

## D4.5 Field Test Report Version 2

WP4: System Implementation and Test

Version 1.0, 3<sup>rd</sup> September 2014

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## Document information

### Abstract

This document describes the field test procedures as planned (first and second wave pilots) and performed (first wave pilots) before the launch of the pilot's operation. Consequent actions in case of problems identified after analysis of the tests results are also discussed.

### Key words

Field Tests, Integrated Care, Prototypes, Evaluation methodology, User Interface, Electronic Health Record.

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### Outstanding Issues

None

### Filename

D4.5 v1.0 SmartCare Field Test Report (V2)



### Statement of originality

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

### Executive summary

This deliverable describes in detail the prototype validation mechanisms per site before the official launch of the pilots. This particular validation mechanism is known as field test, as it is conducted in conditions as near as possible to the actual operation.

Both Version 1 (D4.2) and Version 2 (D4.5) describe mostly the first wave pilots, however second wave pilots also appear in the versions with varying degrees of maturity per site. As launch dates vary, this deliverable will be updated till all sites start their pilots in order to accurately report on all field testing and consequent actions.

All sites have to answer the same set of questions; these are:

- Introduction, Scope and Objectives.
- Methodology.
- Users, Time and Location.
- Prototype Description.
- Evaluation.
- Conclusions and Further Work.

The individual conclusions and further work sections per site reflect the level of existing infrastructure as well as the maturity of the solution and the overall implementation plan. It is important to note that all sites expect to run evaluation sessions prior to official pilot launch, to make sure that functional requirements are met.

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# 1. Introduction

## 1.1 Purpose of this document

The scope of this deliverable is to describe in detail the prototype validation mechanisms per site before the official launch of the pilots. This particular validation mechanism is known as field test as it is conducted in conditions as near as possible to the actual operation.

D4.2 comes in two versions, Version 1 and Version 2. Version 1 focuses mainly on the first wave pilot sites, which by now have proceeded with the setup of the required infrastructure to host extensive testing before launch of the SmartCare services. Second wave pilot sites also appear in Version 1, but despite the fact that they provide input under the same headings, the depth of analysis varies according to the degree of maturity per site.

Version 2 (the current deliverable) reports on updates per site before operation. It will be updated constantly till all sites launch their pilots.

## 1.2 Structure of document

There is one section for each pilot site. The structure of information per site is identical. The topics discussed are the following:

**Introduction, Scope and Objectives:** This section is dedicated to explain briefly the scope of each site and to state the objectives as these were set out in the Technical Annex. This set of objectives, materialising into technical and functional specifications, is the guideline against which performance will be measured.

**Methodology:** Testing, depending on the implementation under scrutiny, can be a very complex process, so the descriptions per site vary according to the size and maturity of the offered service. A common principle for establishing a sound methodology is to follow closely the objectives set from the early stages of designing the services.

**Users, Time and Location:** Criteria and selection process for the end users participating in the field tests will be detailed, as well as the time frame and/or duration of tests and the available venue or venues including the end users' home environment.

**Evaluation:** Evaluation in the SmartCare context is defined as a continuous process; field tests are no exception to this. In this section, the means used for the site should be described in detail and adequately explained.

**Conclusions and further work:** The test results will have an impact on the original design, as well as the implementation followed for the offered services. In case problems are identified, then there will be consequent actions in an effort to rectify them and return to operation according to all technical and functional specifications. Even if operation is flawless, there are other parameters that might be identified that could benefit from reconsideration, e.g. promotion or educational material for the end users / patients or training and technical support issues for the professional end users and technology provider.



### 1.3 Glossary

API	Application Programming Interface
EHR	Electronic Healthcare Record
FVG	Friuli Venezia Giulia
GP	General Practitioner
HCP	Healthcare Professional or Health Care Provider
ICT	Information and Communication Technology
I/FCP	Informal / Formal Care Provider
IS	Information Systems
LiU	Living it Up (Scotland)
RSD	Region of Southern Denmark
SCP	Social Care Professional

## 2. Prototype FVG (1<sup>st</sup> wave pilot)

### 2.1 Introduction, Scope and Objectives

FVG ended the procurement process for the SmartCare service at the end of April, and the signature of the contract to the awarded company was foreseen for mid-June.

Because of the appeal and the related review, the procurement process lasted two months more than expected. The company awarded the contract, HeS (from Piacenza, Italy), finally signed the contract on 16<sup>th</sup> July 2104.

FVG/ASS1 SmartCare staff started immediately to work with HeS to tailor the ICT platform and service to integrated care specific needs based on the SmartCare LTC and post-discharge pathways.

The platform and service details were set in the first weeks of August; they are going to be shared and finalised at regional level in the last week of August. A round of meetings with health and social care professional involved in the deployment, together with GPs, are planned in the regional Health Districts as follows: Palmanova on 6<sup>th</sup> August, Trieste and Gorizia on 26<sup>th</sup> August, and Pordenone and Udine on 27<sup>th</sup> August.

Training has already started for the staff of ASS1/Trieste and Palmanova.

The test phase will start at the very beginning of September, and will last one month. The deployment will be fully operational by the end of September.

An update of D4.5 with all the details related to FVG field testing will be issued by mid-October.

### 3. Prototype Aragon (1<sup>st</sup> wave pilot)

#### 3.1 Introduction, Scope and Objectives

For the successful provision of services and coordination of the agents providing integrated care within the SmartCare project, it is necessary to design, develop and implement a set of building blocks and functionality not already covered by existing infrastructure and services, neither by SALUD's information systems, nor by the various participating social and informal providers of the project.

The main objective of the SmartCare project is to provide a common framework that allows all agents easy access to all the information needed to coordinate actions in providing integrated care. Likewise, it is aim of the project to ensure that the protocols of actions in the different organisations are not heavily modified, so as to guarantee the continuity of developments and successful future use, minimising the impact on procedures. Therefore, this framework should allow:

- a) access to information from different information systems, integrating those data that will permit easy access to all the information needed for the provision of a service at a single site;
- b) access to the agenda of integrated care that allows coordination of actions by different suppliers; and
- c) consultation of the event history of actions performed.

Since the web site is a place that combines information from different information systems from different vendors, the scope of the testing phase is not the evaluation of the functionality of already existing systems, but the new developments. That is, the ones implemented within the scope of the web portal.

Different objectives pursued in the testing phase:

- Implementation compliant with the requirements. Requirements are very often not well defined in the initial stages, and/or they vary over time. Therefore, the testing phases permit modification of the implementation to ensure that the requirements are fulfilled.
- Ensure its use: The use of a solution depends on several criteria, but the testing phase will permit enhancement of many facets that ease its future use (i.e. compliant with requirements, user-friendly interfaces, corporate look & feel, compliant with current procedures, etc.).
- Reliability and quality assurance.
- Performance of the system. Performance is an important feature of any computer system. In some cases, this can directly influence its usability while in other cases; it may directly invalidate the purpose of a system. Performance tests seek, at the lowest cost possible, to minimise these problems as much as possible.
- Agile and ensure fast development.
- Implementation at the minimum cost. Beginning the testing phase at early stages of the implementation should help to minimise development costs.

### 3.2 Methodology

The solution will be to implement a methodology that permits the development team to implement quality software, at a low cost, and quickly. Therefore, the strategy will be to involve all actors in the testing phase from the start of the development.

The testing methodology will consist of the following steps:

- Management of the resources and environments to reproduce the live environment. After the phases of analysis, design and development, the software will be tested in an isolated environment on a pre-production server that will have similar conditions to the production server, to ensure its proper running in that future phase. The aim is to minimise the uncontrolled differences between the development and production environments. Server, databases and middleware will be set up with same configuration as in the production environment. Testing will be performed, followed by migration to the production environment.
- Definition of the cases to test: A clear identification of the modules to test will be defined so as to test the just newly developed modules. This step will also ensure that current procedures are minimally impacted, and that the solution is compliant with the requirements.
- Continuous testing. The later an error is detected, the more expensive will be its correction. Therefore, the methodology is oriented to the early detection of errors in the development and implementation phases, and on the potential risks to the project. The people that will be testing will be involved from the early phases of the implementation of the software, and will be testing continuously.
- Distribution of the test workload and the responsibility of the tests between different users / teams of users. Different types of users will be chosen for the different tests, so that they form an evaluation team that covers all the points of view, avoiding single points of view or conflicting priorities; i.e. usability, healthcare and social care protocols, compliance with requirements, ensure software quality, performance, etc.
- Avoiding the cost of the transfer of knowledge, by involving staff from the health and social organisations in the testing.
- Shorten the correction cycle. As soon as errors are detected, they are solved, so that there is no long period between versions. That is possible through the involvement of both testing and user staff in the development phases.

The development will be guided by a test-driven development (TDD), where there is a cycle of development, transformation of requirements into unitary tests, testing, solving of errors, and a new cycle of tests. The aim of this test-driven development is to get clean working code that guarantees that the software is compliant with the established requirements.

### 3.3 Users, time and location

Traditionally, the burden of testing was concentrated in the areas of Quality Assurance testers, which in some cases caused conflict of interests between the developer and the tester, or resulted in software invalid or useless for the final users, as their expectations were not met. The SmartCare approach will be to involve in testing as many different users and roles as possible.

Therefore, the software developer, the test analyst, and the quality assurance user will perform modular and unit tests, along with “stress testing” to ensure that any module of

the system works correctly in an independently manner. These persons have a vast experience that permits them to detect large number of errors in minimum time.

In addition, other persons will play a significant role, with different interests to the developer and testers. These are the final users, who will participate from the beginning of the development. Social workers, healthcare professionals; GPs, nurses and specialists, and informal cares will be involved in the testing. These users will identify errors related to procedures, meaning of information, etc., which are not related to the coding, but to the caring systems and proper working and coordination, and that will ensure that the software, after their approval, will be useful and valid for them to perform their daily tasks correctly.

The timeline for testing, as already stated, will be for the whole duration of software development. The start of the development is January 2014, with parallel testing tasks. By the start of the pilot in May 2014, the first version of the software development will be ready and tested, and migration to the production server will be performed. For a couple months, the testing and development phases will continue so as to collect feedback from all users, and implement any new requirements or software adaptation if needed, resulting on a new version (v2.0).

Id.	Nombre de tarea	Comienzo	Fin	Duración	T1 14			T2 14			T3 14	
					ene	feb	mar	abr	may	jun	jul	ago
1	Development	01/01/2014	16/05/2014	19,6s	█							
2	Testing	01/01/2014	16/05/2014	19,6s	█							
3	Start of pilot (v1.0)	28/05/2014	28/05/2014	0s				◆				
4	Enhacements	02/06/2014	18/09/2014	15,8s							█	
5	Testings	02/06/2014	18/09/2014	15,8s							█	
6	Enhancements (v2.0)	25/08/2014	25/08/2014	,2s								

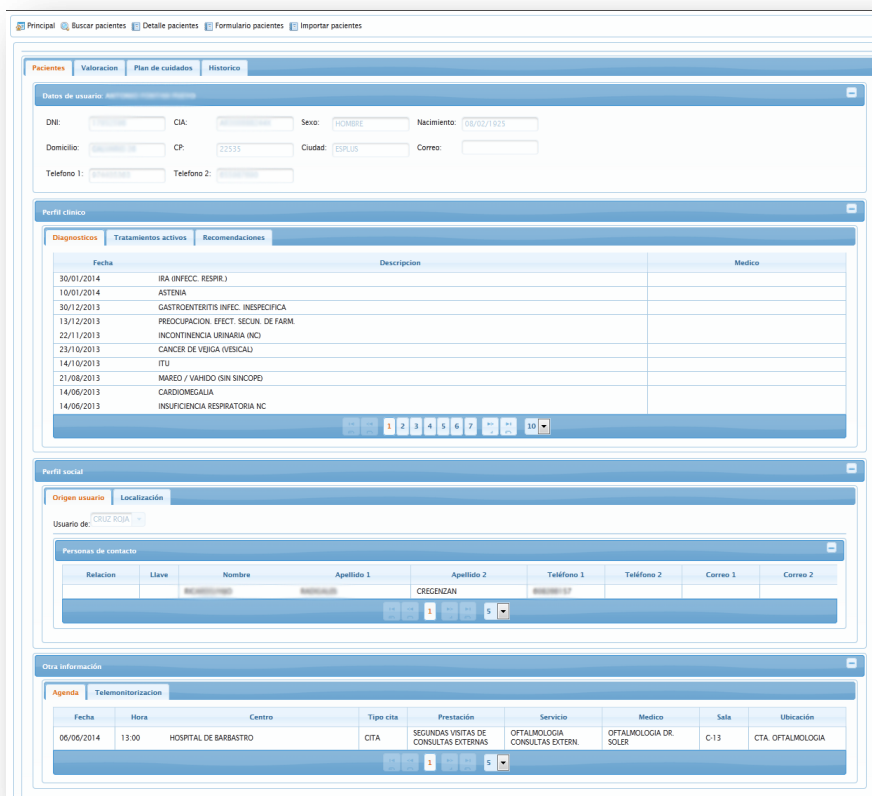
Figure 1: Gantt diagram for testing

### 3.4 Prototype Description

The Aragon SmartCare Integrated Care Portal is a web portal composed of information coming from the different service providers' legacy systems, databases and records, and information generated from the development of the SmartCare system. The website will have different views and roles for the different type of users.

The web portal will permit access to information from different information systems, integrating those data that will permit:

- easy access to all the information needed for the provision of a service at a single site;
- access to the agenda of integrated care that allows the coordination of actions by different suppliers; and
- consultation of the event history of actions performed.



Principal | Buscar pacientes | Detalle pacientes | Formulario pacientes | Importar pacientes

Pacientes | Valoración | Plan de cuidados | Historico

Datos de usuario

DNI:  CIA:  Sexo: HOMBRE Nacimiento: 09/02/1925

Domicilio:  CP: 22535 Ciudad: ESPLUS Correo:

Telefono 1:  Telefono 2:

Perfil clinico

Diagnosticos | Tratamientos activos | Recomendaciones

Fecha	Descripcion	Medico
30/01/2014	IBA (INFECC. RESPIR.)	
10/01/2014	ASTENIA	
30/12/2013	GASTROENTERITIS INFECC. INESPECIFICA	
13/12/2013	PREOCUPACION EFECT. SECUN. DE FARM.	
22/11/2013	INCONTINENCIA URINARIA (NIC)	
23/10/2013	CANCER DE VESIGA (VESICAL)	
14/10/2013	ITU	
21/08/2013	MAREO / VAHIDO SIN SINCOPD	
14/06/2013	CARDIOMEGALIA	
14/06/2013	INSUFICIENCIA RESPIRATORIA NC	

Perfil social

Origen usuario | Localización

Usuario de:

Personas de contacto

Relacion	Llave	Nombre	Apellido 1	Apellido 2	Teléfono 1	Teléfono 2	Correo 1	Correo 2
				CREGIZAN				

Otra información

Agenda | Telemonitorización

Fecha	Hora	Centro	Tipo cita	Prestación	Servicio	Medico	Sala	Ubicación
06/06/2014	13:00	HOSPITAL DE BARBASTRO	CITA	SEGUNDAS VISITAS DE CONSULTAS EXTERNAS	OPFTALMOLOGIA CONSULTAS EXTERN	OPFTALMOLOGIA DR SOLER	C-13	CTA OPFTALMOLOGIA

Figure 2: SmartCare Integrated care portal example

Therefore, the following functional modules will be implemented:

- **Identification of users:** The identification of users is critical to ensure the security of patients. Patients can access their summarised EHR through their digital certificate on their National Identification Card. Moreover, users are identified differently by the SALUD organisation (by the Healthcare Card) and by the social care providers (by National identification number or name). Therefore, a user identification mapping will have to be constructed so as to properly identify users on the different information systems.
- **Search of care receivers:** This module will enable a search for care receivers on the SmartCare database.
- **Care receiver profile:** This will show the personal data and contact persons' data, and the integrated care shared EHR (minimum social and clinic data set). The health profile will show the diagnosis, drug prescriptions, recommendations, etc. The social profile will permit to consult information coming from the different social providers' information systems. The agenda for health events / consultations will also be included in this module, along with telemonitoring information.
- **Assessment module:** The assessment module will allow sharing of the different evaluations performed by the different actors at different times, which will be accessible to the SmartCare Evaluation Committee through the SmartCare portal. These assessments will be those of health assessment, social risk assessment from different providers, function of the family role, etc. Pdf scanned documents or other formats can be reached.

In addition, this module will be used by the SmartCare Evaluation Committee to justify the inclusion or denial of participation of a user into the SmartCare

programme (based on the previous documentation). And if the user agrees to participate, the signed consent form will be linked.

- **Integrated Care Plan Module:** This module will create a first approach of services requested by the user and an integrated care plan. Its main functionality is the definition of the services required, the social provider in charge of providing the service, the status of the applications, and the plan of activities to perform together with its frequency and those responsible. This will allow coordination of actions, agents and providers to ensure integrated care.
- **Integrated Care Record Module:** This will permit not only the definition of the Integrated Care Plan, but also hold a history of records on the integrated care, with information about the provision of services: services provided, actions performed, agents responsible, etc.

### 3.5 Evaluation

Although an evaluation on the testing phase is not planned, a review of the process can be performed at the end of testing.

### 3.6 Conclusions and further work

It has now been more than four months that the Aragon pilot has been up and running. No updates were required after the conclusion of field testing as the results were considered satisfactory. No deviations from planning have been experienced, and the pilot continues full force, thus demonstrating an effective testing process.

## 4. Prototype Scotland (1<sup>st</sup> wave pilot)

### 4.1 Introduction, Scope and Objectives

The aim of SmartCare in Scotland is to "improve the health, care and wellbeing of 10,000 people aged 50+ within Ayrshire and Clyde Valley, by enabling a better co-ordinated and more effective approach to falls prevention and management ... focusing on the role that ICT services and applications can play in supporting integrated care".

The SmartCare programme will link service provision across health, social care, family, informal cares and the third and independent sectors. It will use familiar technology to support people and their carers, to share information about their health and social care needs and coordinate the daily activities which keep them independent.

The existing platform of Living it Up (LiU) ([www.livingitup.org.uk](http://www.livingitup.org.uk)) was developed over 2012/13, and will be used to support SmartCare.

Initial on-site testing of the LiU technology platform to be used for SmartCare will be undertaken by two local health and social care partnerships in the Lanarkshire area in May 2014. Subject to the outcome of this testing, use of the platform will then be extended to the other five partnership areas over June and July 2014. To identify the ICT tools necessary to integrate care pathways across organisations and locations, a SmartCare Implementation Sub Group was established in November 2013. The group includes the Programme Manager, local Project Managers, and other support resources as appropriate.

From October 2013 to January 2014, this group has scoped out the service improvement opportunities and gaps which need to be addressed by ICT in support of better integration and co-ordination of the falls management and prevention pathways. In particular, the group has reviewed how existing technology and platforms can be opened to cross sectoral teams (acknowledging many of the challenges around data governance and the plethora of IT systems within the public sector). It was agreed that suitable technology and platforms need to support:

- Increased collaboration across agencies to develop the local falls service to address common aims as set out in national guidance.
- Improved data collection which indicates the number of fallers and nature of outcome.
- Improved ability of service users and carers to better manage chronic health conditions at home and deal with increasing frailty.

All of the work to date has helped inform the service and technical requirements of the SmartCare model. This consists of four main components:

- **Community Connector:** SmartCare will support self management and well being by linking staff, users and carers to relevant information, services and products in their chosen community. SmartCare will use the existing LiU digital platform which currently operates across five geographic regions in Scotland as a cost effective and innovative solution to link them to their 'circles of care'. LiU has functionality to support an intuitive information search engine which will pull personalised information, services and products towards the person and their interests based on information captured within a personal profile. Scoping of the relevant information, products and services in relation to falls management and prevention is already underway (being led by one of the Project Managers), and a Community Manager Post is in the process of being recruited to brand and upload the SmartCare resources onto the LiU platform from April 2014.



- **Care Co-ordination:** In support of more effective care planning and co-ordination for the individual and their carers, a web-based digital diary / calendar and associated tools will be developed. Initially, the health and/or care professional will work in collaboration with the individual and their family and friends to complete a person centred diary which is then shareable with a range of relevant care providers and the person's 'circle of care'. We are exploring the best links with health and care systems in the local areas with a view to supporting service providers to make appointments / send reminders / share information. The diary will be designed in a way which recognises the challenges for family carers and people living with dementia.
- **Person Held File (PHF):** This digital file will support the person to retain information on their health, care and wellbeing. Updates from GPs, community nurse, social workers, etc., can be stored in the PHF; it is anticipated this can be used in emergency situations, out of hours, etc., to help prevent inappropriate admissions to hospitals and care home. The person's anticipatory care plan (ACP) and Key Information Summary (KIS) could also be stored in the PHF for review and updating over time.
- **Digital Tools for Independence and Re-ablement:** Digital tools for self assessment, screening and multi-factorial assessment will be developed to ensure an accurate assessment of need. Service delivery programmes of intervention will be supported by exercise apps using gaming techniques and personal outcomes to sustain motivation and improve confidence.

The Living it Up technology is now available across all seven local partnership areas. In the initial two months, May and June, feedback was collected regarding use of the LiU platform for people recovering from falls, carers and service providers. Key points made were:

- Initial registration seemed lengthily.
- More local information required.
- Quick links need to be established to other local health and care websites and local authority websites.
- Replication needs to be avoided.
- It looks good "not an oldies website".

All of the above feedback is being addressed, and we continue to collect feedback and adjust the presentation of the site and the content accordingly:

- Working groups have now been set up around the four key concepts.
- Community connector.
- Care Coordination.
- Person Held File (PHF).
- Implementation and Enablement.

The working groups will re visit the designs of each digital tool, and ensure service users and carers are involved in co-producing the final ICT tool.

## 4.2 Methodology

The first stage in approach to developing digital services to support and integrate the falls pathway was to consult widely with all the key stakeholders involved in the delivery of the

falls services and people using the existing service. We needed to develop a broad consensus on the redesign of the pathway and the type of digital solution we could bring to the pathway to improve integration and co ordination. To achieve this, a number of consultation events were held.

**October 2013:** This event was an event specifically for users and carers, and was held as part of Scotland's Telehealth & Telecare week. The event took place at Scotland's national football stadium at Hampden Park on 31<sup>st</sup> October 2013, and involved 165 participants. In addition to a large number of users and carers, there were representatives from each of the three Health Board and seven Local Authority partners involved in the project, plus Scottish Ambulance Service, Scottish Fire Service, Police Scotland, Telecare & Telehealth service and equipment suppliers, Carers UK, Alzheimer's Scotland, Telecare Services Association, Quarriers Scotland, and NHS Forth Valley. The purpose of this event was to raise general awareness of SmartCare with carers / service users and patients, and to highlight how technology can support their health, care and wellbeing; to offer an introduction to the programme which will be progressing in their local area; and to encourage service users / carers and patients to become involved in co-designing and developing care pathways, and to understand the benefits of using assistive technology to support them in the community.

**January 2014:** This event was also held at Hampden Park in Glasgow and was branded as a SmartCare 'Show & Tell' event. There were 186 participants at the event, and 21 industry / technology suppliers exhibited their products to a wide range of staff, users and carers. (Ref: Feedback Report from Show & Tell Event). The specific purpose of the Show & Tell event was threefold. It aimed to engage potential industry partners in the project, and review current technology offerings and products which could be of interest. It also raised awareness and understanding of service providers, users and carers on the effective role that technology could play in the service redesign of integrated falls pathways, and in supporting individual health and wellbeing.

A key outcome was the commitment to forming local reference groups to co-produce the SmartCare digital solutions and test prototypes as they emerge.

Each local area has also held events to further progress implementation. The outcome of these events will be local reference groups who will work with us to complete the design of the SmartCare ICT tools.

The LiU platform is currently undergoing adjustments to include the geographical areas of SmartCare. This work will be completed for the go-live in May 2014.

In addition, preparation work on the Community Connector element has commenced. A sub group to the Implementation Group is currently mapping, reviewing and importing local information and tools relevant to falls management and prevention across the seven partnership areas. This information will be complete for the Lanarkshire Area by the 1<sup>st</sup> May 2014, with planned expansion to the other areas during June and July 2014. Sub groups for the three other ICT elements have been established with a clear lead role in place.

The LiU platform has undergone adjustment to include all the geographical areas of SmartCare. The work required on the Community Connector Element has progressed, but still needs additional work. Feedback on the texting phone of LiU has resulted in changes. These are shown in Table 1.

Table 1: Feedback received and actions understaken

Issue	Action
Locality specific information	Improve speed of populating site. Review priorities and capacity
Speed of logging on	Enterprise architect is reviewing process
Preventing duplication with other related sites	Links are clearly established to pull existing sites into living it up and vice versa
Making best use of established sites e.g. local councils	Links are clearly established to pull existing sites into LiU and vice versa

The formal tendering process was launched in early April 2014, with the issuing of a PQQ invitation. The aim of this is to identify partners who will work in collaboration with Scotland to cost, develop and implement the remaining three ICT components of the SmartCare model. A reduced scope may be required if costs are unaffordable. Any partners will be required to meet the open standards approach adopted in LiU, and use the API guidelines. All additional ICT tools and developments will require to be embedded within the common LiU platform to ensure integration, better communication, and support care co-ordination. This work will proceed over the next three months.

An audit of existing systems in each local area has been undertaken to ensure we establish the potential to link with existing local systems.

### Procurement

The procurement process was delayed by 35 days due to a mistake in the original PQQ document issued in April. The advice from legal services was to correct the mistake and reissue the document. This was done, and the invites to tender were issued on the 14<sup>th</sup> July with a closing date to return on the 19<sup>th</sup> August. These bids will be evaluated on 26<sup>th</sup> August by users and carers, with the final panel on the 2<sup>nd</sup> - 3<sup>rd</sup> September. Contracts will be issued to suppliers by the end of September, and the co-design work with users and carers will begin. The three SmartCare ICT tools being developed to sit on LiU are expected to go live at the beginning of January 2015.

### 4.3 Users, time and location

Three project managers from each of the local areas have received a briefing on the existing LiU platform, and are now using the site to identify opportunities for development specifically in relation to falls management and prevention. They have also introduced LiU to service users and carers at the local events, and collated feedback on the relevance of the site to people who have fallen or are at risk of falling. This feedback is being used to develop the LiU platform to accommodate the needs of SmartCare users. At present, this has involved 45 users and carers.

Approximately 60 staff have been introduced to the site, and again their feedback is being used to further develop digital services on the site to support their falls prevention work. Staff have been particularly interested in the connect service which can facilitate consultation with professionals, or enable the person to participate in local exercise classes even though they are housebound.

This activity has ensured we have a well-informed group of users, carers and professionals on the LiU site, providing feedback on how it can be adjusted in preparation for the new ICT tools.

From 1<sup>st</sup> May 2014, a larger number of people receiving falls services for recovery and prevention will be using the LiU site.

Update: At August 2014, the LiU now has 67 people registered. At present we can report on geographical areas and over the next month we will be able to define the registered users in more detail, e.g. carer, service user, professional.

#### 4.4 Prototype Description

A key element of new development will be a small set of SmartCare applications that offer a personally held file to build an integrated record for care provision, a care diary / calendar, and digital tools for self assessment and independence. This will be in addition to information about events and activities to promote wellbeing, as well as tools that are already present on the Living it Up platform.

In this update to the Field Test Report, we anticipate that a number of SmartCare applications will be introduced which supersede our initial assumption that all functionality will be combined in a single application. The procurement was divided into lots accordingly.

We have also detected a strong interest by the local partners to involve their local authority websites. Consequently we anticipate some level of integration, for example the sharing of information via APIs and mutual hyperlinks.

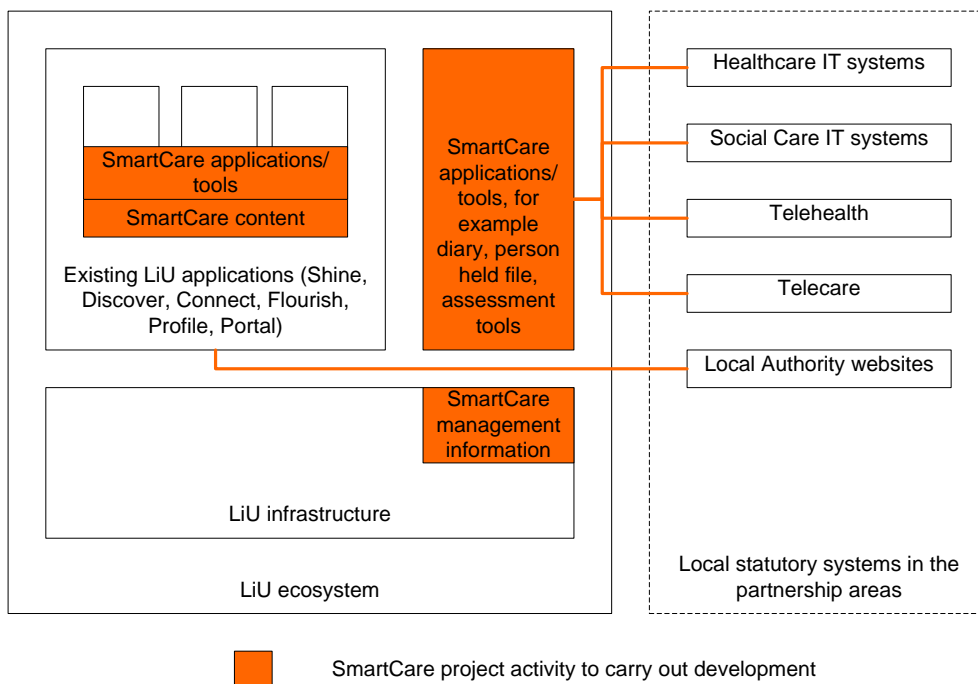


Figure 3: Scotland: Project development activity

##### 4.4.1 The approach to the SmartCare application

The applications are expected to be browser based, or simple apps for mobile devices, designed for use by the general public on consumer devices. They will include suitable security for holding sensitive personal information and for user authentication supported by the LiU infrastructure. They are also expected to support integration with systems in the statutory domain.

We recognise that some suppliers may generate innovative ideas around the use of mobile apps and therefore decided to include this possibility, in addition to browser based applications.

The Scottish SmartCare concept emphasises that the applications contain information owned by the user, with access by other parties controlled by the user. The person held file and diary in particular will become the location of an integrated record to allow a more timely and informed response by professionals.

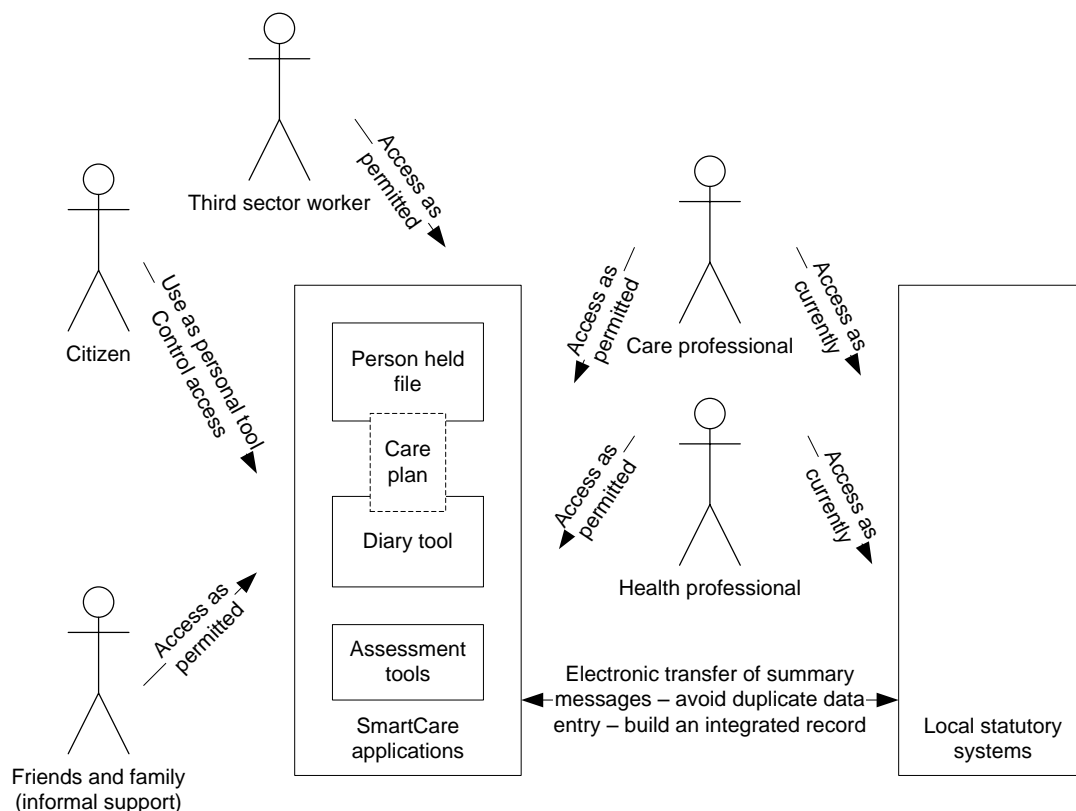


Figure 4: Concept of the SmartCare application

#### 4.4.2 Concept of the SmartCare application

In this update, we want to recognise that the third sector (for example, voluntary organisations) play an important part in the SmartCare pathways, and will therefore need access to the applications. We also decided to model the care plan as information that sits across the person held file and the diary tool.

Integration with existing local statutory systems is intended to avoid duplicate data entry, and timely availability of summary information.

As a general policy, SmartCare expects the applications to natively support open interoperability standards.

We may decide to carry out development with successful bidders in the procurement to add open standards APIs to otherwise good products in order to bring them into compliance with this policy. Further analysis is needed to identify these standards because they depend on details of the summary messages to be exchanged, and whether a fit-for-purpose standard is available. In the healthcare domain this may well lead to standards from the HL7 area. Equally, we will need to consider relevant health and social care integration standards being developed in the UK (including Scotland) between the NHS and LOCAL Authorities.

Apart from that, it would be difficult for us to mandate specific standards, because we need more information to identify relevant standards.

We may find some level of constraint around standards support by what is available from systems that are already deployed in the Scottish environment. In this case, we will seek to use integration technologies to build adapters rather than attempt to introduce bespoke extension into existing products. In the case of NHS Scotland, we will be able to build on the national investment in an integration product. For local authorities the situation remains unclear at the moment.

### 4.4.3 Integration with the LiU platform

In order to participate in the LiU ecosystem, the procurement will specify a number of non-functional requirements to ensure interoperability. Some of these will require integration with the platform API. Some are policies that need to be reflected in the way the application is designed and delivered.

When integrating with LiU, in some scenarios (use cases) compliance with open standards becomes a necessity. However, the scenarios themselves have options, and adoption of scenarios, options and relevant standards will depend on the overall proposed solution.

#### 4.4.3.1 Cross-browser and cross-device support

The LiU policy is that applications are supported on mainstream consumer browsers and devices. Currently:

- on PC
  - IE 8, 9, 10
  - Chrome - latest
  - Firefox - latest
  - Safari - latest
- plus default browsers on iOS and Android handheld devices - latest versions of browsers on latest version of the OS

Under normal circumstances, applications should be browser-based, written in HTML 5 and use an adaptive grid for rendering on a variety of form factors.

Detailed UX guidelines are available.

#### 4.4.3.2 Common login and SSO

The application is expected to accept LiU as Identity Provider (in other words, users can use their existing LiU login). This requires support for the authentication protocols that LiU provides.

#### 4.4.3.3 Common navigation

The application is expected to support movement across all applications of the ecosystem.

The Living it Up consortium of suppliers decided to leave the details more flexible in terms of technical approach, whereas previously there was an assumption that common navigation would rely on components provided by the consortium.

### 4.4.3.4 Personalisation using the profile

The application is expected to utilise the LiU Profile in order to improve the overall user experience and personalisation for an individual that moves between applications.

The Living it Up consortium developed more specific guidance around this as follows:

Information in LiU will be segmented, and only some of it will be found in the profile. Technical partners can start from a position whereby their applications persist application-specific data in their own data stores.

Requirements will then drive whether there is a benefit to interacting with the profile. Technical partners are expected to consider the following three scenarios, and work with their product owners to determine why and what data is shared via the profile.

- support a good UX (User experience) across the ecosystem by avoiding double data entry for users;
- support sharing of user attribute information between LiU applications;
- support a common view on the user base for communication and analysis.

### 4.4.3.5 Common branding and UX, common domain URL

This is an area that will be driven by business needs, and by end-user needs for a straightforward user experience.

The current LiU applications demonstrate a very high level of adoption, but from a technical point of view it would be equally possible for an application to show a high degree of its own identity.

### 4.4.3.6 Business intelligence

The application is expected to provide management information via Google Analytics, and potentially by submitting additional information to the LiU infrastructure API.

### 4.4.3.7 Elements of development to LiU to support SmartCare

In order to support SmartCare, a number of related developments will take place on the LiU platform itself.

- Provision of content aimed at the SmartCare user population. This can take various forms:
  - Adding articles to the LiU Content Management systems (Drupal) which support Portal and Flourish.
  - Adding information on local services and events to 3<sup>rd</sup> party sites (such as <http://www.aliss.org/>) that are linked to LiU through web services. These support Shine and Discover to provide tailored information.
  - Messages and videos on social media (Twitter, Facebook, YouTube).
  - Adoption of SmartCare branding and hyperlinks.
- Adding support for SmartCare management information:
  - Picklist options to allow users to identify themselves as SmartCare participants.
  - Dataset extracts.
  - SmartCare reports.

In this update we no longer assume that the assessment tools will be located within Flourish. Whilst this may well happen, we decided to allow for more flexibility around how the SmartCare applications will be positioned on the LiU platform.

### 4.5 Evaluation

The evaluation process has been established, and a working group meets every four weeks to progress this work. Questionnaires are being developed for implementation on 1<sup>st</sup> May. A methodology acceptable to both health and social care is being explored.

Specific evaluation of the digital tools developed will commence around September 2014. From May to September, we will collect data on the community connector service and the benefits achieved.

The process to collect a "before sample" has commenced, and will be completed by the end of August. We will then have our comparison information established. The evaluation group are also confirming other tools they wish to use to collect the information required. This will include an outcomes approach, and will be in line with national activity evaluating the evaluation of integration in Scotland.

### 4.6 Conclusions and further work

SmartCare in Scotland is a direct service to users and carers. It has been critical that we developed the service along with them, rather than for them. This is in line with national policy in Scotland ensuring services are co-produced and outcome focused. This approach requires significant investment in partnership working which is very time intensive. The positive outcome is that you develop a service which is fit for purpose and sustainable in the future. This investment of time should help us generate expected referral numbers early in the process, and sustained interest as the service is genuinely meeting need as identified during the co-production process.

Our tendering process will be complete at the end of August, and we can then work more intensively with suppliers to create the products we need to support the falls pathway.

As previously stated the procurement process was delayed.



# 5. Prototype RSD (1<sup>st</sup> wave pilot)

## 5.1 Introduction, Scope and Objectives

The development of the Shared Care Platform originally started in April 2012. In the development process both social care and healthcare professionals, e.g. doctors and nurses, have been involved, and also care coordinators, physical therapists and patient associations provided inputs. In addition to the Shared Care platform, there is also the existing messaging system as part of the SmartCare service. This messaging system is already implemented and running, and therefore it is not included in this report.

The Shared Care Platform has been in use since May 2013 after the initial development process ended. The platform was tested by three nurses and one secretary in their daily work with heart disease patients in Svendborg. Since they have tested the system in their daily workflow, they have been able to provide many useful inputs, e.g. on response time and adjustments to the system.

When new users get access to the Shared Care Platform, they get access to the test environment for approximately one month. The test environment is a safe way to get to know the system and test the functionalities before committing to the actual platform. The support team in the Health Innovation Centre of Southern Denmark also uses the test environment to build up new interfaces and test coming releases from the provider (IBM).

We have chosen this approach because we believe that the best test results come from “live” testing close to the user’s actual workflow. The goal has been to ensure that the system actually works in a real life setting. The pilot group has been very limited on purpose, since it is demanding and challenging for the professionals and potentially the patients to be part of a pilot starting phase.

In addition, seven patients have had access to the system from their home to provide input on the patient user interface. Their input, and additional input, was collected at a patient workshop held on 20<sup>th</sup> March 2014.

In April, some selected GPs and social care providers will start testing the system in their everyday work so they could provide input on their needs and requirements. Having a couple of selected users ensures that not all potential users have to spend time on the test. Testing a new system is time consuming; this way, we ensure that time is not wasted. The testing ended early June, when the municipality as well as hospital staff started using the platform in the real environment.

## 5.2 Methodology

As described above, small specialists groups were appointed to test the system; at the same time, the support team at the Health Innovation Centre of Southern Denmark conducted different tests every time there was a new release.

During the development process, interviews were conducted and meetings were held with the different actors. The meetings were individual meetings where the Shared Care Platform was assessed by the users. Follow up meetings have been held on a regular basis to make sure that all questions have been answered and all requirements have been taken into account.

A special support e-mail account has been opened so the users can ask questions to the Shared Care support team in the Health Innovation Centre of Southern Denmark. There has

also been telephone contact with the users and they have also had the opportunity to call the support team to ask questions or comment on the system.

Different requirements, wishes, comments and needs have been brought to the provider IBM at the monthly project meetings that have been held throughout the process.

### 5.3 Users, time and location

Three nurses and one secretary have been involved from May 2013 in their own setup.

Since May 2013, it has been an ongoing process to give patients access to the platform. Since then, seven patients have been granted access to use the platform from their own home. Even though only seven patients have access so far, many more patients' data have been entered into the platform. In May, specialists had entered data for about 120 patients, and the number continues to increase. From June, all relevant staff in the selected hospitals started using the platform in the real environment; they will start including more active patients from 1<sup>st</sup> September.

The support team from the Health Innovation Centre of Southern Denmark has been testing the system from the office since 2012. Whenever there has been a new release from the provider (IBM), the support team has tested the changes in the test environment before the users get access to the new release.

From April, one social care provider will get access to use the platform in their own setup, to test the system before deployment starts in May. The testing extended into May, and in June the staff were trained a second time and started using the platform in the real environment.

From April, four GPs got access to use the platform in their own setup to test the system before actual deployment started in May. We have however had some difficulty in recruiting GPs and are still trying to find additional GPs to test the platform as well as the integration. We expect to expand the number of GPs using the system in August and September as the summer break is over. However initial response has been positive.

### 5.4 Prototype Description

The Shared Care Platform builds on existing systems and standards such as SAM:BO and MedCom messages that have been described thoroughly in other deliverables.

The Shared Care Platform is described thoroughly in deliverable D4.1. Basically, the Shared Care Platform is a web based system built up around generic building blocks; it is therefore also possible to configure the system for other disease areas.

The following elements have been developed and tested along with response time in the prototype:

- Forms.
- Activities.
- Portlets developed based on the workflow at the hospitals with focus on the conversation with the patient.

These following are examples of portlets in the Shared Care Platform:

Diagnoser		
Dato	Navn	Historik
29-08-13	AKS (NSTEMI med PCI)	<a href="#">Vis</a>
06-09-13	Risikofaktorkontrol	<a href="#">Vis</a>
06-09-13	Familier hyperkolesterolæmi	<a href="#">Vis</a>
29-08-13	Diabetes type 1	<a href="#">Vis</a>
06-09-13	KOL	<a href="#">Vis</a>

Vis slettede

This portlet describes the diagnoses entered by the specialists.

Symptomer				
Værdi	Måling	Dato	Ny måling	Vis graf
Svimmelhed	Nej	29-08-13		
Træthed	Ja	29-08-13		

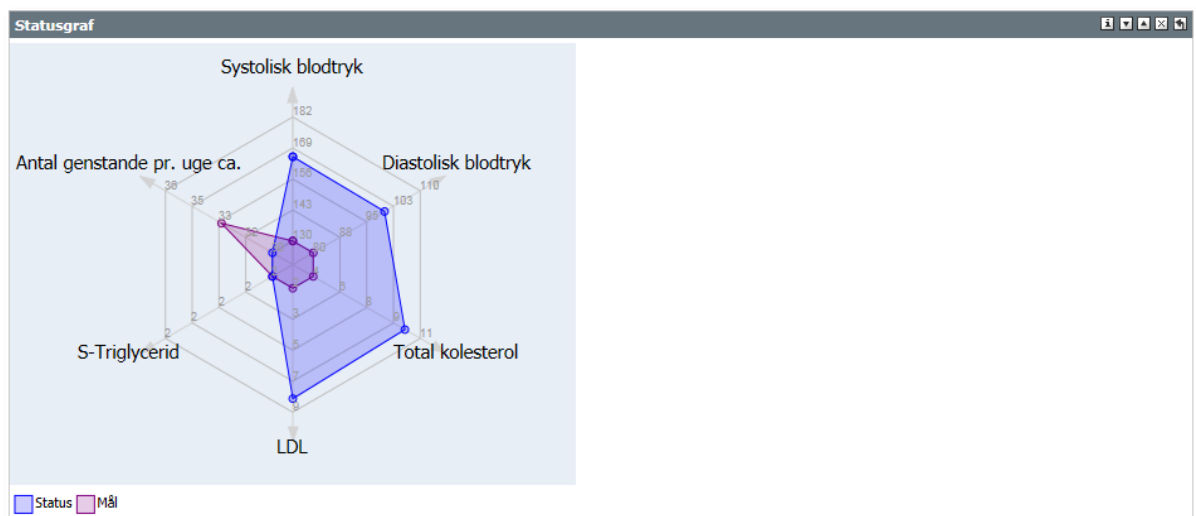
Vis slettede

This portlet describes the symptoms the patient has including the latest measurements.

Mål og status				
Værdi	Mål	Status		Historik
Systolisk blodtryk	under 130	155 mmHg		<a href="#">Vis</a>
Diastolisk blodtryk	under 80	95 mmHg		<a href="#">Vis</a>
HbA1c	under 6,5	7,8 mmol/l		<a href="#">Vis</a>
Total kolesterol	under 4,0	6,3 mmol/l		<a href="#">Vis</a>
LDL	under 1,8	2,0 mmol/l		<a href="#">Vis</a>
S-Triglycerid	under 1,7	4,0 mmol/l		<a href="#">Vis</a>

Vis slettede

This portlet describes the goals and status for the patient.



This portlet has a graph illustrating the goals and status.

Målinger					
Værdi	Måling		Dato	Ny måling	Vis graf
Systolisk blodtryk	165	mmHg	19-08-13	<a href="#">Ny måling</a>	<a href="#">Vis</a>
Diastolisk blodtryk	100	mmHg	19-08-13	<a href="#">Ny måling</a>	<a href="#">Vis</a>
Højde	1,80	M	21-06-13	<a href="#">Ny måling</a>	<a href="#">Vis</a>
Vægt	69,0	Kg	18-06-13	<a href="#">Ny måling</a>	<a href="#">Vis</a>
BMI	21,3	Kg/m <sup>2</sup>	23-08-13	<a href="#">Ny måling</a>	<a href="#">Vis</a>
EKG	Atrieflimren		10-04-13	<a href="#">Ny måling</a>	

Tilføj værdi  Vis slettede

This portlet describes the measurements taken at appointments with care providers. The patient can also enter data.

Laborativværdier					
Værdi	Måling		Dato	Ny måling	Vis graf
HbA1c	7,8	mmol/l	29-08-13		<a href="#">Vis</a>
Total kolesterol	6,3	mmol/l	29-08-13		<a href="#">Vis</a>
LDL	2,0	mmol/l	29-08-13		<a href="#">Vis</a>
S-HDL	1,4	mmol/l	29-08-13		<a href="#">Vis</a>
S-Triglycerid	4,0	mmol/l	29-08-13		<a href="#">Vis</a>

Vis slettede Svar fra 0 ud af 9 laboratorier hentet 03-10-13 10.22

This portlet describes the lab values measured.

Egenomsorg					
Værdi	Måling		Dato	Ny måling	Vis graf
Socialt	Kontakt til hjemmeplejen		29-08-13	<a href="#">Ny måling</a>	
Antal genstande pr. uge ca.	30	Stk	10-04-13	<a href="#">Ny måling</a>	<a href="#">Vis</a>
Motion antal timer pr. uge ca.	9	Timer/uge	12-06-13	<a href="#">Ny måling</a>	<a href="#">Vis</a>
I behandling for hypertension	Ja, er sat i behandling under dette forløb		12-06-13	<a href="#">Ny måling</a>	

Tilføj værdi  Vis slettede

This portlet describes self care abilities. The social care provider will benefit the most from this portlet.

Pårørende					
Prioritet	Fornavn	Efternavn	Telefon	Relation	
1	Anders	Andersen	86146622	Ægtefælle	
2	Alice	Andersen	39823388	Datter	
	Ulla	Nielsen		Ægtefælle	

This portlet contains information on the patient's relatives.

Rapporter
<a href="#">Samlet Information Om Borgeren</a> <a href="#">Hjerterehabilitering / Sekretærrapport</a> <a href="#">Hjerterehabilitering / Borgerens Plan</a>

This portlet contains different reports that can be printed out.

Aktivitetsliste						
Deadline	Aktivitet	Ansvarlig	Organisation	Formular	Udført	Historik
06-12-13	3 månederskontrol	Tovholder			<input type="checkbox"/>	<a href="#">Vis</a>
29-11-13	3 månederskontrol	Allan Nasser	Region Syddanmark		<input type="checkbox"/>	<a href="#">Vis</a>
06-09-13	Udfyld spørgeskema inden samtale	Borger		<a href="#">Åbn Formular</a>	<input type="checkbox"/>	<a href="#">Vis</a>
06-09-13	Visitationssamtale	Tovholder			<input type="checkbox"/>	<a href="#">Vis</a>

Vis slettede  Vis udførte

This portlet contains the activity list for the patient.

Sundhedsfaglige Kontakter				
Rolle	Ansvarlig Person	Ansvarlig Organisation	Vis Kontaktinfo	Historik
Kommunekontakt		Nyborg Kommune	<a href="#">Vis Kontaktinfo</a>	<a href="#">Vis</a>
Tovholder	Jesper Rødtne	Odense University Hospital	<a href="#">Vis Kontaktinfo</a>	<a href="#">Vis</a>

Vis slettede

This portlet describes the care professionals included in the care pathway and their contact details.

Noter til patienten				
Dato	Notetype	Note	Ansvarlig	Historik
29-08-13	Noter til patienten	Remember to take your medicine!	Allan Nasser	<a href="#">Vis</a>

Vis slettede

This portlet contains notes sent from the care professionals to the patient.

Vejledninger				
Dato	Notetype	Note	Ansvarlig	Historik
09-09-13	Vejledning	<a href="#">Linkt til dit træningsprogram</a>	Allan Nasser	<a href="#">Vis</a>

Vis slettede

This portlet contains instructions e.g. on workflows or links.

Patientens egne noter				
Dato	Notetype	Note	Ansvarlig	Historik
26-09-13	Egne noter	Idag har jeg haft en forfærdelig hovedpine	Anne	<a href="#">Vis</a>
23-09-13	Egne noter	Jeg har det rigtig godt idag. Har gået 5 km.	Anne	<a href="#">Vis</a>
09-09-13	Egne noter	Jeg har glemt at tage mine piller i går :-( Jeg har taget dobbelt portion idag - håber ikke at det gør noget?	Anne	<a href="#">Vis</a>

Tilføj  Vis slettede

This portlet contains the patient's own notes.

## 5.5 Evaluation

There has been an ongoing evaluation based on the feedback from the pilot users. These are the overall comments they had:

- Issues with response times in the system. This problem has been solved by using a new browser; more work will be done to optimise speed in Internet Explorer. Soon it will be changed to version 8 which should solve some of the issues.
- A number of minor adjustments have been made during the testing process.
- There is still no clarification regarding the report that is currently printed out to the secretary. This is due to missing integration with the hospital system Cosmic, because adjustments still have to be made in order for it to work properly. The Cosmic integration is expected to be operational in August.

We have agreed on having a closer dialogue with the pilot testers, since it is crucial that they keep sending feedback on their requirements, wishes and needs regarding the platform, so that they do not return to their usual workflow and habits. This is also to ensure that all of the requirements are taken into consideration and approached more systematically, also in regards to further development. An overview has been prepared; this will be updated on a regularly basis at meetings.

In the future it might be necessary to appoint local project managers in each test site to ensure progress and collect input along the way as the number of users increases.

## 5.6 Conclusions and further work

The tests of the system have been very useful for the further development of the platform. It has made it possible to solve any issues along the way, because the tests have been an ongoing process. Test users have had to spend a lot of time testing the system, but it has benefitted the project.

We will continue using this approach. However, we are aware that this method requires a lot of follow up and dialogue at the beginning. Lessons learned throughout the process will be documented as a recommended implementation process to benefit other new locations.

The requirements received so far have either been developed, or will be considered for further development, and resources will be used to describe and develop the system to fit new needs and requirements when new pilot users are included. A few integrations (Sentinel and Cosmic) and home monitoring devices are still pending. However, the Shared Care Platform itself is considered fully developed and ready for use. Further development and enhancement of the user-interface will continue, and will be prioritised and developed during the project period according to resources available.

## 6. Prototype Tallinn (2<sup>nd</sup> wave pilot)

### 6.1 Introduction, Scope and Objectives

The main idea of the SmartCare services is to improve the independence and well-being of elderly (at least 65 years old) care receivers who are suffering from chronic diseases. Improved health situation and stronger sense of security is expected from using the SmartCare integration infrastructure. Bringing together social and medical care givers, and sharing information about the care recipient between SCP, HCP and I/FCP, is also a very important aspect for creating a new integrated care service.

A contact centre with nurses and social workers is going to be set up to co-ordinate the integrated care. Workers in the contact centre monitor the care recipients remotely, using the SmartCare portal that is going to be developed for the SmartCare services. In addition to the contact centre workers, the care recipient, his informal carers, GP, specialty doctor, social alarm service workers, and if allocated social worker and home nurse, can have access to the home monitoring data and on-site care information using the SmartCare portal.

Social alarm button, medical sensors and environmental sensors are going to be installed in the care recipient's home by the contact centre's technical support. A SmartCare tablet with the SmartCare application is going to be given to the elderly. The tablet is a central unit that collects, displays and transmits data from the sensors.

Everyday users of the services will be the care recipient, who will make the vital measurements at home, and the SmartCare contact centre workers who regularly monitor the measurements. The specialty doctors and nurses, GPs, social alarm service workers, and in some cases the social worker, are also expected to use the portal on a weekly basis.

Testing will concentrate on the SmartCare application and portal. The objective of the testing is to make sure that:

- The application and portal are compliant with requirements stated earlier.
- The application and portal are operating fluently, the performance is reliable, and the data exchange is smooth.
- User interfaces are user-friendly, easy to comprehend and easily accessible.

### 6.2 Methodology

SmartCare technical support will test the connections and data transmission from the application to portal and *vice versa*. Technical support will have different sets of equipment for testing. A set of equipment is going to be provided to the test subjects who represent different user groups. There will be test subjects who will represent the care recipients and relatives; also, one or more GPs and specialty doctors who are involved in the project will test their interface. The contact centre workers will also have access to the SmartCare portal prior to the start of the pilot to test its functions and make suggestions.

Later, the testers are going to evaluate the prototypes; when the need occurs, changes are going to be made. It is important to detect possible errors as early as possible, because making corrections afterwards is very time consuming and expensive. All problems and questions that users may have afterwards while using the SmartCare services are communicated to the SmartCare contact centre. If the contact centre workers are not able to help, the question is referred to technical support.

### 6.3 Users, time and location

The first test users of the portal are going to be the workers of the SmartCare contact centre and the technical personal. Also the testers who represent the care recipients and their relatives are going to be involved. Later on, access to the health and social care providers is granted. The testers will test if the portal is functioning without a problem, and the tablet and sensors are functioning as requested.

The end users can access the portal through the tablet at home. SCP, HCP and relatives can access the portal through the web, either at home or at work.

### 6.4 Prototype Description

The SmartCare portal is a web-based system working on an Android operating system. Access to the portal can be achieved either by a computer or a tablet. Through the portal, information about the care recipient can be obtained and video connections can be established. The most important function of the portal is to store the data from sensors located in the care recipient's home, and to provide a common platform for data sharing and communication for the social, health and informal carers.

In summary the main functions of the SmartCare portal are:

- Administering users.
- Displaying sensors data.
- Displaying general information about CR's.
- Management of:
  - Diary posts;
  - Reminders;
  - Medications;
  - Nutritional advice;
  - Exercises;
  - Reports;
  - Documents;
  - Alarm thresholds;
  - Questionnaires.
- Notification in case of alarms.
- Video calls.

The SmartCare portal will have different roles for different type of users. The security of the web based SmartCare software is based on national ID-card solution which is mandatory for all Estonian citizens. Using this, all users can securely access SmartCare portal through the web. The SmartCare portal is represented in Figure 5.




Smartcare Logi välja

Platsinõudjate nimekiri

List of care recipients

- Kasutaja1 14
- Kasutaja2 3
- Kasutaja3
- Kasutaja4
- Kasutaja5
- Kasutaja6
- Kasutaja7
- Kasutaja8
- Kasutaja9
- Kasutaja10
- Kasutaja11
- Kasutaja12
- Kasutaja13
- Kasutaja14
- Kasutaja15
- Kasutaja16
- Kasutaja17
- Kasutaja18
- Kasutaja19



Nimi

Viimane ühendus 01.07.2014 kell 12:35

Asukoht Näita kaartil

General | **Diary** | Reminders | Video | Measurements | Documents

Üldine | Päevik | Meeldetuletus | Video | Mõõtmised | Dokumendid

Nimi	Patient 1
Isikukood	412121234567
Vanus	82
Aadress	Harju, Tallinn, Ravi 18, 12451
Sugu	Naine
Pikkus	170
Kaal	80
Telefon	555577776

Contact persons

#### Kontaktisikud

Nimi	Telefoni number	Suhe patsiendiga		
Tütar1	555577776	Tütar	<input type="button" value="Saada Email"/>	<input type="button" value="Saada SMS"/>
Tütar1	555577776	Tütar	<input type="button" value="Saada Email"/>	<input type="button" value="Saada SMS"/>

Figure 5: The SmartCare portal view

The standard set of SmartCare equipment in care recipient's home involves the tablet which is a central unit (CU), the medical and environmental sensors, and a social alarm button. The general functions of the CU are:

- Receive, transmit and display sensors data.
- Display reminders (measurements, medications, doctor visits).
- Enter and display diary posts.
- Register on-site interventions.
- Video calls.
- Provide nutritional advice.
- Provide low-level exercises to reduce risk of falling.

Graphical user interface can be seen in Figure 6.

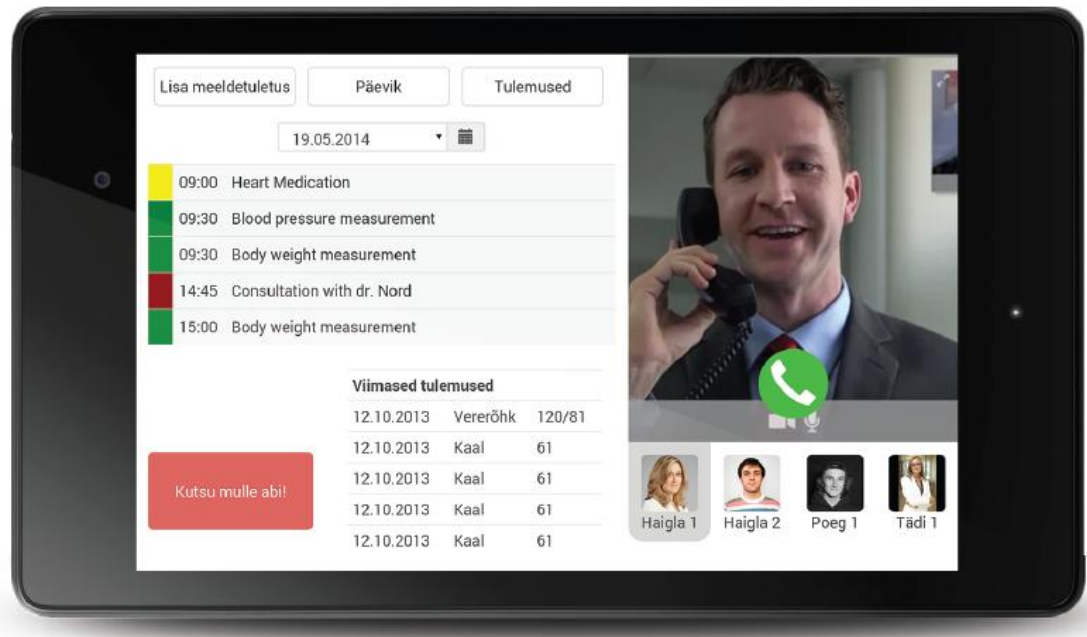


Figure 6: Graphical user interface

## 6.5 Evaluation

The initial evaluation is going to be done after the initial testing of the SmartCare portal and equipment. The evaluation will be carried out by testers who represent all the future users of SmartCare services: CR, SCC workers, technical support team, social and health care providers and informal carers. After the testers have had time to test the functions and user-friendliness of the portal, application and devices, interviews will be carried out with them to detect possible errors in the prototype.

Taking into account their suggestions, necessary changes will be made. Later the evaluation is an on-going process based on the feedback of stakeholders.

## 6.6 Conclusions and further work

The system testing is expected to have a very beneficial outcome, and changes to the system are going to be made considering the feedback of users. Deployment of SmartCare services is planned to start in January 2015.

# 7. Prototype Kraljevo - Serbia (2<sup>nd</sup> wave pilot)

## 7.1 Introduction, Scope and Objectives

Development of the integrated SmartCare portal will start in June 2014. From the beginning of the Project in March 2013, both social care and health care professionals have been involved in the process and contributed with their inputs to better envelop their needs into an integrated solution.

It is planned that first prototyping of the new services will be possible in early September 2014. Platform will be tested by selected professionals in their work environment with regular patients.

New users will be instructed to gain access to the system, and will have a chance to get used to the test environment for 14 days. This will allow them to safely acquaint themselves with the system before they access the live platform.

## 7.2 Methodology

Method used for choosing test groups of users will be performed by decision makers in the Centre for Social Work Kraljevo and Medical Centre Kraljevo. On the other hand, the system vendor will be at their disposal for any kind of help and questions, either through telephone assistance or email support.

## 7.3 Users, time and location

The number of professionals in the test period and exact time of the initial phase of testing will be decided in the near future.

## 7.4 Prototype Description

## 7.5 Evaluation

On-going evaluation will be performed throughout the testing period by the pilot users. All their comments will be collected, and face-to-face contacts with users will be recorded to further develop and adjust the system.

## 7.6 Conclusions and further work

As this pilot site has not reached operation yet, an update on the current document will be issued on field testing by the end of December 2014.

## 8. Prototype South Karelia Social and Health Care District (2<sup>nd</sup> wave pilot)

### 8.1 Introduction, Scope and Objectives

South Karelia Health and Social Care District (Eksote) provides health services, family and social welfare services, and services for senior citizens that promote the health, wellbeing, and ability of residents to function well in everyday life. The District provides both health and social services in nine municipalities of South Karelia. Services for the elderly aim to promote their wellbeing, health, ability to function, and working capacity with high-quality, cost-efficient and flexible services that are adaptable to the service needs and age structure of the population. Eksote's multidisciplinary staff have a rehabilitative approach to developing the care of the elderly, and also make good use of modern technology. Particular attention is given to enhancing the remaining resources of the elderly and supporting independent living.

The aim of SmartCare Project's South Karelia site is to integrate social and health services more tightly together. This will be done by integrating SmartCare system with part of the home care services. There are two developing paths in the pilot: SmartCare platform and Contact Centre. The platform will be tendered and Contact Centre will be established during 2014. Also, remodelling of home care processes will be a very important part of the SmartCare project.

### 8.2 Methodology

Until now, the South Karelia site has focused on the development of the technical solution, tendering procedure and informing the nursing staff and informal caregivers.

### 8.3 Users, time and location

There will be (2015) ten health professionals and two social workers involved in the SmartCare Project. Most of them are working in the Contact Centre, and are part of the assessment of service needs team. The project staff have developed the SmartCare platform and have prepared the tender for the platform. The tendering procedure will be finished during autumn 2014, and pilot will begin in January 2015.

### 8.4 Prototype Description

The description of the prototype is not yet available because the tendering procedure of the platform is still in progress. The figure below shows how the patient data will be moved between different stakeholders, and how this will tightly integrate the social and health sectors. The SmartCare portal will be integrated into the eHealth platform of South Karelia Social and Health Care District. On the portal, there will be a professional view for both social workers and healthcare workers. Clients and their relatives will have their own view on the SmartCare portal.

During the summer of 2014, the development work of e-service and care plan (provided by Tieto Oy) has been prepared. The date of issue will be on November. The service and care plan will be integrated into Hyvis portal; it will then be seen by the professionals. The remote monitoring system (provided by MediConsult Oy) has also been under developing during the summer. The remote monitoring system is in use, but it will not be integrated into the SmartCare system until the pilot of the system will begin.

South Karelia

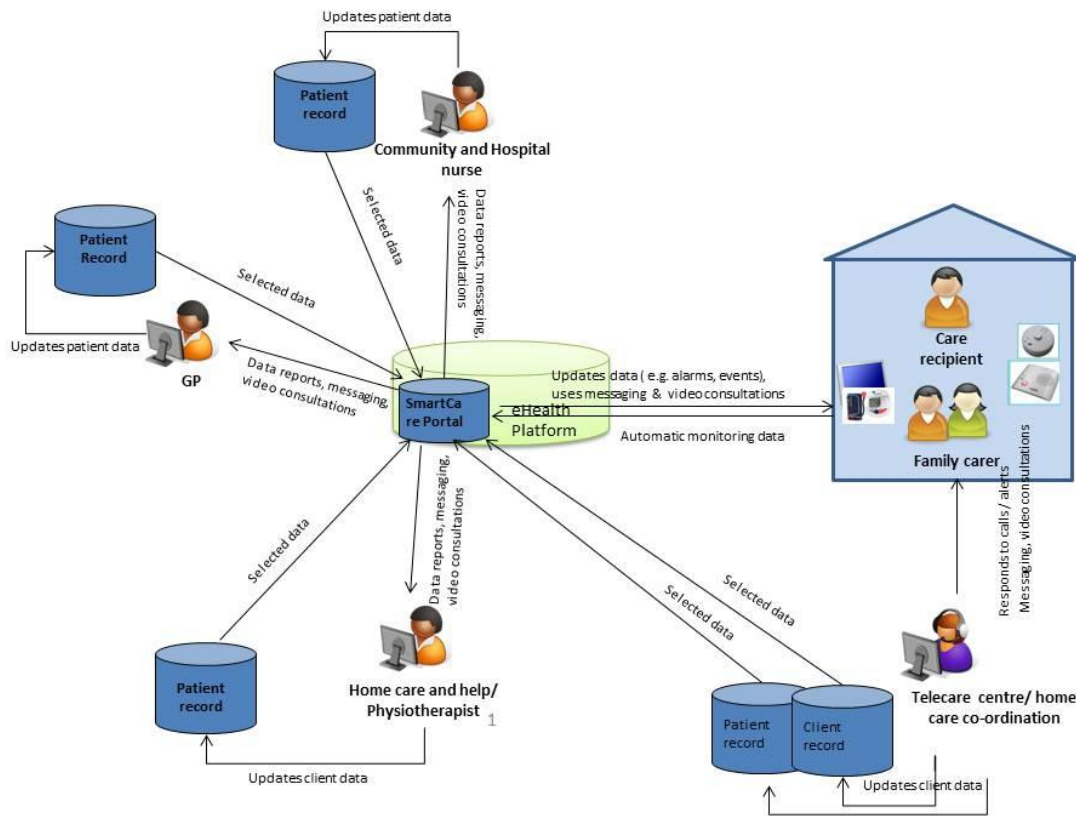


Figure 7: South Karelia data architecture

### 8.5 Evaluation

During the pilot there will be an ongoing evaluation based on feedback from users of the SmartCare platform. In South Karelia, we are also investigating how the SmartCare platform can support clients to live in their homes longer and safer. One of the study subjects will be how the system can impact on the solitude of clients. Informal caregivers will also be part of our study. The pilot clients will be evaluated by RAI assessment during the project.

### 8.6 Conclusions and further work

The pilot of the SmartCare platform and Contact Centre will began in January 2015. Then next steps in South Karelia's pilot site will be: finishing the tendering procedure, recruiting the nursing staff and social workers for the pilot, and after that pick and choose the clients and informal caregivers.

## 9. Prototype Attica (2<sup>nd</sup> wave pilot)

### 9.1 Introduction, Scope and Objectives

The Attica pilot site belongs to the 2<sup>nd</sup> wave pilot sites and its operation is forecast to start 1<sup>st</sup> January 2015 at the latest. Currently, the identification phase for the missing blocks in order to implement a SmartCare compatible service has been completed, and it is now followed by the development phase.

SmartCare, as an ICT enabled project, requires a significant testing phase for its prototypes before the prototype is released to a wider audience. This phase includes all tests of the operational aspects of the service to be piloted, together with compliance testing to the technical specifications and general standards.

Coherence of functional specifications *per se*, as well as qualitative parameters of the service such as usability, user friendliness, accessibility etc., will be tested after the prototype release, and they will be part of formal testing. The results of this phase are very critical to the overall SmartCare evaluation process, as they also have an impact at design level, in case of serious problems are identified.

### 9.2 Methodology

Training is of outmost importance for the “expert users”, i.e. the professionals (social and healthcare domains) who will be responsible for conducting the field testing. A principle of train the trainers will be used, where the technology provider of the site (Vidavo S.A.) will offer training sessions to the Attica site professionals who in turn will assist end users and test groups alike to familiarise with the system and introduce it into their everyday life.

Vidavo S.A. will offer its support throughout the field testing period, and closely follow the evaluation process so as to integrate all findings into the offered solution.

### 9.3 Users, time and location

The full technical solution is expected to be ready for testing by end of October 2014. All tests will be conducted at the premises of the three municipalities contained in the Attica pilot site, namely Palaio Faliro, Ag. Dimitrios, and Alimos. There are two categories of end users: the professionals and the patients. The professionals will perform first stage of testing during their training and familiarisation sessions, while the patients will only go through this phase once, and with the assistance of the professional carers. The recruitment period will start as early as possible, even before August, coinciding with the dissemination events that the municipalities will hold. Hence, we expect at the end of October to have an adequate number of users to take part in the field test period.

### 9.4 Prototype Description

The prototype description is not yet completed. The main reason for this delay is the tendering process, which was launched in early August, more than a month later than originally anticipated. This is due to the bureaucratic constraints pertinent to the municipalities operation. However, we expect to have everything in place by end of October.

### 9.5 Evaluation

Evaluation for the Attica site is an ongoing process throughout the pilot period. It will be performed by various means, but mostly in the form of questionnaires either uploaded to the portal where the end users can reach them and fill them in, or depending on the type of usage level, these might even be in the traditional paper form and collected by the responsible SmartCare team member for further analysis. The findings of evaluation and testing period are going to be incorporated into the provided service.

### 9.6 Conclusions and further work

At this stage and since testing has not even started, there are no conclusions to be discussed; however, when this phase is completed, we intend to retune the Attica implementation of SmartCare according to the findings of the testing period, so as to ensure maximum user compliance and satisfaction. An update to D4.5 will be provided by end of December 2014 when all tests will have been concluded, and the site will be ready to launch pilot operation.

## 10. Prototype North Brabant - Netherlands (2<sup>nd</sup> wave pilot)

### 10.1 Introduction, Scope and Objectives

The main objective of SmartCare is to integrate health and social care. By enabling communication and data exchange, and by joining-up various services, the care network members (care recipients, informal carers and a wide variety of health and social care professionals) are bound more tightly together, in order to increase quality of life, quality of care and efficiency of care.

The 2<sup>nd</sup> wave pilot site North Brabant focuses on integrated care for care recipients with ischemic heart disease (IHD) and chronic heart failure (CHF). Care recipients are aged 65+, and have a high probability of complications and/or destabilisation. Comorbidities are the rule in this population. The high prevalence of exacerbations can justify the extra costs for home equipment and care coordinator support.

For the ICT, we build further upon the Open Data for Health (OD4H) ICT infrastructure: a tool for exchanging patient data and multi-disciplinary case discussions among care professionals. Whereas OD4H is originally healthcare oriented, the system will grow towards an open platform for integrated care, incorporating formal health and social care, informal care, and self-care. This platform will be combined with a user-friendly care recipient portal offering interactive apps for care and self-management, e-inclusion, social participation, and entertainment. Within SmartCare, the infrastructure will be configured specifically for care recipients with cardiac conditions.

User recruitment and operation is forecast to start from January 2015. Before, the platform and services require significant testing with regards to operational aspects (technical robustness, reliability, interoperability, etc.) and service quality measurements (perceived added value, accessibility, usability, etc.). The user interfaces for both primary and secondary users are to be developed and tested up to November 2014.

### 10.2 Methodology

Outside the scope of the SmartCare project, the technical OD4H infrastructure has been tested and evaluated before. Within SmartCare, the focus will be on the configuration and evaluation of specific tools, support and services for care recipients suffering from IHD or CHF. Added value, alignment with current procedures and infrastructure, and usability are the key evaluation criteria.

Prior to the start of the pilot, the ICT-based solutions need thorough testing. It is planned that first prototyping of the new services will be possible in early September 2014. Afterwards, an iterative participatory design approach will start in order to refine the prototypes together with care recipients on the one hand and healthcare professionals and social workers on the other hand.

Both primary users (care recipients) and secondary users (informal carers, healthcare professionals and social workers) will be involved in cognitive walkthroughs, interviews and participatory design sessions. Opinions and suggestions will be evaluated as input for the further development process.



### 10.3 Users, time and location

Due to the iterative approach, the timeline for testing will be for the whole duration of the development process. Testing tasks and development tasks are alternated in order to ultimately improve the quality and functionality of the design.

Acceptance of a new system is influenced by the level of fulfilling someone's needs and expectations. This counts for both primary and secondary users. Therefore, care recipients, informal carers, healthcare professionals and social workers will contribute to the development process right from the beginning. These users will identify issues related to the alignment with current care delivery, infrastructure and procedures. This will ensure that the final version of the software will be useful and valid to perform their daily tasks successfully.

Preferably, tests will be conducted at location, so as to better understand the context in which the system will be used.

### 10.4 Prototype Description

The SmartCare platform builds on the existing OD4H ICT infrastructure. The prototype description is not yet completed, because the system needs to be tailored to the SmartCare objectives and services, and configured for IHD and CHF. The infrastructure combines a shared platform for inter-professional communication and secure data exchange, and a care recipient portal to access a set of services.

The SmartCare equipment - excluding the portal itself on PC/laptop/tablet - depends on the personal needs of the care recipient. A set could include e.g. telemonitoring devices, home sensors and a social alarm.

### 10.5 Evaluation

Evaluation at the North Brabant deployment site is an ongoing process based on interim feedback collection from both primary and secondary users throughout the project. It will be performed by various means: in the beginning, participatory design and familiarising sessions will be organised to give rise to comments and suggestions. In a later stage, feedback will be gathered via questionnaires, face-to-face contacts, and information received via the helpdesk. It is crucial to continuously collect feedback on requirements, and use this as input for the next iteration cycle, to ensure acceptance and usage.

### 10.6 Conclusions and further work

Since we are only at the beginning of the iterative design process, there are no conclusions yet to be discussed. Nevertheless, we are convinced that an iterative approach is useful to solve any issues along the development process.

Throughout the pilot, we will continue the iterative participatory design approach. To realise a high acceptance rate, it is critical that the SmartCare program is developed with the users rather than for them. We are aware that this method is time consuming, but the collected feedback is required not just to further develop and adjust the system, but also the implementation process. The positive outcome is that a sustainable program will be developed. All relevant issues will be documented to benefit future deployment at other locations, or for other care recipient groups.

An update to D4.5 will be provided by end of December 2014 after the finalisation of the field testing period, and just before the launch of pilot operation.