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Document information

Abstract
The Final Report is SmartCare’s project’s closing report. It is intended for an external audience to gain an overview of the project objectives, activities and results. The report summarises the key aspects of the project and directs readers to appropriate project material for more in-depth information.

Key words
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Executive summary

Against the background of the European Innovation Partnership on Active & Healthy Ageing, SmartCare has aimed to define a common set of standard functional specifications for an open ICT platform enabling the delivery of integrated care to older European citizens. In the context of SmartCare, a total of 23 regions and their key stakeholders have defined a comprehensive set of integration building blocks around the challenges of data-sharing, coordination and communication. Nine regions have deployed integrated health & social services to combat a range of threats to independent living commonly faced by older people, while the others have prepared for early adoption; some of these are now pilot sites in the framework of other ICT PSP projects, namely BeyondSilos and CareWell.

In a rigorous evaluation approach, the deployment sites have produced and documented evidence on the impact of integrated care, developing a common framework suitable for other regions in Europe. The evaluation examined the benefits and shortcomings for all parties across the care pathway continuum, with the care recipient and carer perspectives and experiences being central. Cost benefit analysis and business modelling underpinned the evaluation, with the outcomes and outputs providing the regions with the necessary evidence-base for them to consider mainstreaming the delivery of integrated care services for other population cohorts in their region and elsewhere.

Guidelines and specifications for procuring, organising and implementing the service building blocks have been produced. The organisational and legal ramifications of integrated care have been analysed to support long term sustainability and upscaling of the services.

SmartCare services build on ICT platforms to provide full support for cooperative delivery of care, integrated with self-care and across organisational 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-organisation access to home platforms.

In SmartCare, these platforms, which enable regionally customised integrated care models and care pathways (the SmartCare Pathways), are open to cross-sectorial care teams, improving the ability of older people to better manage their chronic conditions at home, and deal with their increasing frailty. The work has involved the development of localised approaches to implement and evaluate the SmartCare services based on two generic pathways for integrated home care, long term support at home, and short term support following hospital discharge, within their system of health and social care delivery.

The Consortium comprises the whole value chain of older people care. The core is constituted by 26 Regional Partnerships which comprise all the local older care stakeholders, mainly but not exclusively Regional Authorities and Municipalities, which, in most EU regions, are together responsible for and manage the expenditure budget for older people care. 17 of these Regional Authorities and Municipalities have been mandated by their respective National Administrations to represent the Member State they belong to. In many cases, these public entities are also the providers of care to older people. In cases where this task is outsourced, the outsourcer is equally included in the Regional Partnerships as a beneficiary or a subcontractor. Nine regions have implemented the SmartCare services.
The other stakeholders are represented through their federations at European level, and comprise:

- **The User Advisory Board**, whose partners are:
  - ARE: Assembly of European Regions
  - AGE Platform Europe: Older People’s Platform.
  - EFN: European Federation on Nurses Associations.
  - Eurocarers: Informal caregivers.
  - IFIC: International Foundation for Integrated Care, Medical association.

- **The Industry Board** represented by the following association:
  - CHA: Continua Health Alliance.

- **Three leading consultancies** specialised in the fields of eHealth and eInclusion:
  - Empirica and Health Information Management SA (as a subcontractor to the Coordinator selected through a European invitation to tender), which, between them, have supported the Consortium through their expertise in process re-engineering, project management, and quality assurance.
  - Health Information Management Spain, S.L. is a newly created consultancy specialised in change management in the health and social care sectors, and predictive modelling in the field of ICT applied to integrated care and chronic patient’s management; it has supported the Consortium through their expertise in change management, predictive modelling and evaluation activities.
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1 Introduction

1.1 Purpose of document

The Final Report is the SmartCare project’s closing report. It is intended for an external audience to gain an overview of the project objectives, activities and results. The report summarises the key aspects of the project and directs readers to appropriate project material for more in-depth information.

1.2 Structure of document

Section 2 presents a summary of project context and objectives.

In sections 3 to 7, the main achievements of the project are reported with a brief description of the main activities and results. Further details are reported in the referenced deliverable documents, which can be found on the project website: http://www.pilotsmartcare.eu/home.html. Deliverables and milestone description are listed.

Section 8 gives details of all the participants in the SmartCare project.

1.3 Glossary

CHF Congestive Heart Failure
CR Care Recipient
FAQ Frequently Asked Questions
FVG Friuli Venezia Giulia
HC Health Care
HCP Health Care Provider, or Healthcare Professional
HIS Hospital Information System
QA Quality Assurance
RSD Region of Southern Denmark
SC Social Care
SCP Social Care Provider
2 Summary description of project context and objectives

2.1 Context

Care systems across Europe face significant challenges due to demographic changes and increasing specialisation. For a growing number of older citizens with multiple care needs, the array of health and social care services, their benefits and their procedures can be confusing. People should receive services and care from a system that is easy to navigate, less bureaucratic, more efficient, and that communicates well: A system that is integrated, co-ordinated and joined up.

The SmartCare project focus has been on integrating healthcare, social care and self-care for different health / living conditions, along integrated care pathways, including the underlying organisational models supported by ICT infrastructures to coordinate cross-sector integrated eCare delivery for older persons living at home with complex needs, and thus facilitate:

- Person-centred, co-ordinated care for individuals and their carers.
- Greater levels of self-care and self-management.
- Effective and efficient communication between all parties.
- Better use of resources, less duplication and more streamlined care.

2.2 How SmartCare addressed its objectives

To achieve its goal, SmartCare has pursued a programme of systematic service process innovation complemented by adaptation of technology. This approach has been supported by a robust evaluation programme which, together with targeted exploitation support including cost benefit analyses and business modelling, has led to the generation of evidence-based plans for further service mainstreaming in the regions. Synthesised guidance on service transferability beyond the deployment regions has been developed to serve as an operationally useful source of information for external parties.
3 Towards SmartCare Pathway design

3.1 Background

Real-life implementation and mainstreaming of innovative care services never occurs in a vacuum, neither organisationally nor technology-wise (Allen, Glasby and Rodrigues, 2013). It is clear that the implementation of any new service is influenced by structural framework conditions, which sometimes act as strong barriers towards joint working. In current care systems, a range of specialist health and social services tend to be delivered by organisations that are funded, managed and regulated under different rules, regulations and guidance. Existing care systems tend to be slow in adopting new ways of collaborative working and information sharing, particularly where these cut across established organisational and professional boundaries. Likewise, the process of implementing new ICT tools has to address the challenges associated with any relevant legacy technologies that were created to support a range of silo processes prior to the concept of better joined-up service provision (Kubitschke et al., 2014). A simplistic approach towards service innovation can easily be interpreted as the wholesale migration to new service processes with ICT tools supporting them. Such an approach, however, poses major budgetary problems for service providers, and introduces risks in terms of system delivery and potential loss of service (and data) continuity.

The regions participating in SmartCare share many of the structural challenges mentioned above. However, they differ in terms of:

- health and care systems, their objectives and priorities;
- legal and regulatory frameworks;
- stakeholders (including the care recipient and family carers) and their role in service provision;
- health and care processes;
- existing ICT infrastructures; and
- a number of other factors.

SmartCare’s first challenge therefore, was to find a way of working within the framework of this diversity whilst at the same time achieving the common project goals. In order to reach its objectives, the project needed an instrument that:

- would result in a common vision for integrated eCare services cutting across the many European regions with their different frameworks and settings and preconditions; and
- would support the controlled migration towards integrated eCare services by managing change within these conditions.

On the one hand, this instrument needed to be concrete enough to structure integrated care processes and to serve as a model that each deployment site could work towards. On the other hand, it also had to be flexible enough to allow for a wide-ranging consensus to be established between the regions and the stakeholders working in them.

A widely used instrument to structure processes associated with care service delivery are pathways. The predominant use of pathways is in healthcare, where they are most commonly used as a concept associated with specific clinical conditions such as heart failure or diabetes (e.g. Turner et al. 2008). While clinical pathways are an excellent tool to regulate, prioritise and manage a sequence of events and actions assigned to different healthcare professionals in the delivery of healthcare, for the purposes of SmartCare their
granularity is not suitable and productive. They are for example too detailed to achieve a common vision that works for many European regions, and too bound to care practitioners and roles that normally change from region to region and context to context. Furthermore, the clinical pathways identified by a dedicated stocktaking exercise were too difficult to adapt for the purposes of SmartCare, as they are too specific to support subsequent phases of needs and requirements-based development.

For this reason, SmartCare introduced its pathways as presenting a high-level view of a typical service and workflow involving health, social and informal care. The pathways present a service flow at a more abstract level, i.e. structured along types of activities or groups of tasks; they do not specify actor roles for a clearly defined set of tasks within a specified time. A further differentiation to clinical pathways is that the SmartCare pathways do not specify detailed processes for specific interventions, but instead span the entire integrated care service provision from enrolment to leaving the service.

### 3.2 Main results

A range of methods were used to collaborate effectively with deployment sites to develop two pathways in the different regions:

- Integrated Long-Term Home Care Support (ICP-LTCare); and
- Integrated Home Support after hospital discharge (ICP-Discharge).

The methods used included on-site visits, briefing documents, webinars, online meetings, a face-to-face workshop, and electronic exchange of information and documentation, and resulted in the following:

- Stakeholder requirements, e.g. care recipients, family carers, care practitioners, care delivery organisations.
- Use case definitions to capture and describe the new care recipient’s care pathway journey, and the interactions with relevant care practitioners and care delivery organisations and their systems.
- Service process models to illustrate the new workflow and care pathway roles, functions and responsibilities, where appropriate, of the care practitioners, care delivery organisations, and their systems.
- Identifying and mapping onto the two care pathways the following ICT elements associated with the delivery of the various care process pathway activities:
  - o the information requirements and source, e.g. paper / electronic record systems;
  - o how the relevant information would be communicated to another electronic record system, care recipient, family carer or care practitioner, e.g. electronic message, email, fax, telephone, etc.;
  - o the technological infrastructure which would be used to communicate the relevant information to the different stakeholders.
- Service specifications that included the ICT functional specifications, associated use-case storyboards, and technical architecture illustrations.

The building blocks of the two pathways are shown below.
3.3 Referenced deliverables and Milestones

Deliverables listed below can be found on SmartCare project website.
### Lessons learned report

#### Things that went well

- The collaborative WP1-3 leads and first-wave deployment site representative site visits were extremely helpful in building a consensus around the local vision and implementation principles with a wide range of stakeholders that needed to be involved when designing and deploying integrated eCare services.

- The blended approach of providing a range of methods and tools to undertake the work required to complete the tasks in WP1-3 created continuous opportunities for clarification to be sought and support to be given when needed.

- Aligning and/or mapping the various tasks and activities onto the care process pathways ensured a consistency of approach; this facilitated deployment sites in their workflow redesign endeavours with their stakeholders.

- The collaborative workshop held with the second-wave deployment site representatives proved to be a very effective method of reaching a greater level of understanding amongst the WP leads and deployment sites in relation to how the existing care was structured and delivered, and how this could be redesigned through participation in SmartCare.

- The pathways were a great tool that served as a common vision of what integrated eCare can be and how it can be achieved, facilitating communication between project partners and with the outside world, and providing knowledge and guidance for the future uptake of integrated eCare in other regions of Europe and elsewhere in the world.

- Following the work done in SmartCare, a further 13 European regions have taken up the pathways for their own service development in the framework of the projects CareWell and BeyondSilos.

#### Things that could have gone better

- Additional time in the project plan for the design activities to be tested with the local stakeholders, and further refined if necessary, could have consolidated and reinforced the case for change prior to going operational. Communications would have been strengthened and enhanced, and/or the local project champions identified.

- Stakeholders' appreciation of how the new care process pathways would impact the workflow and roles and responsibilities of care practitioners may have been realised.
earlier in the project timeline had the organisational change management tasks been included from the start.

**Things that surprised us**

- There was considerable variation in the way core integrated care services were delivered by care practitioners and care delivery organisations in terms of roles and responsibilities and funding models.
- The level of understanding about what constitutes ‘integrated care’ varied, as did the maturity of delivery of social care service provision. This resulted in some innovative ICT enabled activities to be included in some deployment sites’ use cases, service process models and specifications.
- The language used to describe the project and its implementation, and the understanding of some fundamental elements this, was often different; this was not always fully appreciated by the WP leads during the initial months.
- Care recipients and family carers were generally very positive about their pre-SmartCare care experiences, and reported having good relationships with their care practitioners. This made the task of eliciting their SmartCare requirements more challenging, with the care practitioners’ enthusiasm for making improvements a critical success factor in building the care recipients’ trust.
- The roles and responsibilities of care practitioners were mostly enhanced to incorporate the new ways of working required to deliver the SmartCare process pathways, with a few sites creating new roles or jobs.
- WP1-3 required the stakeholders to be able to understand the concept of SmartCare. Many deployment site project teams were innovative in their engagement and communications with care practitioners, ICT staff and managers.
- Most of the deployment sites had mature electronic health record systems, even if each care recipient did not have an integrated electronic health record. However, most social care and third sector organisations relied much more on paper care record systems, with some having electronic administrative database systems.

**Lessons learned**

- The SmartCare pathways have proven to be a useful tool to guide the implementation of integrated eCare services in the nine deployment regions, setting them on a course towards viable and sustainable mainstream operation.
- Gaining agreement on terminology and project language is a crucial activity in project implementation.
- Time spent on properly understanding and documenting, in a consistent way, how the different care systems are structured, and which people and organisations do what, when and how, is likely to result in more productive redesign discussions and task completion.
- Mechanisms to facilitate stakeholder engagement and communication as a continuum within the project, without impacting too heavily on care practitioners in particular, is a crucial activity.
- Incremental change within existing structures may yield faster and more stable returns than a complete overhaul of the status quo.
3.5 Recommendations

- **Recommendation 1**: Allow for sufficient time in the project plan for the design activities to be tested with the local/regional stakeholders, and further refined if necessary.

- **Recommendation 2**: Reaching agreement on terminology and project language with the help of a dedicated glossary should be included as a distinct activity in the project implementation plan at the start of a project.

- **Recommendation 3**: Analyse existing regional health and social care policy documents, and align first service design ideas with their priorities, bearing in mind the way in which these documents were drafted, and that they may not have the full support of all stakeholders.

- **Recommendation 4**: Consider creating a permanent working group or steering group composed of people who shaped the initial learning process; use this group to advance from ideas to planning, implementation and evaluation stages.

- **Recommendation 5**: Approach requirements elicitation, service design and service specification in an iterative way, involving all stakeholders.

- **Recommendation 6**: Mechanisms to facilitate stakeholder engagement and communication as a continuum within the project without impacting too heavily on care practitioners in particular is a crucial activity, and should be seen as a priority. Redesigning services is extremely complex, and the content of project plans should be sufficiently flexible to reflect the ongoing learning and feedback from a wide range of stakeholders. Co-production methods as a process of active dialogue and engagement between people who use services and those who provide them have been a successful approach in SmartCare.

- **Recommendation 7**: Incorporate change management from the start as an ongoing activity in service re-design and implementation to facilitate stakeholders’ appreciation of how the new care process pathways would impact on the workflow and roles and responsibilities of care practitioners.
4 Implementing SmartCare Integrated Platform

4.1 Background

The integration architectures for each of the deployment sites were defined to integrate existing ICT systems at each site, to test new components and their compliance with the service specifications, and to implement the integrated service infrastructure at each site. The SmartCare project either provided the integration framework between existing health and social care systems, or built a specific clinical condition based care oriented system which spanned the health and social support requirements for that particular clinical condition. Almost all of the deployment sites used mobile computing technologies and/or web services to provide the SmartCare functionalities. All deployment sites provided integrated information views across the healthcare and social care requirements for the care recipient, with these views being tailored to the particular user.

4.2 Main Results

- Three of the four first wave deployment sites (Aragon, Scotland and RSD Denmark) had large, integrated and established legacy HIS systems. They used the SmartCare project to integrate the GP and social care systems to the HIS system to provide integrated care amongst the different care givers. The SmartCare project is seen as providing interactive combined view web portals with backend software links integrating large databases or information systems. The focus of the SmartCare project was to provide additional functionality which supported specific clinical aims (Scotland), or rounded out more functionality in their existing integrated platforms (Aragon, Scotland and RSD). The fourth first wave deployment site (FVG Italy) used SmartCare to develop further a previous EU project (Dreaming) and added mobile hardware platform capability and home computer platform capability along with interactive questionnaires services; the system is stand-alone, as there are no large established healthcare or social care ICT systems in FVG with which to integrate.

- Most of the second wave deployment sites did not have large legacy health and social care ICT systems to integrate. Therefore they tended to build a separate SmartCare system to provide the integrated functionality, or built either the healthcare or social ICT capability and integrated it. The main exceptions to this in the second wave deployment sites were South Karelia (Finland) and Tallinn (Estonia). In the case of South Karelia, they had a robust ICT framework for multi-user access to health services and social services, so SmartCare provided integration between those two care systems. In the case of Tallinn, they had separate national healthcare and social care systems, so SmartCare provided a way to integrate information from the two systems for user based access, along with deployment of a home remote monitoring system. The other second wave sites focused on specific disease management systems such as diabetes for Attica (Greece) and CHF for Noord-Brabant (Netherlands). In the case of Kraljevo (Serbia), outdated isolated healthcare and social hardware and software systems were upgraded and integrated. In all cases, they provide access to the myriad of users identified by the SmartCare project: care recipients, social care workers, informal caregivers, and clinicians.

- With regard to the types of ICT used by the deployment sites, they tended to rely upon hardware interfaces that could provide web or service oriented applications. This allowed for application portability to many different hardware platforms: mobile phone, tablet and PC. In most cases, any sensor data was either automatically uploaded to a mobile platform, or manually entered. If the data was manually entered, it was usually derived from a care recipient owned device. This ‘bring your own device’ philosophy has been expanding, as many care recipients own their own...
mobile phones, computers and in some cases, simple medical device sensors. Scotland and South Karelia specifically designed their SmartCare systems to be able to accommodate this philosophy. If the end-sensor was provided by the SmartCare service, the sensor data was usually automatically sent to the gateway for transmission to the SmartCare database and application, or to the corresponding healthcare / social system for subsequent viewing by the SmartCare portal / service. In this case, the gateway was for the most part locked down to provide only the gateway application and/or SmartCare services.

- The different network technologies used reflected those which were most prevalent in each region: home-based computers usually used WiFi or GPRS; mobile phones and tablets tended to use 3G/4G GSM mobile network transmission. Short range networking to the home gateway (mobile phone or home computer) was usually provided by BlueTooth, ANT+, or in the case of some home environmental sensors, Z-wave. The short range network transmission was to the home gateway, and the long-range transmission was to the aggregate system (healthcare, social care or SmartCare specific). In the case of Tallinn, NFC was used as a short range network transmission protocol for user identification with their national ‘smart-card’ ID cards. TCP/IP was used for the network protocols in the computer based systems (and in some cases with the mobile platforms), with 3G/4G used in the mobile based systems.

- With regard to the standards used for interoperability, all of the sites used some type of networking standards as described above. For data and messaging standards, most sites used HL7 for messaging interfaces. A few complied with IEEE 11073 for medical device data standards and/or used Continua certified personal health devices, which are compliant to IEEE 11073, HL7 and IHE-PCD for data standards, messaging standards and profiles, respectively. Denmark has a robust standard system for messaging and data called MedCom that they have been using for twenty years. It originally relied on EDIFACT for messaging; however, they are harmonising that with HL7, the IHE profiles, and Continua for personal health care device data inclusion into their HIS. In the case of social care data, there were no specific standards identified outside of a messaging construct. Social care data standards are not yet prevalently available for use in many regions.

- For the web services provided by the SmartCare implementations, a mix of service-oriented protocols was used: http, https, sFTP, JSON (for structured data) and REST (for some web transactions). Other document and service standards included pdf (for scanned documents), iCal (for calendaring functions), and XML as defined by ISO 12967 (middleware architecture for system integration).

- For security standards, https and SSL were used along with user controlled access at the application level. In all regions, user based access to the SmartCare information was required, with concomitant verification against a caregiver or care recipient master list held at a regional or national level for some sites. Additionally, Scotland employed transport layer security for their web services.

### 4.3 Referenced deliverables

Deliverables listed below can be found on SmartCare project website.

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4.4 Lessons learned report

Things that went well

- One of the main criteria by which the deployment sites were selected was the maturity level of their existing infrastructure towards implementing the SmartCare “ideal” solutions. However, the means to implement the platforms varied. Some sites opted for in-house development of applications (Aragon, NHS24 Scotland, Eksote) while others either issued tenders with technical objectives (Attica) or used subcontractors (FVG, Serbia) who were often longstanding collaborators (e.g. Southern Denmark with IBM). Each site, being aware of their own technological, clinical and social environments, in the end did deploy an integrated platform and intend to incorporate the integrated service models and platforms that SmartCare developed into their standard care.

- There was extensive user input in many of the deployment sites before procurement to ensure good platform usability by all the different users and stakeholders.

- There was a clear understanding between the deployment sites that what was really important was internal communications and the definition of common targets, especially in multi-entity schemas.

Things that could have gone better

- As with most EU projects, more time to implement the platforms and allow for an adequate review cycle would have been beneficial.

- Many of the deployment sites did not necessarily have their technical people, who were implementing the platforms, be involved with other deployment site gatherings (project assemblies, etc.); there might have been earlier collaboration.

- Initially, an iterative approach had been chosen for the full deployment of the services. However, due to various limitations and constraints, a more flexible model was adopted, allowing each site to decide on the optimum roadmap to implement the offered services.

Things that surprised us

- The reliance on client owned devices at deployment sites where the main interface was a web portal integrated to existing ICT systems that had been augmented by SmartCare.

- Several deployment sites (NHS24 and Noord Brabant) used open interoperability standards to define the interfaces to their platforms that were built by outside subcontractors; they looked at this as a long term project and not a stand-alone pilot.
• There was extensive debate regarding how to handle personally generated data - how to integrate it and display it with other types of data that are generated about the care recipients. In general, deployment sites found that having a separate personal file or database and then providing a shared view was best.

Lessons learned

• Extensive user testing over the life of the project is necessary to help ensure better system acceptance.

• Procurement processes can be the limiting factor in platform implementation timescales. In one site’s case, the bureaucratic process held up their implementation. In another site’s case, a change to using a ‘bring your own device’ requirement which allowed for maximum flexibility by the user and reduced operating costs, modified the technical interface requirements and increased the testing parameters.

• Despite the maturity level of implementations in the healthcare domain for many of the deployment sites, the majority of sites had a weak or non-existent ICT penetration in the social care domain. Hence before being able to implement the two integrated pathways as requested to meet SmartCare’s targets, considerable efforts were needed for the social care services to reach a similar if not identical level of digitalisation.

• For those deployment sites that had well-developed ICT systems supporting healthcare and other various services, their main technical issues were in providing integration between those systems and bringing about shared access.

• System / platform response times were found to impact users’ acceptance of the system. Careful attention and specification of acceptable network delay / response times should be one of the systems requirements.

• Adequate and repeated training in the use of the system is necessary for platform acceptance; be prepared to spend more resources than originally anticipated on this task.

4.5 Recommendations

• Recommendation 1: Know your environment both technologically and service-wise. Be prepared for multi-disciplinary approaches and requirements to be able to meet the diverse user requirements.

• Recommendation 2: As above in the lessons-learned, you will most probably find that social care services are less technologically developed in the ICT realm. Be prepared to augment that service to bring parity and eventual technological integration with the more advanced services.

• Recommendation 3: Consider using open standards as specification documents for your interfaces between your systems. This will allow you to ensure flexibility on each side of the interface such that a change on either side should not break the data flow.

• Recommendation 4: Using web based portals for user interfaces allows for system flexibility over time; different end hardware platforms can be accommodated, as well as limited network bandwidth constraints.

• Recommendation 5: Discuss with all stakeholders how the different sources of data will be managed security-wise, storage-wise, access-wise and integration-wise. Anticipate that personally generated data will need to be accounted for as a source, and integrated with traditional sources of data.
Recommendation 6: Feedback from ICT suppliers on the technical overlay should be sought as early as possible, to avoid a mismatch between what care service providers / care recipients want, and what suppliers are able to offer. An open market consultation as part of a procurement procedure is one way to achieve this. If the service calls for components or entire systems that are currently not provided by suppliers, a pre-commercial procurement (e.g. joint development of a solution by suppliers and clients, sharing the investment risk) might provide a way forward.
5  Paving the way towards SmartCare eCare deployment

5.1  Background

Two workpackages comprised the activities to bring to reality the implementation of integrated care services and the implementation of the care pathways designed for a real environment.

During WP5, each site carried out specific activities according to their local context, formal legal and ethical requirements, organisational models, and administrative procedures. Some sites had to go through public procurement for the design, supply and set up of the ICT SmartCare service.

Field testing was carried out in each site before launching SmartCare services. Operational planning included identification and recruitment of formal / informal stakeholders, development of a sustainable model of training, and a relevant training protocol.

In WP6, the main objective was to describe, analyse and follow-up the operational activities performed by the sites to provide integrated care activities, to bring to real environments these integrated care pathway designs. The operation of activities in the different areas of deployments were studied and analysed, covering the risks that sites could face, the actions that they performed to deploy integrated care services, the issues that occurred and how the sites solved them, and the lessons learnt from these experiences. All this know-how and experiences are made public for other following sites to learn from when deploying their own integrated care services.

Each site had its own local context and specific situations that affected the implementation of ICT services. However, they had to follow a methodology for the provision of integrated care services to ensure best quality, ensure the correctness of the procedures to provide care according to the pathways protocols definition, and provide help support services that would help users when facing issues at any time.

The operational activities and experiences of the sites were classified under different categories to better disseminate their know-how. These were: users' recruitment, enrolment of professionals, training, help desk, ethical and legal aspects, technical issues and organisational changes.

5.2  Main Results

The main results for WP5 were:

- Procurement(s) to set up integrated services & ethical approval of integrated service interventions.
- Risk assessment & development of contingency plans.
- Identification and recruitment of service users: formal / informal stakeholders, e.g. nurses, GPs, specialists, social workers, caregivers, third sector, end users.
- Training, both one-to-one and class training, webinars, manuals.

The main results for WP6 were:

- Quality assurance teams in each site to ensure the correctness and quality of the integrated care provision in accordance with the pathways.
- Help support services of different types to ensure the resolution at any time of incidents or requirements that the users may have. Call centres, ICT support, etc.
- A methodology to analyse integrated care implementation plans based on Risks, Actions, Issues and Lessons Learnt.
- An online tool to collect and share knowledge, experiences and know-how (www.pilotsmartcare.eu/rail). This tool is shared among other European projects.

5.3 Referenced deliverables

Deliverables listed below can be found on SmartCare project website.

<table>
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<td>Installation of last deployment sites completed</td>
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5.4 Lessons learned report

Things that went well
- Despite a few challenges, the operational planning stage was successful thanks to close collaboration, supervision and dedicated management teams.
- Creating a methodology of work to ensure the success of the implementation of ICT services (quality teams and support services).
- Methodology of definition of lessons learnt through the definition of its context (Risks, Action, Issues, Lesson Learnt) to capture valuable experiences and very detail know-how.
- Creation of an online tool to collect, share and promote knowledge among other follower sites.

Things that could have gone better
- The dynamic nature of healthcare and social organisations, under the recent pressures posed by sustainability, hindered the flow of planning and enrolment activities.

Things that surprised us
- Some sites underestimated the actual length of timescales for procurement and ethics approval;
- Transversal training of professionals (doctors, nurses, and social workers) proved to be effective in team building and cooperative learning skills.
Although the context was different, most of the sites faced the same challenges and risks. Therefore, a big basket of solutions and resources are available for the follower sites that would like to implement ICT services.

Lessons learned

- Time matters and plays a crucial role in ensuring a successful preparation. In fact, installing an integrated service is a lengthy process, from technical, legal, and organisational viewpoints. Integrating new platforms within existing ICT systems is a slow process as well, and needs to be carefully accounted for.
- Without an existing culture of integrated care, paving the way for change may be time consuming and resource hungry. Training needs planning.
- The human factor is the core element of every integrated care plan. Management team needs to be made up of experts. Theory is important, but practical experience does make a difference.
- Each site has a different context; therefore, the implementation of integrated care services has to adapt to the strategies and environments already in place. Learning from others' experiences is essential to speed up the process of deployment.

5.5 Recommendations

- **Recommendation 1**: Set up an experienced management team made up of experts experienced in integrated care, health and social care domains, capable of understanding the internal organisational process.
- **Recommendation 2**: Have a realistic plan and time schedule, including an effective risk and contingency plan, to be able to effectively monitor all the set-up progress.
- **Recommendation 3**: In order to achieve valuable knowledge that will be useful for readers, it is necessary to understand the context in which the experience has occurred. This has been solved in SmartCare by defining a methodology to define the context of an experience by explaining the risks that a site may face in the implementation of integrated care services, the operational activities performed to avoid these risks, the issues that occurred, the solutions to them, and the lessons learnt. This entire context provides enough information to understand the lessons learnt by the early-deployment sites.
- **Recommendation 4**: An online tool to share experiences is very helpful to spread the knowledge and disseminate lessons learnt among the different regions that wish to implement integrated care services.
- **Recommendation 5**: Having a close collaboration between care providers is essential for a successful integration of care. Care providers must have a communication channel that allows them to work jointly and communicate easily. ICT platforms are one of the tools that may help in this, as it permits an asynchronous channel to work closely and rapidly.
- **Recommendation 6**: Each and every step of an integrated care service plan, organisation and implementation requires a considerable amount of time. Procurements have proved everywhere to be a lengthy and challenging process. Recruitment of healthcare / social care multi-professional teams may also be time consuming, since it requires an innovative change management approach. With a view to ensuring successful completion and scalability of interventions, the EC is called upon to ease and sustain realistic project timelines, consistent with such relevant needs.
6 SmartCare European added value initiatives

SmartCare has created European added value in a number of areas:

- Extending the MAST assessment model to integrated care.
- Predictive modelling based on experimental data.
- Change management tool box.
- Working with the B3 Action Group.
- Knowledge sharing with other similar projects.

6.1 Background

A series of unplanned but fortunate circumstances have led to a situation in which three of the main projects funded by the European Union in the area of ICT enabled integrated care (SmartCare, BeyondSilos and CareWell) have been won by a same set of core partners. In addition, most of the deployments sites were also reference sites of the EIP AHA. This has facilitated a very high level of synergy among all the initiatives addressing the issue of the ageing EU population and the changes in the care paradigms which are indispensable to cope with the consequences of such ageing: deterioration of the dependency ratio, increased prevalence of chronic conditions, higher citizens’ expectations about care services, etc.

The rapid ageing of the population has also added further urgency to the need to provide reliable and contextualised information to decision makers in such a way that they can confidently allocate part of the care budget to the development of innovative ICT enabled care services. Unfortunately, experience has shown that best practices are not necessarily transferrable from one context to another.

This has led SmartCare to develop predictive models which can not only predict with a reasonable approximation the outcome of introducing an innovation based on experimental data collected in one context into another context, but also predict future outcomes (short- to medium-term) if an innovative service is deployed or not in a particular setting.

SmartCare has invested considerable resources to address in a scientific way the issue of resistance to change by professionals. This was based on a survey among the deployment sites of the three projects on the main obstacles to innovation. SmartCare has developed a tool kit aimed at supporting care providers to engage professionals in continuous innovation to adapt care organisations, practices and processes to the evolving needs of care recipients.

6.2 Main Results

- MAST 2.0 which extends the applicability of the MAST assessment model to integrated care.
- Predictive models validated with experimental data in two regions.
- Change management study & tool box.
- Active participation of SmartCare representatives in the work of the B3 Action Group.
- Adoption of the EIP AHA maturity model by 10 members of the SmartCare Committed Regions Board.
Knowledge sharing through the participation of SmartCare partners in the Mentoring Schools organised by BeyondSilos.

6.2.1 MAST

The MAST 2.0 Manual (MAST-IC) manual comprises a first draft of the new MAST-IC framework for assessment of ICT supported integrated care. The manual describes the steps needed when assessments of this type of service are conducted, and provides a foundation to support decision makers when taking decisions on investments in new integrated care services. The MAST-IC manual follows the structure of the original MAST manual, but reflects the additional elements that are needed when assessing ICT supported integrated care.

6.2.2 Predictive models

Interventions in the area of integrated care are in most cases complex, building upon a number of components that may act either independently or interdependently, and involve and affect a range of different stakeholders. The application of predictive models in two deployment sites, FVG and Aragon, started from current pathways and organisational models; taking advantage of the data collected, they tried to predict future outcomes, and if an intervention tested and proved to be successful in one setting could also be successful in a different setting. Different approaches have been applied including Markov models, discrete event simulation, and budget impact analysis, in accordance with international guidelines.

6.2.3 Change Management

The main results of Change Management Toolkit is summarised in these two parts:

- Part I: Reporting on ‘the ‘Change Management’ Research Project study approach, activities, outcomes and conclusions, on-going work and future research.
- Part II: Change Management Tool Box which contains the reporting of study outcomes and conclusions, customised into a practical ‘Change Management Tool Box’ providing concise description of: general strategies and requirements, interventions, indicators and physician e-leadership.

6.2.4 Synergy with the B3 Action Group

The main objective of the synergy activities carried out between the SmartCare, BeyondSilos and CareWell projects, and the European Innovation Partnership on Active and Healthy Ageing (EIP on AHA) B3 Action Group on Integrated Care, was to establish close connections between the three project teams and the B3 Action Group. This took full advantage of the presence of key partners in the projects and in the B3 Action Group to share knowledge, experience and tools to maximise the reach and impact of all the initiatives.

The value of linking the project’s activities with the work of the B3 Action Group on Integrated Care has been evidenced in the production of key outputs from these synergy activities:

- The self-assessment of maturity of integrated care (using B3 Maturity Model) in 10 SmartCare regions.
- Summary report of key findings / outcomes (included in this document).
- Inclusion of the use of the B3 Maturity Model in the SmartCare Guidelines for Deployment (D9.3).
Free availability of MAST 2.0 for the B3 Action Group members wishing to evaluate the outcome of the ICT-enabled integrated care services that they deploy.

The following notable outcomes were achieved from the synergy work between the B3 Action Group and SmartCare:

6.2.4.1 MAFEIP

The European Commission decided to develop a tool, MAFEIP, the main purpose of which “... is twofold: first, to accumulate evidence on the impact of the activities carried out within the (EIP AHA) Partnership in terms of quality-adjusted life expectancy and health and care resource use within and across its six thematic Action Groups; and second, to provide decision relevant outcomes that are of value to developers, investors and implementers of innovation in the Active and Healthy Ageing arena across Europe.”

Members of the SmartCare Consortium, and in particular a substantial representation in the team involved in the evaluation of the Project results, followed closely the various phases of the MAFEIP tool development; in particular, they gave a significant contribution to the MAFEIP tool workshop held on 21st September 2015 in Brussels.

In the Seminar on Scaling-up and mentoring organised by SmartCare’s Project Officer on 20th January 2016 in Brussels, the SmartCare Management Team presented in a graphical way the relation between MAST and MAFEIP, and in particular how they can be used in the same project at different stages of the project’s lifecycle.

6.2.4.2 Testing the B3 Maturity Model with SmartCare Regions

A key achievement of the EIP on AHA B3 Action Group on Integrated Care has been the development of a conceptual model for regions to assess their readiness for integrated care: the B3 Maturity Model (B3-MM). The B3-MM was derived from interviews with 12 European countries, or regions within a country, responsible for healthcare delivery. These regions / organisations are also active members of the B3 Action Group on Integrated Care.

As part of the collaborative work between the B3 Action Group and SmartCare project, 10 members of the Committed Regions Board (CRB) participated in the self-assessment process into readiness for integrated care using the B3-MM.

This activity developed a radar diagram for each CRB Region showing how the healthcare systems are attempting to deliver integrated care services for their citizens, and what are their strengths and weaknesses. The findings of the outcomes of this activity are reported in SmartCare deliverable D7.5 SmartCare Collaboration with EIPonAHA B3 Action Group.

The synergy activities between the three projects and the EIP on AHA B3 Action Group on Integrated Care has resulted in real benefits for project partners, B3 members, and the wider European integrated care community.

6.2.5 Synergy with BeyondSilos and CareWell

Apart from the financial aspects that have been kept rigorously separate because they were governed by separate Grant Agreements, in many ways SmartCare, BeyondSilos and CareWell have been run as a single, very large project. The three projects:

- all aim to deploy ICT enabled integrated care and assess the outcome of it using the same multidimensional assessment models (MAST and ASSIST). Differences between the services exist, but they are not so large as to make comparisons meaningless;

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2 Excerpt from http://is.jrc.ec.europa.eu/pages/TFS/MAFEIP.html
• have the same three partners in the same key roles:
  o HIM SA for operational and medical coordination, and quality assurance;
  o Empirica for dissemination, cost benefit evaluation, support to the deployment sites for requirements and use case definition, service process modelling and exploitation preparation;
  o RSD for evaluation. Some of the evaluation tasks were subsequently transferred to HIM SA and HIM SL, but they were anyway conducted in close collaboration with RSD;

• have the same Operational Coordinator and share several members of the Management Team.

The main areas of collaboration lie in:
• Predictive modelling. See section 6.2.2 above.
• Change management. See section 6.2.3 above.
• Mentoring School. Representatives of SmartCare have actively participated in the sessions of the Mentoring School and have shared their experience with the partners of the other two projects.
• Evaluation. Major effort has gone into keeping the evaluation framework and the codebooks of the three projects as aligned as possible.
• MAST 2.0.

6.3 Referenced deliverables

Deliverables listed below can be found on SmartCare project website.

<table>
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<td>Release of Change Management Tool Box</td>
<td>HIMSL</td>
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</table>
### 6.4 Lessons learned report

#### Things that went well

- The workshops were a fruitful platform and forum for discussions regarding the value of assessments of both telemedicine solutions and ICT supported integrated care as a foundation for decision making. The 2\textsuperscript{nd} workshop generated a productive and interesting discussion about integrated care, and also revealed that there are short comings in the current methods for assessing integrated care services.

- The development process for the MAST 2.0 manual has been structured and well documented in order for the work on the improvement of the framework to continue in the best way possible.

- The collaboration with the other two projects on ICT enabled integrated care went extremely smoothly.

- The activities related to change management support met with real enthusiasm among the local project teams; an unexpectedly high number of people attended the meetings with the change management team.

- The application of predictive modelling and budget impact analysis on integrated care projects is feasible, and could support informed decision-making.

- The application of predictive modelling and budget impact analysis on the first deployment site, based on the data collected during the project, has demonstrated the short and medium-term sustainability of the services under evaluation, with the potential to release financial / human resources that could be used for other services.

#### Things that could have gone better

- The time frame for developing the new MAST based assessment framework for integrated care was too short. Therefore, it was not possible to present and validate a final framework for ICT supported integrated care assessments in the MAST 2.0 validation workshop. Instead, it was found more relevant to use the workshop as a forum to establish whether or not the original MAST framework was even valuable as a foundation for assessments of ICT supported integrated care.

- Data for the validation of predictive models could have been timelier.

- The time frame for developing predictive modelling for the first deployment site, validating it, and transferring it to the second deployment site was too short; consequently the contingency plan was activated, including the simultaneous development of two different models for the two sites.

- SmartCare could have been officially recognised as a living lab for the members of the B3 Action Group. This would have benefitted the latter more than the former.

#### Things that surprised us

- The literature was not conclusive in terms of what is needed in order to assess ICT supported integrated care that includes both health and social sectors. The studies in the review showed that there is a need for further studies in the field of integrated care in order to develop a more conclusive assessment framework.
People tend to pay undue attention to the hard element of innovation (e.g. technology) and discover too late that the difficult part is the soft element (human behaviour and resistance to change).

Predictive modelling and change management support seem to attract the attention of the very big companies (pharma, medical device suppliers).

Lessons learned

- There is a need for more development of the methods for assessing the different elements in integrated care, e.g. measurements of integration levels and perceptions of informal carers.
- The process of developing and validating a new assessment framework is more time consuming than described in the DOW.
- There is an urgent need for validated key performance indicators for integrated health and social care services. It seems that indicators already tested in different projects cannot cover this need, and the development of new ones may be necessary, e.g. development and validation of appropriate questionnaires, etc.
- The definitions of integrated care differ when you ask different people from different European regions. This means there is still a need for consensus building in the field of integrated care.
- 3½ years is by far too short a time to do all the things that should have been done. We all have the impression that the time constraint rather than the budgetary one has hampered achieving all the possible results; no mechanisms exist within the European Commission to fund the additional work.
- Several factors are identified that could affect interdisciplinary collaboration during implementation of ICT enabled integrated care, in particular: culture, ‘hard’ disruptive impact (workflow), ‘soft’ disruptive impact (relationships and communication), hierarchy, ICT usage, leadership, management influence, motivation, professional fragmentation, rules laws and regulations, (new) roles, shared mental model, system fragmentation, tech-fit, tasks roles and responsibilities, trust workarounds. Factors can be either facilitating or obstructing to collaborative excellence within multidisciplinary teams engaged in the implementation of ICT enabled integrated care.
- ICT enabled care facilitates a significant increase of empowerment of patients and informal carers, e.g. through: information exchange; execution of right of choice; direct communication with professionals). This process enhances a transformational shift in responsibilities, power and identities of professionals, leads to changes in communication and relationships, e.g. by influencing informal hierarchy and pre-existing professional boundaries within existing health and social care arenas.
- Physicians can be essential in ICT enabled integrated care implementation. They are important in building rapport with patients, in change management, and in leadership roles. Like other professionals, physicians can perceive integrated care as a threat to professional boundaries. Physicians’ attitude and behaviour can be changed, e.g. based on positive experiences and being convinced about its added value (e.g. for patients), in some cases also based on economic incentives.
- Implementation of ICT enabled integrated care should be regarded as a dynamic process of (often disruptive) transformation, based on an intertwined myriad of soft and hard factors influencing each other. This process takes a considerable amount of time, resources and willingness of all stakeholders to change and transform.
- The complexity of implementation dictates that all disciplines of the extended integrated care team (including informal carers and care recipients) should be well
represented at all levels of teams responsible for and during all phases of implementation.

- (Clinical) governance and management can have a significant (positive or negative) impact on sustainable integrated care implementation, since laws, regulations and other formal agreements can influence interdisciplinary collaboration in numerous ways.
- Interventions identified reflect a relative absence of effective theoretical models and approaches to facilitate interdisciplinary collaboration during implementation of integrated care.
- There is a need for an assessment of the transferability and sustainability of the services under evaluation.
- Predictive modelling techniques can support informed decision-making, and potentially reduce the risk of a planned investment.

6.5 Recommendations

- **Recommendation 1:** The new framework “MAST-IC” should be tested in integrated care studies and validated before it is finalised. It could be relevant to have a validation workshop where MAST-IC in its current form should be discussed with decision makers to validate that the framework covers their needs.
- **Recommendation 2:** Methods to measure integrated care in a more generic manner should be developed, instead of having a disease specific focus. Also, methods for measuring carers’ and citizens’ perceptions of the care should be developed. This will ensure more focus on the care continuum instead of only health related outcomes.
- **Recommendation 3:** Transform MAST from a mere assessment model into an operational tool by integrating it with predictive modelling and support for change management.
- **Recommendation 4:** Develop within the European Commission mechanisms which allow reports that can be written only after the end of a project.
- **Recommendation 5:** Governance: Executive level decision makers should reconsider their approaches to organising change and transformation. Expert advice on healthcare transformation will often be needed at executive and board levels.
- **Recommendation 6:** ‘Hard factors’: Priority should be given to redefine relevant laws, rules and regulations potentially influencing effective collaboration between disciplines and jeopardising sustainable implementation of integrated health and social care.
- **Recommendation 7:** Change management approaches: Sustainable implementation of integrated health and social care entails a rigorously different approach in managing change, in particular focusing on human factors. New insights on implementation, health and social care transformation, and cultural change need to be taken into account when preparing for implementation; experts explicitly knowledgeable in these new areas should be employed at all levels of the organisation.
- **Recommendation 8:** Further research: Based on the results presented in D7.6, further research is required, in particular on: validation of influencing factors identified; practical implications of the current work, e.g. focusing on change management tactics, instruments, and their effects on sustainable implementation of integrated health and social care; and development of medical (e-)leadership competences of physicians.
- **Recommendation 9**: Predictive modelling should be applied early in the project, before deployment of the service under evaluation, and then validated during the project in different deployment sites.

- **Recommendation 10**: Budget impact analysis is a well-established methodology to assess the impact of health technology in healthcare systems. Since, this type of analysis is requested by most of relevant authorities in order to approve the reimbursement of new healthcare technology, it should be part of the evaluation framework of an eHealth or integrated care project.

- **Recommendation 11**: Further research is necessary in order to validate the combined use of predictive modelling and budget impact analysis in the framework of MAST 2.0, in order to support informed decision-making beyond the end of a project.
7 Has integrated eCare kept its promise? Results from SmartCare

7.1 Background

The project objective was to identify all the relevant differences induced by implementing ICT supported integrated health and social care, mainly in the health and social care resources used, safety and clinical effectiveness, users’ perspectives and organisational aspects. Any impact that ICT supported integrated health and social care might have on all users was the subject of analyses according to the framework presented in the MAST model (Kidholm, et al., 2012). MAST was adapted for SmartCare to cover aspects of social and healthcare integration; it includes the following domains:

1. Health problem and characteristics of application.
2. Safety.
3. Clinical effectiveness.
5. Economic aspects.
6. Organisational aspects.
7. Socio-cultural, ethical and legal aspects.

An observational study design was adopted, where participants were allocated to intervention or comparator group and followed prospectively.

Originally, the project evaluation was to be based on deployment site evaluations; only after the last review was the statistical analysis plan extended to include a project level evaluation, taking into consideration the significant diversity between sites.

The primary research hypothesis was that SmartCare services would improve care recipients’ perspectives, mainly quality of life, empowerment and satisfaction, while at the same time their need for admissions and contacts with the healthcare professionals would be reduced.

A number of limitations have been clearly identified during the project and reported, e.g. the significant diversity, and the lack of an established evaluation framework for integrated care, etc. Significant efforts have been made by the partners in order to reduce these limitations, but this was not possible for some of them. Consequently, the project results have to be interpreted cautiously, taking into considerations these limitations.

A socio-economic impact assessment was carried out assessing integrated eCare services to enable those implementing integrated care to make strategic decisions during development and early operation. The approach used is called ASSIST (“Assessment and evaluation tools for e-service deployment in health, care and ageing”). It is based on cost-benefit analysis, standing out from other assessment frameworks in that it:

- helps to identify and address stakeholders that lose through the service, who may thus become strong veto players;
- allows monitoring of the actual and prospective service development over time;
- includes non-financial factors that in many cases have a major impact on the behaviour of a stakeholder; and
provides probabilistic methods to achieve rigorous results from data of varying quality.

The overall aim of the socio-economic impact assessment was to support the deployment sites in making integrated care services:

- Viable: working successfully.
- Sustainable: maintaining a positive ratio of costs and benefits.
- Scalable: working for all patients, and not only the project population.

7.2 Main Results

- There was great diversity across the participating regions in relation to the prevailing framework conditions for the cross-organisational integration of already existing care delivery processes. Significant diversity was thus seen among the different deployment sites when it came to the localisation of the generic Smartcare pathways. In turn, the local implementation of the common pathways and organisational models led to differences in tested services, ICT infrastructures and perceptions of integration.
- From a final number of more than 10,000 service users, the evaluation cohort consisted of 1,764 (56.3% were female); 1,043 received SmartCare services, and 721 usual care, mainly recruited in the long-term pathway.
- The mean age was 75.9±11.3 years old, but the comparator group was about two years older than the intervention group (p<0.001). A significant difference in the mean age among the different sites has been seen, from 61.79 years old in North Brabant to 84.58 years old in Aragon.
- The SC services recipients had more comorbidities than the comparator group, as indicated by the higher Charlson Comorbidity Index (CCI) at enrolment (2.32±2.17 vs 2.05±2.56, p<0.001). However, there were also significant differences between the different sites in CCI, from 0.86 in North Brabant to 3.91 in Kraljevo.
- A significant diversity has been seen in the population characteristics and outcomes among different deployment sites. But there were also differences between the integrated care and the comparator groups; this may indicate unsuccessful randomisation or a degree of selection bias, e.g. more care recipients in intervention group were familiar with the use of PC compared with the comparator group (61.5% vs 21.6%, p<0.001).
- The integrated care (IC) group has been followed for 238.70±167.12 days, and the usual care (UC) group for 287.88±121.03 days (p<0.001). This difference is mainly due to the significant difference in the follow-up of the Scottish population; excluding the Scottish population, the follow up is 291.21 days for IC vs 278.16 days for UC. About 10% of the IC group has been lost to follow-up or withdrew informed consent, and <1% in UC group. Aragon, Kraljevo and RSD followed their cohorts for a mean duration of 11 to 14 months.
- SmartCare services were safe from a clinical and technical point of view, and there was no statistical significant difference in mortality.
- Fewer patients from the IC group have been hospitalised than from the UC group. About 80% of these admissions were unplanned, and usually in the cardiology department. Although the total number of admissions was higher in the IC group, their hospitalisations were shorter.
- If we focus on the unplanned admissions, we see the same trends as in total admissions; but it was very interesting to see that there was a significant delay before the first admission for the IC group.
- More contacts (physical and others, planned and unplanned) with the health and social care professionals have been registered in the IC group.
- There does not seem to be any self-perceived progression from passive receipt of care toward greater patients’ activation, which indicates that strengthening of empowerment and of self-management has not been demonstrated.
- According to the measurement scales applied for evaluation purposes, the change in QoL was negligible in both groups. This suggests that the anticipated benefits of integrated care, in terms of quality of life improvement, have not materialised in the deployment sites.
- Outcomes of the cost-benefit analysis suggest that SmartCare care recipients, at least in part, value the new services in terms of supporting them in better coping with their care related situation. Although this effect may not be reflected in the QoL and care integration measures applied, the available cost benefit data point in the direction that at least some of the care recipients value the new SmartCare service as being helpful when compared with the services they had received before.
- Further to this, available cost-benefit data point in the direction that the time care staff needed to spend on client related matters could be partly reduced, e.g. due to improved co-ordination and sharing of information among professionals. For instance, in at least some of the deployment sites, it was possible to reduce the average time spent by health and/or social care professionals per consultation. Also, under certain circumstances, the involvement of third sector organisation and volunteers in the care loop enabled a partial shift of tasks from relatively “expensive” care staff to “lower-cost” stakeholders. Whether, and if so how, such effects may be achievable seems not least to depend on the local context within which the SmartCare services were implemented.
- An extrapolation of SmartCare service delivery over a duration of 84 months taking such effects into account suggests that, assuming otherwise unchanged conditions, a positive overall socio-economic return is likely to be achievable in some deployment regions; that is, the sum of all estimated benefits outweighs the sum of all costs accruing across all stakeholders over the assessment period. However, within the currently implemented service configurations, achievable costs and benefits rarely tend to be equally distributed across the individual stakeholders involved: while one stakeholder may bear most or all of the additional costs of the new collaborative service model, another one may reap most or all of the achievable benefits, e.g. in terms of liberated resources. In such a case, it likely to be necessary to specifically address observable cost-benefit shifts, e.g. by means of inter-organisational agreements, in order to avoid any “veto players” compromising the sustainability of the service.
- Depending on the cost-benefit structure currently prevailing at a given deployment site, different aspects deserving attention could be identified when it comes to further optimising the current SmartCare service implementation. Depending on the given regional implementation context, there may for instance be merit in examining options for reducing current costs of end user equipment, e.g. by looking for alternative equipment / vendors, and/or negotiating refurbishments schemes for end user devices. In other cases, there may be merit in examining options for reducing the time currently spent on staff and/or end user training, e.g. by didactically improved training measures and/or materials.
- In the case of Friuli Venezia Giulia (FVG), predictive modelling techniques, including cost-effectiveness and budget impact analysis, have demonstrated that the FVG
service for heart failure patients as it currently stands has the potential to be sustainable, and to outweigh the initial investment before the second year of deployment.

- Full consensus and precise awareness exists in the nine sites that integration and integrated care stem from the necessity to meet the complex needs of frail persons with higher quality of care services and better care effectiveness.

- The major aim of the deployment sites was to improve horizontal integration, although in some cases there was also greater vertical integration. Integration was supported by ICT in order to facilitate information exchange, faster communication, and better quality of home care services. The shared electronic personal record was considered essential.

- The correct sequence of IC processes was applied, from acceptance / reception of citizens to the personalised care plan, then to on-site and remote provision of care, continuous review and revision of the care plan, with a final evaluation of the status. This is now an asset of each site. This represents the pre-condition for acquiring major benefits from the use of ICT in supporting and facilitating such integrated care practices.

- The self-assessment to complete the integration index matrix showed that in all sites scores improved, which indicate a significant improvement in the self-perceived level of integration as a result of the project.

- Despite not being “scientifically proven” (probably impossible to do), all sites agree that high quality care services must be based on (more and more) integrated care. When this is achieved, higher efficiency and equity is expected.

- It has been demonstrated that integration is a continuous process in which cooperative, multi-professional coordinated care actions are delivered in a comprehensive person-centred approach (vision).

- Consistently, all sites unanimously report that this type of coordinated care positively impacts on care recipients, care givers and the organisation, adding value to the interventions of each professional (care actor) involved in the care pathway.

- In all sites, the active role and participation of the care recipient and family-entourage has been shown to be a priority; the aim to improve empowerment and self-care capacity is at the top of the list for the care process, as well as the capacity to build up a formal and informal care network.

- The SmartCare local operational protocols and services have fully respected the four core principles of bioethics: autonomy, equity - justice, beneficence, and non-maleficence, and have not been subject to ethical scrutiny at any point.

- There was no evidence about cultural, religious or moral beliefs to be challenged by the services provided. There were no gender issues in any site.

- All sites listed and complied with the national applicable legislation about data protection, research, medical protection, healthcare acts, rights of patients, information system; some of them referred to European legislation.

- Even though there is room to develop the social aspect further, it seems that in general integrated care had a positive impact in the care recipients’ role in major life areas.

### 7.3 Referenced deliverables

Deliverables listed below can be found on SmartCare project website.
### 7.4 Lessons learned report

**Things that went well**

- Full consensus and precise awareness exists in the nine sites that integration and integrated care stem from the necessity to meet the complex needs of frail persons with higher quality of care services and better care effectiveness.

- Significant improvement in the self-perceived level of integration has been seen as a result of the project.

- SmartCare has created new cooperation between care providers that were not collaborating before, or who were collaborating in a suboptimal way.

- In all sites, the active role and participation of the care recipient and family-entourage has been shown to be a priority.

- Consistently, all sites unanimously reported that this type of coordinated care positively impacts on care recipients, care givers and the organisation, adding value to the interventions of each professional (care actor) involved in the care pathway.

- The new collaborations established, and the positive experience with the project, constitute fruitful ground for future development of the services.

- Deployment sites have made an effort towards ensuring the user-friendliness of the ICT tools.

- The SmartCare local operational protocols and services have fully respected the core principles of bioethics and complied with the applicable national legislation.
The use of a common indicator set as starting point for the cost-benefit analysis proved to be very useful, albeit further customisation was required to reflect the particular circumstances prevailing in the individual deployment regions.

A number of aspects could be identified through the socio-economic assessment which deserve attention when it comes to further optimising the services under given regional circumstances.

**Things that could have gone better**

- It had been anticipated by the project that simply bringing together the relevant stakeholders, and adding ICT to existing service processes, was unlikely to automatically result in horizontally integrated care. Therefore, a context-sensitive and iterative approach was pursued right from the beginning, one that enabled tailoring existing service delivery processes to the specific needs of the care recipients and those involved in day-to-day service delivery, thereby considering how these might use and accept technology within their local contexts. Even so, it turned out to challenging to achieve this across a relatively large number of deployment regions within the time and resource constraints of the current project.

- Better randomisation might have increased the value of the outcomes.

- Some of the deployment sites faced unexpected difficulties in collecting the requested data, especially from the comparator group. More efforts or resources could have been invested for this task.

- The extension / adaptation of MAST framework and the application of predictive modelling techniques should have started earlier in the project in order to reap the full benefits from them.

- In some deployment settings, the integration of social care could have been further developed.

- Despite contextual complexities regarding funding, sustainability of the sites could have been better explored in some regions.

- Involvement of informal carers in the sites could have been more systematic.

- The ICT tools deployed in some sites could have offered more possibilities for a two-way communication between end-users and health and social care professionals.

- Some of the deployment sites faced difficulties in collecting the requested data for the cost-benefit analysis.

**Things that surprised us**

The sites faced many obstacles regarding:

- Procurement of the necessary equipment (and/or hiring personnel): too long (time-consuming) procedures for the procurement of the necessary equipment and/or for hiring personnel have been seen in several sites, causing significant delays in the progress of the project.

- The political and financial environment: changes in the organisation of health and social care at governmental level, cuts in public spending, etc.

- Legislation on privacy and data protection: professionals needed to share information, fully respecting end-users' preferences; in some countries it was impossible to share.
Lessons learned

- There are significant challenges in the evaluation of a project with significant diversity. Advanced statistical techniques for use in such cases exist, and can be used to extrapolate results, but the robustness of these results can always be challenged.

- There are no established key performance indicators or questionnaires that could reliably map the impact of integrated care on all the different stakeholders.

- An appropriate evaluation framework for integrated care services is missing. MAST could be adapted to serve this need.

- Data collection is more difficult than expected in projects conducted in real life conditions, as in the case of SmartCare, especially for the comparator group.

- An assessment of the transferability of innovative services is necessary. This could be supported by predictive modelling techniques as suggested by national and European guidelines, if applied from project start.

- Longer follow-up is necessary when you want to assess the impact of innovative services on chronic diseases, or when you want to map the impact of organisational changes on different stakeholders.

- Integrated care services seem to consistently increase contacts with the primary health and social care professionals in the short-term.

- Although not clearly demonstrated in project results, all deployment sites unanimously agree that ICT-enabled integrated care is a prerequisite in order to meet the complex needs of frail persons, and that this care positively impacts on care recipients, care givers and organisations.

- There are no major legal, ethical or social issues that could delay the deployment of integrated care, but in some cases some additional authorisations for personal data sharing may be necessary.

- Implementing integrated care takes time and resources.

- Political support is essential

- Integrating social care remains a challenge that needs to be addressed, as the social side is often the missing point in the care systems across Europe, but essential to ensure the sustainability of healthcare and full integrated care.

- Older people are ready to use ICT as long as this is accessible, the benefits are clearly explained, and it is not seen as a replacement, but as a complement and support to face-to-face consultations.

- The socio-economic impact assessment requires someone with economic experience at the deployment site. Where not already available, resources need to be spent to build up such expertise.

- A good understanding of the service process is needed to set up a socio-economic impact assessment. The socio-economic assessment needs to follow the service process, and consider it as the subject of the assessment. To create the assessment model, it is crucial that planning of the service process should be quite advanced, since costs and benefits are usually closely related to specific activities or tasks.

- Considering all the relevant types of costs and benefits can be a challenge: monetary impacts are usually most easily identified, but both resource related impacts and intangible impacts require more consideration.

- Out of sight, out of mind. Some stakeholders tend to be neglected when considering a service, in particular those stakeholders that are affected by the service in a passive manner.
7.5 Recommendations

- **Recommendation 1:** The European Commission should follow more closely the conduct of projects, and be prepared to endorse / enforce decisions of the management team on issues that are critical to the project, e.g. imposing adherence to trial protocols.

- **Recommendation 2:** An evaluation framework adapted to the needs of the assessment of integrated care is prerequisite for a reliable and robust evaluation. MAST could be the ideal framework for this adaptation. Substantial steps in this direction have been achieved through the development of MAST 2.0. These adaptations, which could only be released in the last part of the Project lifecycle, will benefit future projects even more than they have benefitted SmartCare.

- **Recommendation 3:** It is necessary to identify (if they exist) or develop and agree on key performance indicators (KPIs) able to map the impact of ICT-enabled integrated care services on all the different stakeholders in a credible and robust way. These KPIs should be mandatory for all the EU-funded projects.

- **Recommendation 4:** The evaluation of a project should not be based only on data collected for this purpose by the project investigators, but also on data from administrative, hospital and other databases. Integration of these datasets will increase the credibility of the results, and potentially reduce the cost of data collection.

- **Recommendation 5:** Longer follow-up is necessary when assessing the impact of innovative services on chronic diseases, or when mapping the impact of organisational changes on different stakeholders. In particular, the likely duration of procedures to procure the necessary equipment, hire personnel or to implement organisational changes have to be taken into account, especially if they concern public organisations.

- **Recommendation 6:** Even if the data analysis and reporting of the project results have been completed on time, there is no time for scientific dissemination of the final results and interaction with experts on the specific fields, because these processes demand more than six months once the final results are available. Moreover, in several projects it has been seen that a significant amount of data collected has been left unused. It is recommended to support the complete utilisation of the collected data, and the dissemination of results, even after the official end of a project, taking advantage of any unused budget of the project.

- **Recommendation 7:** Predictive modelling techniques, including cost-effectiveness and budget impact analysis, should be part of the standard evaluation in order to assess the sustainability and transferability of the services under evaluation. These types of analyses are required by public authorities in most European countries whenever a new service or technology is suggested for reimbursement, and there are very clear guidelines about the appropriate methodology.

- **Recommendation 8:** Integrated eCare for older people means listening to older people’s preferences in all processes and in all phases; this means setting up mechanisms of consultation where older people and their informal carers can express their views and opinions, and influence the architecture of the service.

- **Recommendation 9:** Integrated care is not primarily an issue of ICT, but a health and social policy challenge with social, economic and political implications. This context needs to be taken fully into account when implementing integrated care services.
8 Address of the project public website and relevant contact details

Project website: http://pilotsmartcare.eu/home

8.1 Deployment sites

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<th>Contact person</th>
<th>Country</th>
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<tbody>
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<tr>
<td>• East Tallinn Central Hospital</td>
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<td>• The Tallinn Social Welfare and Health Care Board</td>
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- The Studenica Health Centre  
- The Centre for Social Work | Milan Vukovic <milan.vukovic@belit.co.rs>  
Mirjana Krcevinac <krcevinac.m@zcstudenica.org> | RS | ![CENTAR ZA SOCIALNI RAD](centar.png)  
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#### 8.2 Committed Regions

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Valencia  
- Fundación de la Comunidad Valenciana - Centro de Investigación Principe Felipe | Vicente Traver <vtraver@itaca.upv.es> | ES | ![Príncipe Felipe](principefelipe.png)  
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Euskadi  
- Kronikgune | Esteban de Manuel <edemanuel@kronikgune.org> | ES | ![Kronikgune](kronikgune.png)  

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8.3 User Advisory Boards

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<td>AGE Platform Europe</td>
<td>Borja Arrue</td>
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<td>Eurocarers</td>
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<td>Paul De Raee</td>
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<td>European Patients’ Forum</td>
<td>Walter Atzori</td>
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<td>(AOK) Rheinland/Hamburg - Die Gesundheitskasse</td>
<td>Jörg Artmann</td>
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<td>The International Foundation for Integrated Care (IFIC)</td>
<td>Nick Goodwin</td>
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8.4 Other partners

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<td>Empirica</td>
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