measurement exceeds an agreed value. This means that the care professionals have an opportunity to intervene faster than in the existing system.
7.2.2.7 On-site provision of formal social care

Today, when the patient returns home the social care is waiting according to the message/report sent by the hospital nurse via Sam:Bo. This could typically be a home care professional from the municipality which provides services such as cleaning, bringing food, bathing, dressing and helping the patient to bed. These services depend on the needs described by the hospital nurse. The patients are also offered an individual conversation with a coordinating social care professional if they are expected to have low self-care ability. The patients are also offered a group-based educational programme of 6 weeks at a local facility, regarding lifestyle factors such as diet and exercise according to their condition.

With SmartCare, when the patient is discharged the local rehabilitation centre in the municipality contacts the patient either by telephone or personally for a follow-up meeting on the treatment so far and the planned rehabilitation course (typically 6 weeks of training and education in lifestyle elements). Depending on the level of selfcare ability the patient either has a range of meetings or just the one. In the meeting the rehabilitation worker fills out a list of information in addition to the heart plan, where personal goals and expectations are elaborated. This is entered directly into the SmartCare platform. He or she may also determine which information is to be shared in the platform, such as guides for the patient, activities and notes. He or she will also look at the measurements taken at the hospital or from home.

7.2.2.8 On-site provision of formal health care

Today the on-site provision of health care may include physical rehabilitation, medication or treatment of wounds and check-ups at the general practitioner. All these services are assessed at the time of discharge and the patient’s needs are re-evaluated before starting as an example physical rehabilitation. Here a 6 weeks long programme is made according to the individual’s needs - either in groups or individually. The patient sees their local GP for annual check-ups after the first year after discharge. If there is a need for rehabilitation this can either be performed at a local training facility or at the patient’s home depending on the patient’s ability to transport themselves.

With SmartCare, the caregivers in this category will find great value in seeing information from the other actors in the treatment as well as benefiting from possible home-monitoring or videoconferencing functions. For heart patients the time for adjustment of medication has shown to be cut in more than a half when using videoconferencing. Also the GP and the hospital clinic will be able to see the patient’s measurements and notes before the scheduled check-ups and some of these check-ups might be able to be replaced by home-monitoring or videoconferencing. The caregivers will enter relevant information such as measurements or goal status either in the SmartCare platform or in their own IT-system, which is then shared between the two systems.

7.2.2.9 On-site provision of informal care

This section is very limited in the Danish system, however relatives will be able to see the information in the SmartCare platform as the same way the patient does. This allows them to support and monitor their loved ones.
7.2.2.10 Remote provision of health / social care to the home (telecare, telemonitoring)

Today, there is not a wide-spread use of telecare and telemonitoring possibilities today. There are however a number of projects, that show the relevance of these elements. In the SmartCare platform the patient is able to enter data from devices into the platform themselves or connect devices that automatically update in the platform. The measurements are stamped with the point of origin so that the care professionals are able to see where the measurements are coming from. Videoconferencing will also be made available in this service in a complimentary system, not yet defined. These possibilities may replace physical meetings in the hospital or at the GP, and will also supplement the measurements taken at the scheduled check-ups.

7.2.2.11 Integrated documentation of home care provided / self-care measures

In the currently existing system each caregiver organisation is able to get an overview of defined variables from their own systems. There is also a possibility to see statistical data on the type and amount of electronic messages sent between the parties. The relevant data is stored in the individual systems of the caregivers and national databases regularly collect information to get an overview across systems. In the SmartCare platform it is also possible to get reports based on the data entered. There is a very flexible configuration which allows users to set up their own report templates with selected information from the platform. This is only limited by the access and rights of the individual ordering the report. In addition the entire platform is based on presenting relevant and updated information on the screen so that the caregivers or patient will not need to search around in the system after it. The screen set-up can be customised to suit the individual user’s needs. It is also easy to see historic data and get them presented in a visual and user-friendly way.

7.2.2.12 Control / reassessment of the home care recipient

Currently, the patient attends check-ups at 3, 6 and 12 months after discharge at the hospital clinic. The patient is called in for a check-up at their own general practitioner after the first year of check-ups at the hospital. Depending on the level of functionality and self-care ability the home care may be reduced and the hospital passes the responsibility of check-ups and monitoring measurements made from home to the GP. The GP may also refer the patient to additional patient educational activities in the municipality by sending them a referral. It is the GP’s responsibility to be the main responsible caregiver on a long term basis including evaluating the patient’s needs at a regular basis. However the municipality will also assess the patient’s needs for home care services on a regular basis as they are the ones that deliver the services.

With SmartCare, in between check-ups the patient is able to see and enter relevant information from home giving the caregivers a better insight into the patient’s needs. The involved caregivers are able to access the SmartCare platform to see and enter relevant information to be shared. Also the GP will be able to see the patient’s measurements and notes before the scheduled check-ups and some of these check-ups might be able to be replaced by home-monitoring or videoconferencing. This also means that the care professionals are better able to evaluate the patient’s needs on a regular basis rather than on the scheduled visits.

7.2.2.13 Temporary admission / re-admission to institutional setting

Today, the procedure of a temporary admission / re-admission is the same as described under the previous headlines - so the process simply starts over. With SmartCare, the only
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difference in the process here will be that the patient is already entered into the common platform and the involved caregivers are able to see the historic data and include this in their decision making.

7.2.2.14 Exit point

The need for care is reassessed by the social caregivers and the GP on a regular basis and services are adjusted accordingly. The patient will probably remain in the SmartCare platform until they are deceased or wishes to be taken out of the system.

7.3 Expected impacts on local / regional actors

<table>
<thead>
<tr>
<th>Type of actor</th>
<th>Positive impacts</th>
<th>Negative impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR</td>
<td>The patients will no longer need to make sure that they tell their story the correct way to every contact they meet because the information will be available in the SmartCare record. This means that the caregivers across sectors will have a better understanding of the patient’s situation and will be able to prepare before meeting the patient. They will also be able to see the patient’s own notes and get an insight into the patient’s life with their disease. The patients with a desire to be more involved in their treatment and life with a chronic disease will be able to get more insight into the data and take a more active part. The service can create comfort for the CR since he/she can see that all relevant actors are involved and can access the relevant data. Furthermore the patient can see that they interact within the SmartCare Platform.</td>
<td>Some patients might feel insecure in entering and seeing information in the system. They might be confused when presented with a lot of information presented in matter which is typically intended for health care professionals. Some patients might feel unsure of what information is shared with which actors in the different organisations. Some patients might feel that the relation in the check-ups or other contacts is less personal when the professional is using a pc or tablet. The patients with less knowledge about IT will have a hard time when they primarily have to use IT. The information is not made directly for the patients since other actors use the data as well. Even though the patients can access a lot of data it does not mean that they understand it.</td>
</tr>
<tr>
<td>I/FC</td>
<td>The relatives will be able to better assist the patient and gain insight and to have a better dialogue with the caregivers. The service gives the I/FC the possibility of being a part of the patients/relatives course of disease. Furthermore the I/FC can provide active support, comfort and help weak patients.</td>
<td>Some relatives might be overwhelmed with the amount of data and get confused.</td>
</tr>
<tr>
<td>SCP</td>
<td>The staff in the municipalities such as home care professionals, educators and care coordinators will be able to see a complete picture of the patient’s treatment and will be able to enter and use especially the self-care ability indicators to monitor and adjust the amount of homecare services and support. Automatic surveillance that will send notifications if a reaction from a health professional is needed. The municipality considers it an opportunity to have a closer dialogue with the citizens -</td>
<td>Some professionals might be insecure in what information they should enter if it is shared outside their own organisation. Some professionals might feel that they use additional time when having to use a pc instead of a piece of paper. Some professionals might feel that the communication is less personal when using a pc or tablet.</td>
</tr>
</tbody>
</table>
### D1.1 Requirements for Pathways and Integration Infrastructure

<table>
<thead>
<tr>
<th>Type of actor</th>
<th>Positive impacts</th>
<th>Negative impacts</th>
</tr>
</thead>
</table>
| HCP           | The hospital staff gets a tool that better supports the workflow as agreed in the Health Agreements and to see the full picture of the information from the GP and social care part of the municipality. Also they are able to set goals with the patient and follow-up in the portal.  
Automatic surveillance that will send notifications if a reaction from a health professional is needed.  
They will have the opportunity to share information and to get a quick overview of the whole pathway/course of treatment e.g. co morbidity and the possibility of a more dynamic coordination between the actors. | Some professionals might be insecure in what information they should enter if it is shared outside their own organisation.  
Some professionals might feel that they use additional time when having to use a pc instead of a piece of paper.  
Some professionals might feel that the communication is less personal when using a pc or tablet.  
Some health care professionals might not consider the data entered by the patients themselves as valid. |
| TSCP          | If involved they will be able to assist the patient by getting access to the patients information and treatment.  
TSCP does not play a significant role in the Danish system. Therefore they have not been taken into account to any great extend in the SmartCare Platform.  
The patient has to take initiative to involve any TSCP.                                                                                               | They might be overwhelmed over the amount and complexity of the information.  
They might not feel qualified to assist the patients in using the platform or the home monitoring devices.                                             |
| Other         | n.a.                                                                                                                                                                                                            | n.a.                                                                                                                                                                                                               |

### 7.4 Key implementation requirements

#### 7.4.1 End user requirements

In several projects concerning the barriers for a more coordinated treatment there has been collected information on the patients’ and caregivers needs and experiences. In this regard the following information is based on these projects - including a survey done in the municipality with interviews of 60 caregivers and patients and a survey done in the largest hospital in the region involving more than 1500 patients. The results can be divided into two major groups. The first group is the patients and their relatives, and the second group the care professionals. The requirements are briefly summarized below.

- Patients and relatives:
  
  Their main input is making sure that the professionals communicate and not having to retell their story many times. Also the patients are not always aware of the
organisational set-up, so the focus for them is meeting prepared and understanding healthcare professionals that can guide them through the system. A lot of the patients also want more information on their treatment and the possibility of communicating with the caregivers about their goals and everyday experiences more informally. They feel frustrated when they have to wait or struggle to find the right contact person, and then have to inform them about their situation.

So the patients and relatives requirements to the SmartCare portal are for the professionals to be able to find relevant information about their background, disease and treatment, so that they will not have to retell their story or be concerned with whether or not the caregivers are “up to speed”. They also wish to have a visual view of their goals and to be able to talk about their progress with the care professionals. The possibility to write notes and to put in data to be checked by the care professionals and to see a list of who to contact are also important factors. For the patients that are not able to use a computer a tablet could be a way to include them. Finally they hope that home monitoring and videoconferencing possibilities will minimize travelling as this can be both expensive and difficult for chronically ill patients.

Below some quotes from the performed interviews:

- “Everything was better when everybody started working together and started thinking outside the box”
- “We find it difficult to get in touch with the right people and actually we cannot even find the phone number of our municipality”
- “We need a type of database that the professionals will keep updated with the newest knowledge. It can be difficult to search online and find the right information. It would be preferred if it is a mix of professionals and patients to get closer to the relevant issues”
- “A system that can support me in performing actions to prevent additional disease”
- “Safety that what needs to happen actually happens”

• Care professionals:

They main focus for the care professionals is access to relevant information in one single place and a clear overview over involved contact persons from the different sectors. They express the need to see information from the other caregivers in order to better plan the treatment with the patient and to better enter into a collaboration - also to provide security for the patient when expressing the understanding of the patients’ entire treatment. They also request an IT tool to better support the workflow described in the Health Agreements. For many care professionals the information they have about the patient is either placed in many different systems or carried by the patient themselves. This means that they spend a lot of time trying to get the full picture and will often have to ask the patients themselves.

The system should therefore provide an overview with all relevant data, activities and contact persons from the other sectors. The system should be user friendly and support the existing work-flow without too many extra tasks. It should be integrated with existing systems and databases to make sure data is updated and only needs to be registered once.

Below some quotes from the performed interviews:

- “An on-line updated version of the chronically ill available for every professional at all times”
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- “We need a place to communicate across professions and to see the updated information”
- “It’s hard for patients with low self-care abilities - they have to tell their story over and over to the different care professionals”
- “It is impossible to coordinate care if you do not have information from the different care providers”

7.4.2 Organisational, staff and business related requirements

There will need to be made specific analysis of the end-users current workflow and the changes that will be made to that when implementing the SmartCare portal. That will be different from each organisation even though the SmartCare project also will make efforts to align some of their current often paper based tools. In that process end-users will need to be involved and documents describing the new workflow will be produced and made visible before using the portal. For the hospital in Svendborg this process has been made and there are no additional tasks when implementing the portal, so this is simply a matter of learning to use the system instead of paper and memo-recorders. As the SmartCare platform generally supports the care pathways outlined in the health agreements it will naturally also support the overall workflows.

The system will have to be available - this means an analysis of the number of PCs per professional, so that there will not be any unnecessary waiting. Also the system must be reliable and easy to access. This means that the staff can use their existing log-in known as the staff-certificate. They will also need sufficient training and guides as well as a support system when preparing to use the platform.

We regulate the collaboration and reimbursements in the Health Agreements - a part of a large process where the Danish Health services control the collaboration. We strengthen the system within the given frames. We need clearer descriptions of how to handle the rules and the agreements regarding economy.

7.4.3 Legal / regulatory / contractual requirements

In Denmark there are two basic regulations to follow in this area - the act on processing personal data and the Health Legislation. The first act is to ensure that sensitive information surrounding the patient is not distributed electronically without purpose and permission from the patient. This can be allowed if the patient signs a consent form where it has been made clear who sees the data, what is shared and to what purpose. There are some issues regarding the sharing of data that many systems now wish to support and the legislation. This means that your consent form has to be very specific for the patient to actually know what permission they are giving.

The two basic Danish regulations that are relevant for the SmartCare project are the following:

- The Danish Act on Processing of Personal Data: The Act on Processing of Personal Data sets the boundaries for how public authorities must process personal data. This applies in cases such as when public authorities collect and register data about citizens e.g. when the municipality processes a citizen’s application for social care benefits. The Act includes many specific rules that relate to processing of personal data.
- Consent: To enter a patient into the SmartCare platform they have to sign an informed consent. The content of the consent can be done whenever the patient has
signed a consent form. However the consent has to be very specific and specify who
the data will be transmitted to. The consent will be repealed after a year in relation
to the Health legislation. The question is how you define a pathway/course of
disease/course of treatment when a patient has a chronic disease.

- Health Legislation: The most important element regarding the Health Legislation is
  patient confidentiality. It is the same principle as in the Danish Act on Processing of
  Personal Data but it has been specified more clearly what each health professional is
  responsible for. To ensure good treatment of the patient it is necessary for the
  health professional to pass on some information regarding the patient. There are
  rules specifying which other people that are allowed access to the system. Therefore
  it also says which people who can read what other health professionals have written
  and furthermore when it is allowed to transmit information. The Health Legislation
  focuses on transmission of data and retrieval of data.

  o Retrieval of data, Health Legislation §41: Look-ups in an electronic system are
    used only for current treatment of the patient. It has been specified which groups
    of people are allowed to access the data and also what the certain groups of
    people are allowed to access. They are only allowed to see what is necessary for
    the current treatment. There are limits since it is only health professionals
    treating the patient that can access the data. It is not allowed to read everything
    about a patient if it is not relevant for the individual health professional in the
    treatment of the patient. E.g. a chiropractor cannot access the patients’ health
    history but only the current treatment. There has been made a distinction
    regarding which health professionals can do what. There has been made an
    expansion regarding who can access historic patient data.

  o Transmission of data, Health Legislation §42A regarding transmission of data and
    §43 regarding transmission of data for other purposes. E.g. the paper file will be
    collected from a filing cabinet and a decision is made on what data you as a
    health professional want to transmit. It is allowed to transmit data in relation to
    current treatment and in relation to receiving unemployment benefits and when
    having a disease because the municipality has the authority to retrieve that
    information. It is not possible to make a wide and covering consent to get round
    the authority.

- Legal issues deserving particular attention:
  o Who owns the data?
    The person who uses the data controls the data. Therefore it is also the person
    deciding how much data that can be collected and transmitted. This problem is
    related to both The Danish Act on Processing of Personal Data and the Health
    Legislation. The SmartCare platform is consistent with the present legislation. It is
    only our use of the system that can cause problems and therefore it is our
    responsibility to ensure all aspects.

  o The patients entering their own data
    There are a lot of safety issues related to the fact that the patient can enter
    his/her own data or when data is transferred automatically from devices. It is very
    important to ensure that the quality of the data being entered by the patient or
    other medical devices. It might be necessary to have a person that can be
    responsible for securing the quality of the data to make sure that treatment will
    not be made based on unreliable data. There is legislation regarding medical
    devices.

  o Who can access what?
    When a health care professional searches for a patient in the SmartCare platform
    then he/she might have access to all the data. It is relevant to create different
    interfaces for the different users that only show the relevant data for that
individual health professional. In this regard we need a definition of what relevant data is?

- Extra information: There will be a logging function in the SmartCare Platform so it is possible to trace all movement by individuals in the platform. This is a legal requirement. The patient has to feel safe and has to be sure that no information will be shared that can harm the patient in any way.

### 7.4.4 Technology / functionality related requirements

In short the SmartCare platform will need to accommodate existing standards, integration to existing systems and databases and be both fast and reliable on the internet. Below the model illustrates the different partners and their type and number of IT-systems, which the platform needs to exchange data with.

![Diagram of Danish care IT landscape for GPs, hospitals and municipalities](image)

The following are demands for the SmartCare platform, which has to:

- function inter-regionally and cross-sector and not be tied by specific systems. The solution supports a lot of different stakeholders by providing data to be fed into and across a lot of different systems.

- support a multiple supplier strategy when it is controlled by a third party. In the same way, maintenance and development of new modules can be done by another supplier.

- focus on the fact that a lot of different actors need to be able to access the platform. This is something that cannot be done to the same extend if using a client-server system.

- to avoid double registrations and to make it is possible for the involved parties to work within their own systems as much as possible, a system for synchronising all the relevant systems involved is necessary as a part of the solution to ensure that all the systems have the relevant information regardless of where the data originally comes from.

- To be flexible, configurable, scalable and portable

  - Flexibility means that the data in the interface is based on roles and the specific course of disease. The solution can also support a multiple channel strategy and mobility. The view of the data has to be configured to specific units - both static and mobile units.
D1.1 Requirements for Pathways and Integration Infrastructure

- Configurability means that the view of the data should be configurable to fit specific roles through a portlet-technology. Furthermore it will be possible to configure the rules and the patient pathways.

- Scalability means that the solution has to be able to be scaled when the number of patients rises. The solution is based in components that enables development over time e.g. if a simple module has to be changed to a more advanced module to support new needs. The supplier has developed a wide range of standard components to support flexible patient pathways, modelling processes, rule based engine and integrations that have been well-proven through tests and can function on a large scale.

- Portability means that the solution can function on several IT platforms and e.g. be moved from Linux to UNIX or Windows with little effort.

- Will be based on confidentiality and security regarding patient related data.

- Include a number of integrations from the CPR register (Register of Social Security Numbers) to the systems in the hospitals and the systems used by specialists, general practitioners and also a home monitoring database. Therefore it is a solution with a great deal of integrations. These integrations that, mostly have to follow the MedCom standards including ”the good webservice” are essential to get a solution that can be used cross-sectorial, regional and national.

- Deliver IT support to the patient pathways with focus on chronic conditions.

- Give access to a common set of data when having cross-sectorial and cross-disciplinary patient pathways

- Be a common tool to health professionals in the different sectors, to the patients and the management.

- Support the coordination of the individual pathways starting with the patient pathways and the support of the decision makers

- Give the patient the opportunity to become an active participant in his/her own pathway including the possibility of home monitoring.

- Be able to integrate with existing and future relevant systems e.g. Electronic Patient Record systems (EPR), systems used by the general practitioner and the specialists, Electronic Care Record systems (ECR), laboratory systems etc

- Has to function as both an integrated tool for the existing EPR, existing general practitioner systems, specialist systems, ECR systems and as an individual system for that actor who does not use another relevant IT-system e.g. the patient.

- Use the existing open standards

- Offer a high level of accessibility

- Support a multi-supplier strategy

The platform needs to be highly focused on integration with existing systems and databases, and the following systems must be included:

- Integration to Cosmic via CloverLeaf (not an individual module because the integration is made through standard integrations in a basic module)

- Integration to the systems used by general practitioners and specialists through Sentinel data gathering

- Integration to the laboratory portal
D1.1 Requirements for Pathways and Integration Infrastructure

- Integration to data provided by home monitoring
- Integration to Shared Medication Record
- Integration to the client’s CPR component
- Integration to NemLog-in (A secure and personal access for all individuals)

7.4.5 Other requirements

In the course of requirements analysis we have become aware of some ethical issues that need to be taken into consideration in the future process. These include:

- There needs to be a delay in the laboratory values before being visible in the SmartCare platform since these values may have significant importance and meaning, which would be problematic for patients and/or relatives to see before consulting a professional.

- Giving the relatives access to the SmartCare platform also presents a challenge if the patient dies - in that case there should be a support organisation in place that shuts the platform access down.

- It is important to create a user-friendly access that is not dependent on the patient’s internet connection to ensure that as many patients and relatives can use the SmartCare platform in order to minimize the increase the inequality in health services.

7.5 Key steps to follow

Some focus group work has already amply taken place in the scope of the Danish national “SmartCare” initiative that has informed the plans for SmartCare. However, work on use case development and requirements elicitation will need to be further consolidated.
8. 2nd wave pilot site #1- South Karelia (Finland)

8.1 Point of departure: The current service landscape

In Finland elderly persons’ long time care is mainly part of the home care. The same applies to the discharge process from a hospital. Each municipality or district organises services independently, which means, that they are responsible for organising home help, housing services, institutional care and support for informal care. The way that services are organised may vary (for example municipalities can provide services independently themselves, they can organise/provide services together with another municipality, or they can provide a voucher to service users so they can buy services from a private service provider).

Home care is labour-intensive and depends on an assortment of different inputs to provide a variety of clinical, psychological and social services in the home setting. These providers are a combination of professional and non-professional personnel, such as nurses, volunteers, spouses, dieticians, physicians, social workers, therapists and home care assistants.

Likewise, discharge processes from the hospital need to be improved by considering the patient’s needs in the community. More efficient support at patient home reduces length of stay in hospital, and minimise unplanned readmission to hospital.

Coordinating the services provided by various operators to the customer’s own home enables supporting living at home from a sufficiently early stage. Compiling individual services (distribution of medicines, meal services, monitoring the capability to function) into service packages makes their provision more cost-effective. Home care plays an important role in supporting the living at home of senior citizens.

From the organisational point of view, all social and health care is already integrated in South Karelia but the integration could be further implemented in the care processes all over the area. By getting easier contact to caregivers and relatives, elderly people can take more responsibility for their own life and daily activities.

Home care is a very important sector in South Karelia Social and Health care District (Eksote) Strategy. We want to keep all elderly persons at own home as long as possible. ICT systems are one tool to solve this issue without increasing the number of health care professionals. In Finland many home care costumers live by themselves and are suffering from memory problems and physical impairments. Based on the above issues home care is increasingly under pressure to take care of all its customers. The SmartCare solution will support this care process.

New care processes supported by technology will include:

- Home safety services such as fire/smoke alarm, cooker monitor, bed sensors and front door alarms with presence in the home, etc.
- Medicine dispenser help to control is medication
- Indoor safety with the Panic button that elderly can press on him wrist
- Outdoor safety with a GPS can show the position of the elderly through the portal if he/ she get lost when going for outside.
D1.1 Requirements for Pathways and Integration Infrastructure

- Alerts/Alarms that were distributed to care-givers by SMS/email and shown on the portal
- Video services for contact with care-givers

Technology will guarantee that elderly person can live at home and information between elderly home and formal/informal care giver will be consistently available. SmartCare service will be installed to costumers based on assessment of service need made by social/health care professional.

8.2 Initial use case scenario for the SmartCare pilot service

A typical home care costumer is an over 80 year old women who lives by herself. This person suffers from long term conditions and has memory problems. This lady cannot cook for herself anymore and doesn’t remember to take medicine, because of the memory problem. Relatives will visit her as often as possible but they have also their own lives and worries like job and hobbies. The home care service visits her home two times a day to help her with daily activities like taking medication, help get dressed, eat. In addition, such visits will prevent loneliness. Similarly, a typical patient with impending discharge from a hospital may be a 65 year old woman whose general condition has went down suddenly, following a fall and a fractured hip.

One of the main goals of the SmartCare project is to offer innovative ICT services to improve the quality of life of elderly persons and their care-givers who provide the daily care for them. Depending on the individual care needs, SmartCare service will be offered to the home care costumer and will be installed inside the elderly person’s home. New care processes supported by SmartCare service will provide information from home, issue medication reminders and provide information on whether the customer is at home or outside. This is graphically summarised by Figure 5. Now home care professional could call to her videophone in the evening and make sure she takes her medicine and talk with her little bit longer, because HCP don’t need to use time for travelling to her home. The connection centre, where all alarms will be handled, will get an alarm every time the customer has been out of home for longer than two hours. The healthcare professional (HCP) will check via GPS where the costumer is and call her via a GPS device to check if she got lost. After talking with her the HCP will call home care personnel to take elderly lady back to her home.
An integrated needs assessment is envisaged to be based on a list of criteria enshrined in The Social Welfare Act (710/1982):

- **Age** - above 65 years.
- **Lives in own home**; could be supported by home care.
- **Suitable for the pilot**; willingness to participate.
- **Ability to understand conditions of participation and give free and informed consent** to participate in the project trial.

Exclusion criteria may include:

- Participants under active treatment (chemotherapy, radiation therapy) for cancer or other terminal diagnosis.
- Participants with psychological long-term conditions as for example, schizophrenia or depression.

Potential participants will be recruited with the home care staff or through special discharge nurses, aging specialists, memory and dementia clinics and local organizations for aging programs and services.

In South Karelia Social and Health Care District social and health care services are already integrated. Based on the Finnish laws social and health care records cannot be integrated directly together. But in home care social and health care professionals use the same health care record, where a home care plan is available to both professions. Home care professionals and special service managers are already responsible for managing the home care plan and service delivery jointly.

Service managers in home care will provide social care services to elderly home. Home care professionals (registered nurses and practical nurses) will provide health care services
to the elderly at home. Informal care givers could provide support services to home, like cleaning, shopping help and medication control. Remote visits (telecare/telehelath) will be implemented as part of the home care service delivery.

Health care providers and social care providers are envisaged to add documentation and measures directly to the EHR. They will also do reassessment all the time when they are contacted to the patient.

Some cared for persons are expected to participate also in day care, especially those elderly who are very suitable for the pilot. Re-admission to a hospital is avoided as far as possible. Telemonitoring is one thing which could help to avoiding situation that patient should go back to the hospital by giving information from patient condition in time. The cared-for person will be out of the pilot if he/she doesn’t need service any more. This may happen if elderly condition improves or elderly condition degrades and he/she needs to move e.g. to sheltered housing.

Because social and health care have already been integrated at South Karelia Social and Health District, the focus is on developing of working processes and the SmartCare Centre concept. The Smart Care Centre will be located at Elderly Centre and staff of centre will be responsible for receiving care phones alerts and alerts of Smart Care system, assessment of service needs for elderly and handicapped persons, on line services for clients and their relatives. Depend on situation, staff of home care or paramedics take care of emergency home visits. For online services there will be available nursing staff at Smart Care Centre on daytime - on night time the alerts will be answered by night nurses or paramedics.

There will be one main technical operator (local or nationally) which will co-operate another companies and we will buy the service as overall service. We have to competitive bidding this operator - this will happen during autumn 2013.

A focus target group will be elderly who need support to independent living. Nurses of the Memory Clinic are looking for clients to the pilot. The plan is to start the pilot during spring 2014, at the latest on first of April 2014. Clients who will be involved to the pilot are mostly clients of home care and have either care phone and/or some problems with their memory. One of the groups will be elderly who are coming home from hospital and have high risk to get back to hospital.

8.3 Envisaged key implementation requirements

A set of implementation requirements have been identified so far deserving particular attention in the given local context.

End user requirements

- Easy to use, usability requirements
- Easy to remove

Organisational, staff and business related requirements:

- Workflows need to reform to take advantage technical system
- Training for the professionals
- Professionals user interface need be easy to use
D1.1 Requirements for Pathways and Integration Infrastructure

- User interface need to support service processes
- Time required for procuring need to be foreseen and aligned with the project time plan

Legal / regulatory / contractual requirements
- Personal data act 22.4.1999/523
- Act of Status and Rights of Patients 1992/785
- Act on the Protection of Privacy in Electronic Communications 516/2004
- Legal requirements must be added to the invitation to tender

Technology / functionality related requirements:
- Usability need to meet criteria
- Automated processes
- Need to meet quality requirements
- Data protection need to meet criteria
- Performance need to meet criteria
- Maintenance and portability need to meet criteria
9. 2nd wave pilot site #2-Tallinn

9.1 Point of departure: The current service landscape

The Estonian healthcare system today is fragmented between the care providers. There are three major care deliverers, the hospitals, the general practitioners, which control healthcare services and the municipalities which control the social care delivery, each with their own organization and IT systems. Estonia has national health care system eTervis where all needed information can be sent and accessed centrally.

The health information system is a database that is a part of the state information system. The health care related data is processed in this database in order to conclude and execute the health care services provision contract, ensure patients’ rights, protect public health and quality of health care services, to maintain the registers of health conditions as well as to manage health care (The Health Services Organization Act and Associated Acts Amendment Act, §59¹ section 1).

According to the Health Information System Statute, the processor of the Estonian National Health Information System is the Ministry of Social Affairs and the authorized processor is the Estonian eHealth Foundation.

The health care services providers have to conclude a contract with the Estonian eHealth Foundation in order to be interfaced with the Estonian National Health Information System.

The integration between the systems is an ongoing process; unfortunately the information about the activities done at home is currently not accessible. There exists also a patient portal where patient have access to parts of their health data through the public web portal e-Tervis, where they can see epicrisis, radiology reports and different kinds of procedure information sent by the health organization centrally. There are also no standards or profiles to integrate data (health or social) gathered from homes.

There also exists alarm button service in Tallinn City area, which is provided by Tallinn city social and welfare department. There are about 200 elderly using the system now:

- The goal of this service is to call for help primarily in situations where the person is unable to move by him/herself and to open the door for the helpers, for example:
  - Sudden need for health help, with an immobilising effect;
  - Sudden need for so-called personal help (falling, temporary inability to move, becoming trapped in inner rooms, etc.);
  - Situations necessitating rescue services (fire, explosion, etc.).

The alarm button service will be extended with SmartCare services platform together with the East Tallinn Central Hospital and GPs in the area. To sum it up, the objective of the SmartCare service in Tallinn is to enable elderly people to live as long as possible a complete life in their own home. It will gather all the relevant data in one overview, to support agreements among health professionals on how to share treatment of patients with a chronic disease and to make data available at any time to as many actors including social carers and informal carers as much as possible. The system will implement an ID-card solution to make it secure for the stakeholders. In this manner the SmartCare platform is a supplement to the existing systems. It is highly focused on integration with the existing
systems and databases, so that information only should be entered once, but shared with all needed actors.

9.2 Initial use case scenario for the SmartCare pilot service

The SmartCare pilot service will be designed for patients with one chronic disease (Heart failure, COPD or diabetes) and aged over 50 years. There are two entry points and associated pathways in the project:

1. Discharge from hospital and distance monitoring + remote alarm button
2. During the treatment of chronic disease to support living at home

The goal is to develop and implement a universal web-based home monitoring system for elderly chronic disease patients, allowing a combined delivery of social and health care, including both organizational service delivery network, methodical evaluation of technological solutions based on existing experiences / practices, the cost of which is accepted after the project end in the market.

The project target groups: elderly people, who are in need of social welfare in addition to suffering from chronic diseases (including stroke, heart failure, chronic obstructive pulmonary disease, diabetes) who are also in need of social and home nursing services in the periodic health consultation or treatment. In Tallinn the size of this target group is estimated to be up to 20 000 people, of whom 100 people are involved in the project.

After discharge the chosen and suitable patient is signed up in the SmartCare platform and suitable set of devices are given to the patient. Also training is done. After prescribed period of time the patient data is followed regularly from the SmartCare platform. All actors (health/social/informal caretakers) can enter the information about the activities any time.

The interfacing protocols will be developed to integrate SmartCare platform to receive and send patient data messages:

- Message of admittance to the hospital send to the GP, municipality and existing social information systems
- Report send from the municipality to the hospital with additional and relevant information on the patient
- Rehabilitation plan send to the municipality when the patient is discharged
- Prescription send from the GP to the pharmacy

There is an existing 24/7 service alarm button for elderly people. The SmartCare services will be added, all services will be combined into one platform. When it comes to the technological platform, a tender will be carried out in due time to get all the needed equipment.

A nurse evaluates the patient’s ability to perform home monitoring and if they are judged to be able they are given the opportunity to get home monitoring equipment. This is then ordered from SmartCare contact centre, from, where the employees set up the devices at the patient’s home and at the same time introducing the patient to the use. Integrated documentation profiles will be worked out to integrate the SmartCare platform into the national health information system E-Tervis (see above). The SmartCare platform guarantees a regular control of the important clinical and social parameters of the patient.
through a case nurse and all other participating health and social care professionals. The patient can be temporarily admitted to the institution. The information about patient movements is logged in the SmartCare platform. If he/she is not willing to use any more SmartCare services the patient can contact the contact centre any time and refuse the services.

9.3 Envisaged key implementation requirements

A set of implementation requirements have been identified so far deserving particular attention in the given local context.

End user requirements:
- Willingness to use SmartCare services
- Living in Tallinn
- With one chronic disease (HF, Diabetes, COPD)
- Over 50

Organisational, staff and business related requirements:
- Data protection law should be followed. Also there is a need for ethical committee approval.
- legal / regulatory / contractual requirements
- Need for patient subscription form.

Further interview and focus groups with all care (health-, social-, informal care) actors are carried out for the purposes of contextualised use case consolidation and requirements elicitation.
10. 2nd wave pilot site #3 - Attica

10.1 Point of departure: The current service landscape

The focus of the Attica pilot site is on adult (over the age of 50) patients suffering from type 2 diabetes who might also risk falling due to their condition (especially in the older participants amongst them). In this care pathway, the steps involve such citizens who are already living in community settings for a period of time.

The procedure so far was as following:

- The cared for person (CR) “Yiannis” lives in his family house in PALFALIRO. On a regular basis, he checks with his treating Diabetologist, Dimitris and even at home on regular time intervals vital parameters such as BP and Blood Glucose Levels (using appropriate devices). He keeps a personal paper record, but the results of measurements are not readily available to Dimitris for assessment.

- If during one of the visits to the specialists’ practice a need for further exams, tests or treatment options are required, Yiannis, under guidance from Dimitris and with the help of his carer (wife in this case) Maria, performs all required tasks. Arrangements with Social Insurance Funds, reimbursement for any required interventions both therapeutic and diagnostic, are dealt with either by him or Maria who is legally entitled to handle such issues.

- Although Yiannis follows the guidelines that Dimitris has written out for him, he feels that there is no continuous flow of information between them and sometimes he feels “frustrated”. In many instances, long periods of up to 3 - 4 weeks pass since the two of them meet and follow up on Yiannis condition. As a result, Maria, who does not know how to support her husband, also feels depressed and experiences a burn out situation.

- Although Yiannis intention is to have a holistic approach for the management of his disease, he has no care plan that encompasses all necessary steps that can guide him, like a compass, through the current system. He cannot connect various elements of his care plan together, he does not know in clear and well structured way vital information that is important to the management of his condition. The same is true for Maria, she believes she has no real potential to really care for her husband. Instead of helping him and supporting him, she feels she is doing things that are ‘not scientifically correct’.

This procedure lacks the following elements:

- Continuum of care in community settings in an integrated fashion, based on collocation and coordination of care services;

- Systematic registration of data concerning chronically ill patients;

- Continuous and timely support of CRs according to both social and health needs related to their current status;

- Systematic, timely and scientific information on self management of the condition;

- Active involvement of carers and CRs in decision making and care planning.
10.2 Initial use case scenario for the SmartCare pilot service

The entry points are the Diabetologists practice at the municipalities’ primary health centre along with the Social Care Professionals of the same municipality. Each professional has the right to veto his/her colleague’s decision.

The patients enrolled in the service are over 50 years of age and they suffer of diabetes type II. Their service needs are assessed based on recent special diagnostic tests (e.g. HbA1c and others according to IDF) but also on person centred planning within the SmartCare settings.

Yiannis aged 65 and his carer Maria 63, are pensioners that live together in a small apartment in PALFALIRO. Their children have their own families in other cities and try to stay in touch via traditional (e.g. phone calls) and contemporary means of communication (e.g. skype calls). Yiannis is a technology agnostic while Maria has been using the internet and social media building up digital skills.

Yiannis’ treating Diabetologist Dimitris, who works for a private hospital nearby, but is also a contracting Diabetologist at PALFALIRO, suggests to Yiannis, during one of his practice visits, that he enrols with the SmartCare service as he fulfils certain criteria. Eleni was also called in in order to assess his social profile and his needs in the community settings and after a thorough information session with both him and Maria, Yiannis decided he enters the pilot as a user and he fills in and signs the consent form.

So far the couple received health treatment only and was isolated in terms of communicating with other diabetics of their region. In the past they received no social care services and it never occurred to them that they might have been entitled for some kind of benefits or be involved in social inclusion activities in the local community or even self manage the disease.

Eleni (social worker from the municipality) and Giorgos (the dietician) will visit them at home and together design their integrated home care plan which will includes at least, the following:

- Regular Glucose and BP measurements via dedicated devices with wireless communication capabilities so Dimitris can have online access to them and revise the medication plan accordingly - with the help of Maria or the community nurse;
- Tailor made nutrition guidelines via the relevant PALFALIRO portal with the help of Maria as both are responsible for cooking but Maria is the digital enabled of the two;
- Information and registration via the relevant portal to various events covering the broad range of Yiannis’ needs in terms of care and support (e.g. balance training) organised by the municipality where other diabetics or health and social care professionals will attend also with the help of Maria;
- Checking online all benefits received already by the couple and decide if they are entitled to something else - with the help of Maria;
- Involvement in online discussions and chat rooms with other diabetics and carers from the ATTICA pilot.
- Expected outcomes.
- A review procedure.
After enrolling into the SmartCare ATTICA pilot and based on the needs assessment performed of Yiannis for SmartCare services, the individual care plan for Yiannis is developed in cooperation between Yiannis, Maria, Dimitris and other professionals. In order to develop it, Person Centered Planning is going to be used within the current SmartCare settings.

In the centre of the integrated home care plan, is the CR himself, his wishes and his aspirations (i.e. where he wants to go). In addition, the integrated home care plan should contain the tools to support fulfilment of the CRs’ aims and the outcomes that need to be measured and that are meaningful to the CR. Each individual home care plan should also be linked to a review procedure in order to continuously monitor what is working and what not, what is important for the CR now and in the future and in alliance with friends, family and professionals make changes based on that review procedure.

When the Person Centred Planning approach goes ahead for each SmartCare CR, the social worker with the CR or the CR together with the carer should develop the personal support plan, which essentially is a record of the decisions the CR has made about how he wants to spend his personal budget to achieve the outcomes that have been defined.

Figure 6: The ATTICA support plan concept

The IT based SmartCare platform (ICSMER, Integrated Care Socio-Medical Electronic Record), caters for the coordination of integrated care delivery via the various menus and discreet access privileges for all enlisted CRs. Specific monitoring points in time are observed, similar to milestones, from where the decision making process regarding the efficiency and potential revision of the initial care plan is addressed. Information from the SmartCare Platform will be used for the review procedure which is a part of the person centred planning approach mentioned above.

The municipality’s social worker (Eleni) will visit the first time in order to have a face to face meeting with the couple and welcome them on the program by providing adequate information and clarifications where required. In addition, the social service will be accessible to the couple upon request. Eleni will be involved at all stages of the person

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6 Putting People First, NHS, 2010, “A continual process of listening and learning about what is important to and for the person – now and in the future, and in alliance with family and friends – and making changes based on this”
centred planning approach within the SmartCare settings (i.e. needs assessment, plan design, support planning, outcome setting and review of the plan).

Dimitris (the diabetologist) will visit the couple at home very rarely and only in cases where Yiannis cannot visit the municipality’s primary health centre. Other health care professionals will also visit the couple’s home to follow up with the care plan or to assist with specific tasks (e.g. monitoring of glucose levels). Dietician and Psychologist services at PALFALIRO primary health centre will be accessible to the couple upon request. Health professionals will be involved at all stages of the person centred planning approach within the SmartCare settings.

Informal care is provided by the carer (Maria) and rarely from the two children who access their parents’ data on line. Maria is also involved at all stages of the person centred planning approach within the SmartCare settings.

Yiannis will follow closely his monitoring regime consisting on average of one measurement per day of his blood glucose levels and his BP with the smart devices that can automatically transfer the results to his ICSMER. Maria can assist him in assessment. Dimitris will assess the measurements from his gateway either at the municipality’s primary health centre or in his private practice or even at home throughout the day. Reminders will be send to Yiannis smartphone or laptop (or even Maria’s) for appropriate and timely medication uptake, or other therapeutic approaches on a regular basis. In addition, alarms will be generated for health and social care professionals in case an immediate action is needed (e.g. trends in glucose levels are not appropriate, weight management is not good, involvement in social activities are not the ones agreed upon in the plan etc).

Various guidelines will be issued relative to the personalized, integrated socio-health care of Yiannis condition. The basic documentation is the Person Centred Plan, together with the Review Plan, the Personal Support Plan and the Outcome Monitoring Plan. The documentation has as focal point diabetes management and self-management at home addressing also the situations that can lead to re - hospitalisation. The author of the documentation also varies covering the spectrum of integrated care i.e. ranging from health care professionals to social care professionals. The audience of the documentation will be either Yiannis or Maria (or both) as well as the social and care professionals.

The assessment criteria of Yiannis are both health and social as set during the person centred planning. Apart from blood glucose levels and BP, glycosylated haemoglobin will be also measured during the pilot at regular intervals (once every 4 months).

In the unlikely event of Yiannis’ re-admission to the hospital during the pilot’s operation then the same procedure will be followed, as above. On identification of Yiannis as a SmartCare participant, all relevant information in the ICSMER will be available to Dimitris. In addition, relevant information throughout hospitalization will be available to the municipality’s health and social professionals as well as informal carers (Maria and Yiannis children) so that they can monitor Yiannis care pathway in the hospital environment within the limits of the Pilots’ Municipalities. Short stay admission to a hospital or another institution (other than the local, private hospital) will not be a reason for exiting the system, but Yiannis will need to update Dimitris and the rest of the team on the necessary health information during hospitalization in order to inform ICSMER.

Exit points from the smart care service may include the following:

- When the CR (Yiannis) or the guardian (if existing) withdraws his consent;
• When one of the criteria of enrolment is not satisfied;
• When Yiannis passes away or enters another healthcare setting (e.g. another hospital or nursing home) for long term hospitalization.

10.3 Envisaged key implementation requirements

A set of implementation requirements have been identified so far deserving particular attention in the given local context.

End user requirements:

• The end users should be residents of one of the three municipalities (Palaio Faliro, Ag. Dimitrios, Alimos) constituting the Attica pilot site;
• They are covered by public insurance;
• They will have to be well accustomed with Internet Technologies and Mobile Phone Technologies or their carers and have a connection to the internet;
• They should be owners of smart phones, laptops or other gateways or again their carers should be holders of these devices;
• Living alone is not an exclusion criterion for users but they can also live with or supported by carers living in different settings;
• Last but not least they have to be ready to accept changes in their lives on an individualized basis during the SmartCare Pilot.

Questionnaires were also designed in order to gather generic information of the needs of potential SmartCare service CRs for integrated health and social care services. The general needs assessment procedure is based on focus groups whereby interviews with both patients and carers took place (a second wave in September 2013 may follow).

Organisational, staff and business related requirements:

• The main requirement for all staff involved is the fluency in English language otherwise communication with the other members of the consortium will be rather prohibited.
• Additionally and in terms of organisational effort, a multidisciplinary team covering the three municipalities will be set up in order to coordinate all personnel related issues (temporary shortages, overlapping of functionalities).
• The ATTICA Pilot Steering Committee (APSC) will be set up, bringing together all stakeholders of the pilot, in order to monitor all managerial, legal, ethical, organizational and financial issues emerging from the Pilot. Nomination of members and publishing of a Rulebook on the activities of the ATTICA Pilot Steering Committee will be agreed upon and become functional as of January 2014.
• Because of the importance of the pilot for the Greek Health and Social Care System, a Project Communication and Dissemination Committee is going to be established in ATTICA. Leading the Committee will be the Pilot Communication Officer who has large experience in implementing and monitoring communication plans
• The entities constituting the Attica site are of Public nature and this turns them somehow inflexible to radical organisational changes hence all processes developed will have to maintain a certain degree of compatibility with the existing situation.
However, a change management plan needs to be designed and put into action as soon as possible and by no means later than January 2014, because changes in culture of municipalities’ attitudes and ways of working will be significant and furthermore, will be a critical success factor to the pilot itself.

- Physical and virtual collaboration of various Health and Social Care specialists and if possible co-location of services needs to be ensured;
- A continuum of interrelated services spanning both social and health related needs must be provided to the patient in a three tier system: Home Care, Physical Visits to the Municipality Medico - social Centre and e - services;
- There is a need to create and support peer - to - peer support and self - help groups.

Legal / regulatory / contractual requirements:

- All sensitive personal data that will be stored in the electronic platform will undergo anonymisation process in order to be later used for statistical analysis and overall evaluation of the pilot.
- Tenders should be made in order to ensure availability of equipment and related software prior to the pilot’s set up.
- Finally all national procedures for contracting external specialised professional (e.g. Diabetologists, dieticians etc) for the pilot operation will be respected. These will be according to the special legislation regime under which the municipalities function.

Technology related requirements:

- Broadband internet services availability in the pilot region is the main technology requirement. This requirement is envisaged to be met without serious problems as Attica site enjoys an exceptionally high penetration level of these services both in public institutions but also at residents’ homes.
- Access to easy to use gateways (PDA’s, laptops, smartphones) needs to be provided;
- Training needs to be provided in using gateways in order to access e -services of SmartCare;
- Timely and scientific information on self management, welfare benefits management, individual care plan development and management need to be made available;
- Behavioral change needs to be achieved - Reminders, Repetition, Understanding behaviour changes; Personalized behavioural changes;
- Social Interaction needs to be enabled with various stakeholders such as doctors, other professionals, carers, peers (for peer - to peer support) through electronic means (chat rooms, blog posts, social media), particularly relevant to younger patients.
- Easy to use monitoring devices need to be made available;
- User friendly software needs to be put in place.

Other requirements:

- Another critical requirement is that the process-wise transition towards the new integrated service model will be achieved as smoothly and seamlessly as ever possible, so that the functioning services will not be interrupted, but integrated with the new ones.
The IT security plan needs to be concluded as soon as possible, and not later than November 2014. Also, permission needs to be granted by the Hellenic Data Protection Authority for using personal information of users in an electronic format, a process that might take up to 6 months after submission of the relevant dossier for evaluation.

Particular emphasis needs to be put to the implementation of the Communication Plan as Greece is hosting the E.U. Presidency during the first 6 months of 2014 and everything needs to be in accordance with the Projects’ objectives.

Financial sustainability of the services after the pilot needs to be addressed right from the beginning;

Policy Makers need to be convinced to reimburse the service if outcomes are good;

Further roll out need to be planned at an early stage in order to cover many more users;

The above requirements were derived from a first focus group with Diabetes type II, over 50+, patients. It took place on the 3rd of July 2013, at the premises of the Municipality of Palaio Faliro (PALFALIRO):

- The focus group lasted for 45 min.
- A total of 12 participants were involved.
- The user groups were mixed. Both patients with a diagnosis of type II Diabetes (n=6) and health and social care professionals as well as industry representatives were involved (6).
- The recruitment criteria were the same as the ones described in documents:
11. 2nd wave pilot site #4- The Netherlands

11.1 Point of departure: The current service landscape

Like in many other countries, in the Netherlands costs of long term care are ever increasing. The question how care delivery can be organised in a more efficient way has therefore been on the policy agenda for quite some time. In this context, the identification of needs for early and preventative interventions has received particular attention by key actors at the regional level. A strong body of evidence from scientific studies, including a meta-analysis, has for instance demonstrated the relation between physical capability, health status and mortality of older people\textsuperscript{7,8,9,10,11,12}. Mapping risks for health deterioration and large scale screening are therefore considered to be of great importance.

The SmartCare pilot in the Netherlands will therefore build upon an established monitoring centre infrastructure covering the municipalities of Enschede, Apeldoorn, Doetinchem and The Hague, with view on capitalising on monitoring data gathered from older people living in the community during the centres’ usual operations. In technical regard, they already utilise a monitoring centre platform provided by Verklizan, a Dutch telecare and telehealth system provider with subsidiaries in 4 European countries. Up to now, Verklizan’s so called UMO platform has been implemented in 14 countries to serve 850,000 clients overall. As an open telecare and telehealth platform, it provides homecare organisations the opportunity to use those monitoring devices and services they deem most suitable in their particular local context.

Amongst others, the platform enables collating monitoring data that are suitable to indicate general health decline at an early stage. In the early stages of aging, such a preventative telemonitoring has to be very simple and must be applicable without additional investment in equipment and manpower, because it is meant to be applicable for a very large group of people. Expensive equipment, sensors and manpower, which is often used to monitor in AAL environments is not applicable at this stage in an economically viable manner. In later stages, where specific older clients tend to require more intensive forms of care additional monitoring equipment and services can be applied with a view to collating more specific health related data.

All preventative telemonitoring data are fed into the central monitoring system and can be analysed in terms of key indicators for early intervention and prevention, in which thresholds are defined and intervention can be designated. This is to increase the quality of life of the elderly and extend the period that they can live in their own environment.

\textsuperscript{8} Cooper, R. Objectively measured physical capability levels and mortality: systematic review and meta-analysis. BMJ 2010; 341:c4467 doi: 10.1136/bmj.c4467
Also, the relationship with the homecare organisation is to be prolonged and the start of permanent care in a nursing home be delayed.

A challenge currently faced when collating indicators for early and preventative intervention concern the questions which telemonitoring clients actually need preventive care and how can these be identified in a cost-efficient manner. In response to this challenge a staged approach has been developed in relation to different phases of ageing usually experienced by older telecare and telehealth clients.

Monitoring data on early intervention indicators are collated during a 1st phase usually concern older people who have no, or only a limited, demand for care. The monitoring methods applied are very cheap and the population to be reached is very large. There is only very little investment in manpower and equipment at this stage. The goal is to make an earlier contact with this group in order to detect and monitor health decline in an early stage.

In a 2nd phase, the data on early indicators concern those who are in need of more intensive monitoring. A multiple set of indicators is tailored towards the need of this target group. In terms of people concerned, the phase 2 group is considerably smaller than the phase 1 group. The goal for this group is to extend the period that they live in their own home environment.

A 3rd phase, concerns those who are in the most intensive and expensive phase of permanent care. The goal for this group is to shorten the period that they need permanent care in nursing homes.

11.2 Initial use case scenario for the SmartCare pilot service

The objective SmartCare pilot in the Netherlands is to integrate the social, health and informal care flows by means of the platform and to demonstrate the success of the integration. It is intended to include at least 2,000 older adults in the SmartCare pilot, whereby potentially 10,000+ older adults are envisaged to be included at a later stage. The collection of early indicator data will be based on knowledge gained in an ongoing pilot project at Florence in The Hague, as part of a Dutch research project, where walking speed is successfully measured as an early indicator for health problems and falls. Other customers of Verklizan already use questionnaires to perform a ‘Good Morning’ service for their customers.

The target group addressed by SmartCare comprises older people across all three phases described above. When it comes to phase 1 clients in particular, these tend to be unknown to care institutions yet although they may already suffer from health decline in one way or another. But they may not yet consult a GP or a homecare organisation. It is planned to get in contact with them on invitation by the local government, in terms of a general health status check when they reach the age of 75. Some of the Dutch local authorities have already started this process.
After this initial intake at the GP or the homecare organisation, where they are registered in the UMO system and their health status is inquired, the elderly are asked to participate in a program where they are approached every 3 months with a frailty questionnaire (to be defined). They will be approached by the UMO monitoring centre on an automatic base by IVR (interactive voice response), and their score will be stored. When this score crosses a defined threshold, the UMO system signals this event to the agent at the monitoring centre that can take action (to be defined and depending on the score).

When this score indicates for instance a decrease of mobility or a possible fall risk, then they are asked to participate in the walking speed program. Since research proved that there is strong relationship between walking speed and mortality, walking speed is an important indicator for health decline and fall risk in particular. In this method, the walking speed can be measured via traditional wireless (DECT) telephone by the UMO monitoring centre without using equipment or manpower, and can therefore also be applied to a large number of people at low costs. Also, apps currently being developed to answer the questionnaires on tables and smartphones and perform walking speed measurements.

Some people may already have a need for rather light temporary forms of homecare. Additional to the approach described above, the care provider visiting the person concerned has an App on his/her smartphone, with which enables completion of a (dedicated) questionnaire and adding of notes. This information will automatically be synchronised with the UMO monitoring center. Because the care provider already visits the client, extra costs for this indicator information is very limited.

Additionally, some people may an have been assessed by their GP to be in need of a Personal Emergency Response Systems (PERS) from their GP, based on the early indicators described above, or they may have obtained such a service on a private base, often indicated by their social environment (children, family). Those PERS systems have proven to be very efficient for elderly with possible fall risk13. For this group we can use data mining in the databases of the UMO monitoring centres, where we recognise patterns in the alarming behaviour in the average connection period of 30 months (Holland). When those patterns exceed certain thresholds, monitoring agents are informed and can initiate action for intervention.

When it comes to phase 2 clients in particular, additional to the early indicators that are used for elderly with a relative good health condition, a series of devices and services can be applied when early indicators or other initiators (GP’s or home care organisations) indicate that extra monitoring can improve health counselling. In the case that early indicators point out an increased fall risk, for instance additional movement monitoring can be applied in order to make an analysis of the movement behaviour of the elderly and to determine a suitable intervention and rehabilitation plan. The Move Monitor of McRoberts has for instance already been successfully applied in the FARAO project. Other types of monitoring such as temperature, weight, blood pressure, heart rhythm, blood sugar, etc., can be applied focused on different types of chronic diseases. Video monitoring and screen-to-screen communication can provide additional indicators and can support care provision. The combined (early) indicators provide a valuable instrument for early intervention. Care organisations can choose from a large amount of products and services from certified partners that can connect to the UMO monitoring centre.

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13 ‘Low Tech’ Personal Emergancy Response Systems Reduce Costs and Improve Outcomes, by M. Bernstein, 2000
When, after (early) indication through for example the UMO monitoring centre, care professionals - either in health or social care - diagnose a decline in a patient’s health status, they report this and refer the patient to the SmartCare pilot service. Additionally, local authorities systematically invite people for a health status check when they reach the age of 75, and these health checks potentially constitute an entry point to SmartCare service as well.

During an initial intake at the GP or at the homecare organisation, it is investigated whether a patient needs SmartCare or not (yet). Patients who do not need SmartCare (yet) are asked to participate in a programme where they are approached every 3 months with a frailty questionnaire (to be defined) in order to react upon changes as quickly as possible. They will be approached by the UMO monitoring centre on an automatic base by among others IVR (interactive voice response), and their score will be stored.

When this score crosses a defined threshold, it indicates for instance a decrease of mobility or a possible fall risk. The UMO system signals this change in health status to the agent at the monitoring centre that can take action (to be defined and depending on the score). At risk patients are asked to participate in the walking speed programme. Since research proved that there is strong relationship between walking speed and mortality, walking speed is an important indicator for health decline and fall risk\textsuperscript{14}. Based on the severity, different levels and intensity of monitoring, coaching and support will be offered.

In The Netherlands, all relevant stakeholders will be involved in the integrated ICT SmartCare service solution, of which the care recipients, healthcare workers (e.g., physiotherapists, General Practitioners), social carers and informal carers. To decrease the costs in care, an increasing number of services will become remotely accessible, except for the care that is still needed on site (e.g., physical support, quality care...). The goal in SmartCare is to support integrated care between the stakeholders and to support the care recipients by means of a variety of remote ICT services:

- **Remote Health Care:**
  - Physical exercise and training videos and/or screen-to-screen instructions
  - Vital sign monitoring by means of automated questionnaires
  - Medication support and instructions

- **Remote Social Care:**
  - Screen-to-screen contact possibilities
  - Social inclusion services to prevent loneliness

- **Remote Informal Care:**
  - Screen-to-screen contact possibilities
  - Services to support social inclusion

Via (early) indicator monitoring (3-monthly questionnaires, regular speed walking tests), evolution in patient’s health status is updated on a regular basis and additional intensive monitoring can be added if required. Based on this information, the initial home care plan can be revised.

In the UMO monitoring centre database, patient documentation concerning personal data, vital signs monitoring, walking speed measurements and falls are stored and exchanged among all the involved stakeholders. Via a mobile app, also social and informal carers can

add relevant data. In this way, all carers are informed with the most up-to-date information and the care organisations are able to take all necessary actions.

11.3 Envisaged key implementation requirements

11.3.1 End user requirements

Based on previous projects in the field of Integrated eCare, eHealth and Independent living, we have gathered many insights and viewpoints to develop an extensive list of end user requirements, related to perceived usefulness, ease of use, ethics, age-related changes and/or disease specific issues, and acceptance.

Telehealth and telecare technologies can assure the basic support for daily activities, detect health critical situations, and stimulate social and psychological engagement that fosters the emotional wellbeing enhancing dignity and quality of life. Although technology has great potential, older people and chronic patients often categorise it as meaningful when associated to the activities and needs of other groups, but superfluous and useless for themselves. Studies conducted on the usage of IT technologies, demonstrate how the reluctance of adopting communication technologies is not only due to a lack of skills but, above all, to the absence of perceived advantages and benefits. Everybody likes to grow old, but nobody likes to be old. People are not willing to admit that they are ill. Therefore, people in general are reluctant in accepting solutions that reveal their dependency. Thus, it is of immense importance to convince the end-users that taking part in SmartCare is beneficial for them. The first step towards the use of telehealth and telecare, is the perception of needing some assistance. Only when confronted with this feeling of needing help, they will be motivated to approach technologies that are able to answer their specific needs.

Both the system itself and the offered services are developed in the light of the needs and wishes of the target population. If the system indeed does grant the patients’ wishes in a less effort or less money consuming way, they will experience a feeling of perceived usefulness. In order to realize a use intention, this usefulness perception should be combined with both enjoyment and perceived ease of use. Since (older) patients are often shivery in accepting and using new technologies, an attractive and user-friendly interface is indispensable. The end-user interface should lower the threshold to start using new technologies, by making it easy, familiar, and enjoyable. Therefore - besides the requirement to fit disease-specific needs - it is important to take into consideration more general age-related changes in perceptual, motor and cognitive abilities to guarantee the required accessibility.

The system should not only grant the users’ wishes, but should also do this in a less effort or less money consuming way in comparison with standard solutions. In this way the users will experience a feeling of perceived usefulness. In order to realize a use intention, this usefulness perception should be combined with both enjoyment and perceived ease of use. Enjoyment refers to the extent to which the activity of using the system is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated. Perceived ease of use is related to the impression of how much effort is needed to learn and use the system. Here, factors like system quality, coherence, familiarity, complexity and support come into play.
Besides quality and usability requirements, the key requirements have to do with perceived usefulness. By offering the possibility to provide the right set of services, people will be convinced that SmartCare is not only useful for their health situation, but that it will also positively impact their independency and their social and emotional quality of life. Therefore, these kind of services are important:

- **Comfort services**: services for practical maintenance and housekeeping, not specifically targeted at people in need of care. These are the typical services that make a platform attractive, and empowers people to do things themselves and to participate actively in society.

- **Welfare services**: services that contribute to the physical and mental wellbeing of people. This category of services is about improving either the physical condition (e.g. nutrition or sports coaching) or the mental state (e.g. making social contacts).

- **Safety services**: services to increase the level of perceived safety, like the possibility to automatically or manually contact someone in case of emergency (fall, burglary...)

- **Care services**: all services related to health treatment or increasing the level of self-management, like telemonitoring.

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<th>Comfort services</th>
<th>Welfare services</th>
<th>Safety services</th>
<th>Care services</th>
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<tr>
<td>Local event calendar</td>
<td>Video communication</td>
<td>Social alarm</td>
<td>Contact with care service centre</td>
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<td>Local radio / TV</td>
<td>Social media</td>
<td>Fall detection</td>
<td>Contact with care professionals</td>
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<td>Municipality services</td>
<td>Email</td>
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<td>Odd jobs services</td>
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<td>Order services</td>
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<td>Games</td>
<td>Shared agenda for informal carers</td>
<td>Lifestyle monitoring</td>
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<td>Recipes</td>
<td>Coaching (food, physical activity,...)</td>
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<td>House automation</td>
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D1.1 Requirements for Pathways and Integration Infrastructure

Whereas some services (video communication, social alarm and games) will target an older population in general, others (telemonitoring, care planning and medication reminders) will focus on chronic disease management. Besides tele-consults with the case manager, also video services and self-training modules can be developed for physiotherapy, psychological support and dietary coaching.

Additional motivators for the participation in the SmartCare services have to be worked out, such as intensive marketing focused not only on the user group, but specifically on the social environment of the user group and financial drivers provided by insurance companies, local and national governmental organisations that are financing healthcare could also become important motivators.

At this moment Verklizan is investigating the differences in the acceptance rate of Asisted Living Technology in four different countries (Holland, Germany, United Kingdom and Spain) in a Dutch funded IPC program, which can give important input to the acceptance of the services provided in SmartCare.

11.3.2 Organisational, staff and business related requirements

Healthcare and social care services are still often delivered independently. The Dutch healthcare system is based on the Bismarck model. Care is not only provided nor financed by the local or national government, but it also uses an insurance system and many independent private sector providers. The lack of a centrally organised healthcare system has resulted in a fragmented care market, and in the development of different systems for health and social care, that are not interoperable. In the fragmented Dutch care market, many initiatives exist next to each other, and the care organisations only look from their own narrow perspective. In the Netherlands various initiatives in the care sector have come to a success, focussing on EHR's, telemonitoring, independent living... Despite the success of various independent projects, there seems to be problems with integration, scalability and interoperability: Due to the current manner of how healthcare is organised in the Netherlands, the Dutch care sector lacks ownership, costs and benefits do not belong to the same chain partners, and the financing models do not reflect the current way of paying for care. Therefore, it is difficult to increase the care efficiency by innovative ICT solutions.

As learned from central care management in the UK, we can learn that in such a setting rigorous care innovations with eHealth are possible. Integrated care could offer a lot of added value for patients, care professionals and service providers. By involving all chain partners, and starting from the overall care picture, blockades from individual stakeholders are raised. Therefore, it is important to follow the example of the UK, and focus on a more centrally organized and integrated care delivery. Within the SmartCare project independent social and health care providers will join forces, to establish integrated care pathways for vulnerable elderly. By including health insurance companies in the SmartCare project, and adapting the financial models for care delivery, also cost-benefit shifts can be resolved.

Since the financial structures in the Netherlands are very complicated at this time, micro business cases are developed for regional homecare organisations to implement (early) indicator monitoring for a profitable introduction and validation the services. By involving local authorities and insurance companies in this process, support is created for national upscale.

The integration of SmartCare in the Netherlands will benefit from the realisations of earlier projects on integrated care and eHealth in the region, supporting social care,
telemonitoring and video-based physical exercise programs. The combination and integration of an ICT-system for patient management and a patient portal - an open service platform for communication and secure information exchange - offers a wide variety of new opportunities for integrated care and self management, including screen-to-screen communication, data exchange, and information provision.

From the guidelines for integrated care service delivery, developed by Smart Homes in the Independent project, we can extract requirements with regards to organisational, staff and business issues.

- Since staff members are the ambassadors for integrated eCare, it is important that they are convinced themselves about the benefits of sharing information and working together. Involving care professionals as experts in their field increases their motivation and willingness to participate. Additionally, they are interested in ways to increase care quality, patient satisfaction and workload reduction.

- In order to realize SmartCare acceptance by staff, it is of great importance to seamlessly integrate innovations in existing infrastructure and procedures.

- Motivated staff members that face restrictions on a technical, organisational and legal level, could break barriers on a higher level to align organisational, technical and regulatory aspects needed for optimal cooperation between disciplines.

- From a business point of view, real integration into current practice - and not as an experiment on the side - makes it easier to continue the service after the project has ended. Only then, it is possible to attune care processes to the new way of working.

11.3.3 Legal / regulatory / contractual requirements

The first phase of the SmartCare project will include an investigation of legislation and regulation, both on European, national and regional governance levels, which is likely to have a bearing on the design and implementation of the SmartCare pathway in the Dutch pilot.

In view of the immature nature of the integrated care domain as a self-standing field, it may not come as a surprise that no dedicated legal and regulatory framework has emerged in this domain as of today. Nevertheless, a number of policy/regulatory fields have relevance for ICT-enabled services directed towards the health, well being and independent living of older people in general. Together they provide a rather dispersed and patchy frame of reference for legal and regulatory guidance of the various actors involved, in particular when it comes to developing services that cut across existing domain boundaries such as social care and health care. Based on previous experience in similar projects, the list below is developed as a starting point for possible legal and regulatory requirements. During the SmartCare pathway development and implementation, the list will be refined accordingly.

- Data protection, data privacy and EHR
  - EU: Directive 95/46/EC: protection of individuals with regards to processing and free movement of personal data
  - EU: Directive 2011/24/EU: patients’ rights in cross-border healthcare
  - NL: Law on protection of personal data (WBP - Wet Bescherming Persoonsgegevens)
  - NL: Legislation on the use of the Citizen Service Number (BSN) in healthcare
D1.1 Requirements for Pathways and Integration Infrastructure

- NL: Medical Treatment Act (WGBO - Wet Behandelingsovereenkomst)
- In the Netherlands, the current situation about legislation on EHRs (EPD-wetgeving) is vague and unstable. Different bills and law amendments are currently discussed.

- Liability
  - EU: Directive 93/42/EEC: medical devices

- Licensing and quality control
  - NL: Law Occupations in Individual Healthcare (BIG - wet Beroepen in de Individuele Gezondheidszorg)
  - NL: Quality on Healthcare institutions act (Kwaliteitswet zorginstellingen)
  - NL: Medical Treatment act (wet Geneeskundige Behandelovereenkomst)

- Patient rights
  - EU: the European Charter of Fundamental Human Rights
  - EU: the European Convention on Human Rights and Biomedicine
  - EU: Directive 2011/24/EU: patients’ rights in cross-border healthcare

- Ethics approval
  - EU: Directive 2001/20/EC: clinical trials
  - NL: Medical Research Involving Human Subjects act (WMO - Wet Maatschappelijke Ondersteuning)

In cross-border use cases of integrated care, health data storage in an EHR and patient data exchange, the additional issue of legal interoperability arises. Different countries may have diverging legal requirements for the content or usage of electronic health records, which can require radical changes of the technical makeup of care pathways and EHR implementation in question. (in particular, when fundamental legal incompatibilities are involved) Exploring these issues is therefore often necessary when implementing cross-border solutions. To fulfill all legal and regulatory requirements a well thought plan have to be designed including electronic identification and authentication procedures for patients and carers, roll-based access categories, and data security measures like encryption.

11.3.4 Technology / functionality related requirements

In the fragmented Dutch care market, many systems exist next to each other, and the care organisations only look from their own narrow perspective.

So far, Dutch health insurance companies have invested money in various small scale pilot projects on ICT-supported care. Since all stakeholders in chain care are now confronted with the limitations of systems that are not interoperable, the focus is slowly shifting towards large scale integrated eCare and interoperable systems.

For the SmartCare pilot in the Netherlands, interoperable systems with open communication protocols will be used to offer integrated care services to elderly. The UMO monitoring centre of Verkлизан is such a system that can receive information from a large amount of products and services for telecare and telehealth on its open platform and can
respond and provide information to all possible participants in the care chain, in order to provide the right information based on received (early) indicators and to designate the right intervention.

**11.3.5 Any other requirements**

Ethics: The project will be subject to the standard procedure of approval by an EU-certified Medical Ethical Review Board (METC). This procedure takes normally 3 months.

Besides legal issues with respect to ethics, also non-legal issues have to be taken into account. Namely:

- Should the patient pass away, protocol to shut down platform access should be drafted
- Should the evaluation phase end or the project, then there should be an exit strategy ready, also to provide care recipients the possibility to buy/rent the equipment apart from project dependencies.
- Timing of access to lab data on the platform should be carefully assessed so as to allow sensitive information to be appropriately delivered to the patient/caregiver by the healthcare provider.

The sharing of patient information between health care organizations and IT systems is changing from a "point to point" model to a "many to many" one. The European Commission is supporting moves to facilitate cross-border interoperability of e-health systems and to remove potential legal hurdles, as in the project www.epsos.eu/ . The biggest challenges will relate to interoperability and legal clarity.
12. 2nd wave pilot site #5 - Uppsala (CCD)

12.1 Point of departure: The current service landscape

The Swedish healthcare system today is in many aspects a fragmented system. There are two major care deliverers, the County Council (including both hospitals and Primary Care) and the municipalities. Each has their own organization and IT systems. For patients with a chronic disease or patients with many contacts in both sectors, this means that they experience a somewhat non-coordinated treatment. Even though the Swedish healthcare system has a well-established system of electronic messages, each actor typically has their own IT system and can only in a limited way share and see relevant patient data. Especially different municipalities are organizations with difficulties in communicating across departments even though they share the same patients.

The electronic communication today consists mainly of the secure Swedish National Patient Overview (NPÖ), where standardized electronic basic information of Health Care services delivered to the patient are stored. The NPÖ stores for example the following information items:

- Health and care recipients
- Diagnosis
- Health and social care contact
- Medicines ordination
- Medicines prescription
- Received drugs
- Observation signal
- Examination results
- Care and related documents unstructured
- Padl disabilities
- Health and social care services
- Demand for care
- Health and social care plan unstructured

In Uppsala County there is a messaging system called “Prator” between the Health Care and Municipalities for exchanging data between organizations. Presently there are some national initiatives such as the Swedish National Patient Overview (NPÖ), where the patients’ basic data is kept updated and shared among the actors, in order to make sure that common health information is available to the actors.

The patients living in Uppsala today have access to their Medical Record through the public portal “Mina Vårdkontakter”, where they can see appointments, test results and more or less their medical record.

The purpose of the SmartCare service in the County of Uppsala is to gather and store remote monitoring data as well as all other relevant information in one overview, Hälsokonto (Personal health record). In this manner the Hälsokonto and NPÖ are supplements to the existing systems.
12.2 Initial use case scenario for the SmartCare pilot service

The focus will be on people with chronic diseases and aged over 20 who are suitable for remote monitoring of physical parameters at home, especially on those who are in need of both health and social care elements on a long term basis. When the patient is ready to be discharged from a hospital stay the responsible nurse fills out a discharge report in the hospitals IT-system (called “Prator”), which then is to be sent to the homecare department in the municipality. In this report is included information such as:

- General information on the patient and their relatives contact information
- Information on the cause of the admittance and the treatment delivered while in the hospital
- The patients current need for further care.
- An evaluation of the patients level of functions and a description of which social care elements that need to be put in place in the patients home

Hence, the hospital staff decides which care the patient needs when discharged from the hospital. They also send an electronic report to the Primary Care with relevant information on the patient’s needs. These messages are all automatically sent to the specific IT-systems in the different sectors.

So in this sense it is the hospital that takes the lead in assessing the patient’s needs for care services, both health care and some social care. The latter is planned in cooperation with the municipally staff in a discharge conference. In this discharge procedure it should be decided who is enrolled to the SmartCare service.

Social care professionals, the GP or the hospital staff select the patients to be entered into their system. GPs and the primary care as well as the hospitals already share their data in a common health records system. All relevant data can be reached through the NPÖ. The Remote monitoring data can be reached for the professionals if the patients give their consent.

The hospital sends a plan for physical rehabilitation to the municipality through the system called Prator, where they describe the patient’s need for support and training.

The patients also attend and receive relevant social and health care services with the involved caregivers being able to access the SmartCare platform to see and enter relevant information to be shared.

The nurse also evaluates the patient’s ability to perform home monitoring and if they are judged to be able they are given the opportunity to get home monitoring equipment. This is then ordered from the municipalities depending what equipment (in some cases the Health Care must be consulted), where employees set up the devices at the patient’s home and at the same time introducing the patient to its use.

Care professionals from the different relevant clinics in the hospitals as well as staff in the general practitioners offices and selected staff from the municipalities will be able to share data from their individual systems, use the SmartCare portal to support their workflow across sectors and to view data from the different caregivers. Information shared from the hospitals and GPs could be lab-results, measurements, notes, symptoms, diagnosis. They will also be able to see the information provided by the different actors such as patients and municipalities. Social carers will be able to see relevant information
about the patient’s disease and self care ability. They will also be able to see the information provided by the different actors, such as patients, hospitals and GPs.

In general the patient is called in for a check-up at their chosen general practitioner after the responsibility is transferred from the hospital to the primary Care. This varies among different cases as well as different diagnoses. Depending on the level of functionality and self-care ability home care may be reduced and the hospital passes the responsibility of check-ups and monitoring measurements made from home to the GP. When a patient needs acute clinical treatment he or she is admitted to the hospital where he or she receives the necessary treatment. The patients will remain in the long term care pathway until they are deceased or no longer willing to participate.

12.3 Envisaged implementation requirements

A set of implementation requirements have been identified so far deserving particular attention in the given local context.

End user requirements:
- In several projects concerning the barriers for a coordinated treatment there has been collected information on the patients’ needs and experiences. Those experiences represent the initial knowledge base for our vision about the end user requirements. These will be further consolidated

Organisational, staff and business related requirements
- There will need to be made specific analysis of the end-users current workflow and the changes that will be made to that when implementing the NPÖ, Prator and the EHR.
- How technology and it’s use on everyday basis of the staff, especially on the field, needs to be further analyzed.
- One common requirement is that those information sources must be integrated in the systems the staff is using in their daily work. E.g. it shouldn’t be necessary to log in different system to get a full overview.

Legal / regulatory / contractual requirements
- In Sweden there are some regulations to have in mind.
- The most important legislation is the Personal Data Act, Patient Data Act and the Social Services Act,

Other requirements
- The system will need to accommodate existing national standards.
13. 2nd wave pilot site #6 - Kraljevo, Serbia

13.1 Point of departure: the current service landscape

Kraljevo is a municipality located 180 km from the capital city of Serbia. It is one of the cities which the old and the majority of the population is between the age of 50-59 years, it their 10.585 inhabitants. Also large population occurs at the following age ranges from 60 to 64 years (8.673 inhabitants), from 65 to 69 years (5.837 inhabitants) and with over 70 is around 17.000 inhabitants. That city going old is the fact that the average age is 42.3 years, the number of pensioners in the city is 22,689.

In Kraljevo city the basic unit of social protection is Centre for Social Work, established in 1960, and the Gerontology Centre to accommodate elderly. Within the Health Centre Studenica, PHC operates as a separate organizational unit for Home care. As a part of the Health Centre, operates Emergency Services as well as all the hospital wards and the admissions department for admission of patients to hospital. All these services are connected and share information in writing. In the general medicine there are 26 ambulances with 54 teams in the municipality, which is considered a significant resource in the implementation of this program.

According to the data available to the Centre for Social Work, in 2012 services of the social security system is used by 1.865 persons of older population, out of them 1072 were from the urban areas. Looking at the structures of clients, and their household, majority of them are elderly households (1567), singles (145 persons) and 151 persons are chronically ill.

As for social vulnerable elderly clients, 830 persons received some kind of financial aid in 2012. During this year, 32 elderly clients received foster accommodation, and 185 were accommodated in social protection institutions. 578 elderly clients were entitled to receive social care and support services, of which 279 had a degree of physical disability of more than 70%.

According to data of PHC (Primary Health Care Information system) the Home care service currently provides for 1750 chronically ill persons. Home care services are also provided by five remote peripheral ambulances which enables accessibility to the patients in remote areas of the city of Kraljevo.

Bearing in mind the population and territorial characteristics, the Centre for social work Kraljevo (SCP) together with local self-government is keen to promote active care and to provide elderly clients longer stay in their homes and extend independent life.

Thus, services for elder clients were developed on the local level: Help in home service (30 users), Social housing with supportive condition (35 users), a Day care centre for elderly citizens (160 users). During 2012 there were 8 elderly persons in high risk condition and it was necessary to respond with urgent intervention/separation and emergency accommodation. For that purpose on city level there is an urgent accommodation facility in a Gerontology centre and urgent accommodation in foster families is available.

Currently no electronic communication channels exist that would connect:

- the Studenica Health Centre Studenica (HCP) and the Centre for social work Kraljevo (SCP)
D1.1 Requirements for Pathways and Integration Infrastructure

- Primary health care department/GP information system (PHC) and the module for admission/discharge inside the Health information system
- Care Recipient (CR) and/or I/FC (Informal/Family Carer) and SCP/HCP information systems

An example of the current negative consequences of this lack of communication when providing health/social care are:

- Unnecessary home visits from HCP or SCP due to non-existence of information exchange between the two institutions. This disturbs the planned work of institutions, waste resources and started a procedure of finding CR.
- Unnecessary home visits from SCP not knowing that CR is hospitalized.
- Not timely or delayed alert for SCP when the patient (CR) is discharged from hospital. This causes an extended number of bed days in the hospital and social care services are not ready to plan and provide best care.

Given the national strategy on aging, as well as the national strategy for the development of social and health care and the local strategic plan for social policy of Kraljevo for the next seven years, the SmartCare model is a challenge and opportunity to provide even more users to extend independent life. The wider deployment of ICT is considered beneficial in order to reduce the effects of the above poor practice allowing efficient operation HCP and SCP and therefore better care for CR. In the project, we attach great importance not only to appeal to local authorities, but to the ability to provide older people with a much broader range of services in the field of social and health care through a coordinated approach to the two systems, which can provide integrated care in an optimal and sustainable manner, ultimately leading to improved quality of life for the elderly.

13.2 Initial use case scenario for the SmartCare service

The following eligibility criteria for participation in the SmartCare pilot services are envisaged at this stage:

Health criteria for care recipient:

- people with disabilities (wheelchair, blind, ...)
- people with chronic disease
- post-hospitalisation with long term care/monitoring needs

Social needs criteria:

- elders 60+
- living alone
- living with a partner or cousin who is/are also elder or people who are also dependent of the health or social care or carer’s allowance
- living with family but family unwilling to engage in care
- an existing carer is temporarily prevented to provide care due to illness or absence
- living in a family in which there is an expressed dependence on alcohol, drugs, or a psychiatric illness
- living in a family where there is a suspicion or risk of abuse and neglect of the elderly
• Elderly person who is a financial and/or residential threatened

Legal criteria:
• Using SmartCare services requires the consent of the participant (older people) or his guardian.

Potential CRs (Care Recipients) will be identified by health or social care professionals depending on who is the first point of contact for a potential CR. During routine service provision activities, an SCP (Social Care provider) could recognize if elder persons need health care and notify the relevant HCP (Health Care Provider), i.e. the home care department or emergency health service. Also, health professionals - during contact (at home, policlinic, hospital etc.) with an older person - could identify if this person is in need of social care. In such a case, the health professional notifies the admission office in the Centre for social work Kraljevo.

When it comes to people who stay in hospital, in the course of admission/discharge procedure, hospital staff would complete a nursing admission sheet / discharge paper (in electronic manner). With the CR discharge letter goes a Nurse letter (also in electronic manner) created from data in Integrated Care Record, which describes the CR problem when he/she admitted, the pathway and outcome of care and status at discharge and treatment. This letter is to continue monitoring the CR at home and lets us know in case of re-hospitalization and his health condition.

A social care worker in the admission office prepares documentation for the CR and forwards this documentation to the Office for Adults and Elderly where the CR will be assigned to a social care professional responsible for the coordination of the CR inside the health/social care system and for the initial needs assessment. This assessment is made based on consultations with the CR and/or his informal/family carer and data on his health status and all other available data about the CR (history data from social care records and integrated care records).

If the CR needs hospital treatment, his selected GP creates a referral letter for hospitalization and notifies all actors (SCP and I/CR) to timely respond and prepare for needs assessment. In an emergency case, information about the CR admission/discharge to/from hospital will be shared by the SmartCare system with all actors.

For the purposes of SmartCare, an integrated care team will be responsible for the care plan and care delivery. It is envisaged to be composed as follows:
• social care professional assigned by Adults and elderly office (and if necessary other social care worker - depending of CR needs),
• health care professional (selected doctor, nurses, health home team, ...)
• informal or family carer (if exists)

Depending of social and health status of the CR team for integrated care will define initial integrated care plan. Team for integrated care is responsible for coordination and care delivery. The following types of social services are envisaged:
• Service for home care ( house cleaning, preparing quick and easy meals, washing and ironing, help with personal hygiene, food supply, medicines and other supplies, walking assistance, communication with other institution of importance for users, contacts with HC and SC)
• Short term financial support
D1.1 Requirements for Pathways and Integration Infrastructure

- Regulating the rights of social welfare and family legal protection (right to receive and increase other care and help, social assistance and care protection, etc.)
- Urgent accommodation in emergency situations (impairment health status, the service can not meet the need of CR in accommodation) shelter for the elderly mentally ill, urgent foster care, urgent accommodation in Gerontology Centre.
- Long-Term housing in appropriate institution, if it’s the only solution to the current situation of the user.

Types of health care that are envisaged include the following:
- Visits and physical of the CR by the home care team (doctor - nurse)
- Electrocardiographic physical
- Preparation for Parenteral therapy in home condition
- Wound treatment in the field
- Installation and replacement of catheters and flushing of the bladder
- Patient care education

Types of services addressing mainly informal carers and the CR (self-care, if CR is capable) will include the following:
- Home support (house cleaning, preparing quick and easy meals, washing and ironing, help with personal hygiene, food supply, medicines and other supplies, walking assistance, communication with other institution of importance for users, contacts with HC and SC)
- Part of the work that Health Care works in field (blood pressure, sugar blood and other health care...)
- Timely notification HCP and SCP on health and social condition of CR

Depending on the needs of the CR and the integrated care plan to be defined remote care delivery such as telemonitoring or teleassistance will be delivered as well. These services will reduce the need for on-site delivery of care or allow for its better preparation and more effective delivery (e.g. through advice, appointments, reminders, alarms, etc.).

All activities in the integrated care plan will be inserted in an Integrated Care Record (visits, interventions and activities by HCP, SCP, FC and CR (self-care)). Depending on the actor role in the system, the care record will enable different views of the content, based on the user role. Through the Integrated Care Record with defined reminders and alarms feature, HCPs and SCPs will be enabled to effectively monitor/control the health and social situation of CR. Depending on achievable changes in the user’s self-care ability the professional care delivery may be reduced and future plan for care may be more efficient. Depending on the integrated care plan, the CR could be temporarily admitted to the hospital or a specialized institution of social care. Access of integrated care record should be very useful for such institutions to provide adequate care.
13.3 Envisaged implementation requirements

End user requirements:

- The majority of the envisaged users will most likely be unable to use advanced technology without any help or advice. Targeted capacity building measures need to be carefully planned and conducted against this background.

Organisational, staff and business related requirements:

- Adaptation of current workflow will be required, mainly targeted towards healthcare providers and social care providers in using integrated data of the CR and creating an integrated care plan.
- This task will require careful training of all actors (social, health, informal carer and care recipient), with a view to enabling them to effectively exchange information, data, reminders, alerts and using ICT solutions more generally.

Legal/ regulatory / contractual requirements:

- In particular the integrated database needs to be designed in a way that should be designed, to define what set of data are legally available to exchange.

Technology / functionality related requirements:

- Secure connection for exchange of data between HC and SC will need to be established.
- Existing solutions already in operation at the part of the health care provider organisations, i.e. a web based solution, will need to be adopted for Social Care Professionals in receiving/viewing selected data.
- A call centre does not exist in both Institution and that is a chance to implement integrated call centre and Message Dispatch System for alarm, alerts, reminders, notifications.
- At the part of the social care provider organisations, some legacy system are in place as well (database and social care record of clients) and these will need to be integrated into the SmartCare solution as well.
- Access to the integrated infrastructure will need to be enabled by desktop devices (e.g. PCs located in an office environment) and mobile devices (e.g. mobile phones) used by health and social care staff and for some remote delivery of care.