



Learning from integrated eCare practice and
promoting deployment in European regions

D1.1 REQUIREMENTS FOR BEYONDSILO PATHWAYS AND INTEGRATION INFRASTRUCTURE

WP1 Requirements and integrated care pathway development

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Executive summary

The aim of the BeyondSilos project is to develop and pilot integrated care services delivered with the help of suitable ICT systems. These services are to be based on care pathways cutting across boundaries which typically separate health care from social care. In this sense, BeyondSilos will achieve what has frequently been called “horizontal integration” of care delivery.

Successful service integration requires both technology innovation and service process innovation being pursued at the same time. In the care domain, ICT-based services tend to be delivered within socio-technical systems, and value is frequently achieved by people applying technology for dedicated tasks rather than technology on its own. Hence, ICT can effectively support well-designed care service delivery processes, but it cannot substitute for them. Within the work plan of BeyondSilos, the first step in achieving such a combined innovation approach is the development of common integrated care pathways which are to be supported by ICT.

This document describes the methodological approach adopted by the project for this purpose and the outcomes so far. Two generic pathways – for acute care and long-term care – are introduced that form the basis of the project’s service development and implementation work. The pathways are part of the overall project approach, being the first in a series of steps leading to the eventual operation of specific integrated social and health care service at each of the pilot sites. The main part of the deliverable presents the first versions of the so-called contextualised pathways, i.e. pathways adapted to the specific framework conditions at each of the pilot sites.

The work on requirements analysis and pathway definition is currently ongoing and final results will be presented in a later deliverable.

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1. Introduction

1.1 Purpose of this document

This document sets out the requirements for the integrated care pathways, supported by ICT, which will be implemented in BeyondSilos.

The work on requirements analysis and pathway definition is currently ongoing and final results will be presented in a later deliverable.

1.2 Background: BeyondSilos integrated care pathways

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

The quest for horizontal integration of care delivery in itself is anything but new. Only recently however, policy and practice are beginning to fully recognise that fragmentation of care can threaten its quality and cost effectiveness¹. In particular, the potential of ICT-enabled support such as telecare and telehealth could be exploited in a more effective way if they were not, as today, embedded in healthcare and social care services delivered in “silos”.

Although ICT-based implementation of horizontally integrated day-to-day care practices have remained comparatively rare until now, experiences from earlier pilots suggest that successful service integration requires the pursuit of both technology innovation and service process innovation at the same time². In the care domain, ICT-based services tend to be delivered within socio-technical systems³, and value is frequently achieved by people applying technology for dedicated tasks rather than technology on its own.

¹ C.f. for instance: Stroetmann K.A., Kubitschke L., Robinson S., Stroetmann V., Cullen K., McDaid D. (2010): How can telehealth help in the provision of integrated care?, WHO Health Systems and Policy Analyses, Policy Brief 13.

² See for instance Kubitschke, L., Meyer, I. & Müller, S. 2014. Do all roads lead to Rome? Models for integrated eCare services in Europe. In: Meyer, I., Müller, S. & Kubitschke, L. (eds.) Achieving Effective Integrated E-Care Beyond the Silos. Hershey, PA: IGI Global. See also: Allen K., Glasby J. and Rodrigues R. (2013): Joint working between Health and Social Care. In: Leichsenring K., Billings J. And Nies K. (Eds.) (2013): Long-term Care in Europe, Improving Policy and Practice.

³ The concept of socio-technical systems has been frequently used as an approach to complex organisational work design, thereby recognising the interaction between people and technology in workplaces. C.f. for instance William A. Pasmore (1988): Designing Effective Organisations: The Socio-technical Systems Perspective; and: Jose Luis Mate and Andres Silva (2005): Requirements Engineering for Sociotechnical Systems.

Hence, it has been emphasised by practitioners and researchers that ICT can effectively support well-designed care service delivery processes, but that it cannot substitute for them⁴.

Within the work plan of BeyondSilos, the first step in achieving such a combined innovation approach is the development of common integrated care pathways which are to be supported by ICT. The methodological approach adopted for this purpose and the preliminary outcomes achieved are described in the remainder of this deliverable.

1.3 Structure

The deliverable begins with a description of two generic pathways – for acute care and long-term care – that form the basis of the service development work (Section 2). Subsections describe how the pathways are embedded in the overall service deployment approach of the project and how they are adapted to the individual circumstances prevailing at each site.

Section 3 then describes how the pathways are part of the overall approach to service development and implementation adopted by the project, being the first of a series of steps leading to the eventual operation of specific integrated social and healthcare service at each of the pilot sites.

A dedicated section (Section 4) deals with the implications of the contextualised implementation of the generic pathways at each of the pilot sites.

The main part of the deliverable (Sections 5-11) presents the first versions of the contextualised pathways for each of the seven pilot sites. In keeping with the project's iterative deployment approach, these adapted pathways will be revised at a later stage in the project, depending on the outcomes of the first development cycle. Final versions of the pathways will be presented in D1.2.

1.4 Glossary

ADL	Activities of Daily Living
BSA	Badalona Serveis Assistencials
CR	Care Recipient
ECR	Electronic Care Record (N Ireland)
EMR	Electronic Medical Record
GP	General Practitioner
HCP	Health Care Provider
HCP	Home Care Portal
ICP	Integrated Care Partnerships (N Ireland)
ICP	Integrated Care Pathway
I/FC	Informal Carer
SCP	Social Care Provider
TSCP	Third-Sector Care Provider

⁴ C.f. for instance: Stroetmann K.A., Kubitschke L., Robinson S., Stroetmann V., Cullen K., McDaid D. (2010): How can telehealth help in the provision of integrated care?, WHO Health Systems and Policy Analyses, Policy Brief 13.

2. Two generic pathways guiding integrated care delivery within BeyondSilos

2.1 Introduction

Based on the work carried out in the SmartCare Pilot A⁵ and on discussions in the BeyondSilos consortium, two candidate service themes were identified which hold the potential to deliver significant benefits through better joined-up care delivery. These are:

- Integrated short-term home support after an acute episode.
- Integrated long-term home support.

The first service theme addresses the needs for joined-up home support arising from an acute episode and the immediate support at home afterwards, e.g. after hospital discharge or a fall. Potentially, it also addresses people without long term care needs beyond a certain transition phase following a hospital stay. The second service theme is directed towards people in need of joined-up home support from a long-term care perspective.

First versions of these generic integrated pathways have been developed for both service themes in SmartCare, in close collaboration with the pilot sites of that project. These are intended to present a high-level view of a typical service process flow involving health, social and informal care interventions. As can be seen from the graphical representations presented below (Figure 1 and Figure 2), each pathway is described as a sequence of generic steps to be performed when the service is delivered in a particular instance. For BeyondSilos, these pathways represent a tool that helps to define & implement the services to be piloted, not an end in itself. For this reason, deviations from the pathways in the localisations are possible whenever they derive from the requirements analysis carried out at each pilot site.

In practice, implementation of each generic step in the context of the BeyondSilos pilot sites requires a range of subordinate tasks to be performed, usually with the help of ICT systems, by different parties and according to different protocols. The specifics of these subordinate tasks as well as of the ICT systems involved are only captured to some extent at this early stage of the deployment process. They will be defined in more detail in the subsequent Work Packages 2 and 3.

Each of the generic pathway elements is briefly described for each pilot site in the following sections.

It should be noted that the concept of 'care pathways' has been used differently in different contexts, both in health care and in social care (where in several countries this concept may not be used at all). For the purposes of BeyondSilos, it is intended to be used in a pragmatic manner. It is considered as an enabler for a systematic description of a defined sequence of actions carried out by collaborating parties. In the following descriptions, generic terminology is used whenever possible in order to avoid a terminological bias towards the health or social care domains.

⁵ See www.pilotsmartcare.eu.

D1.1 Requirements for BeyondSilos Pathways and Integration Infrastructure

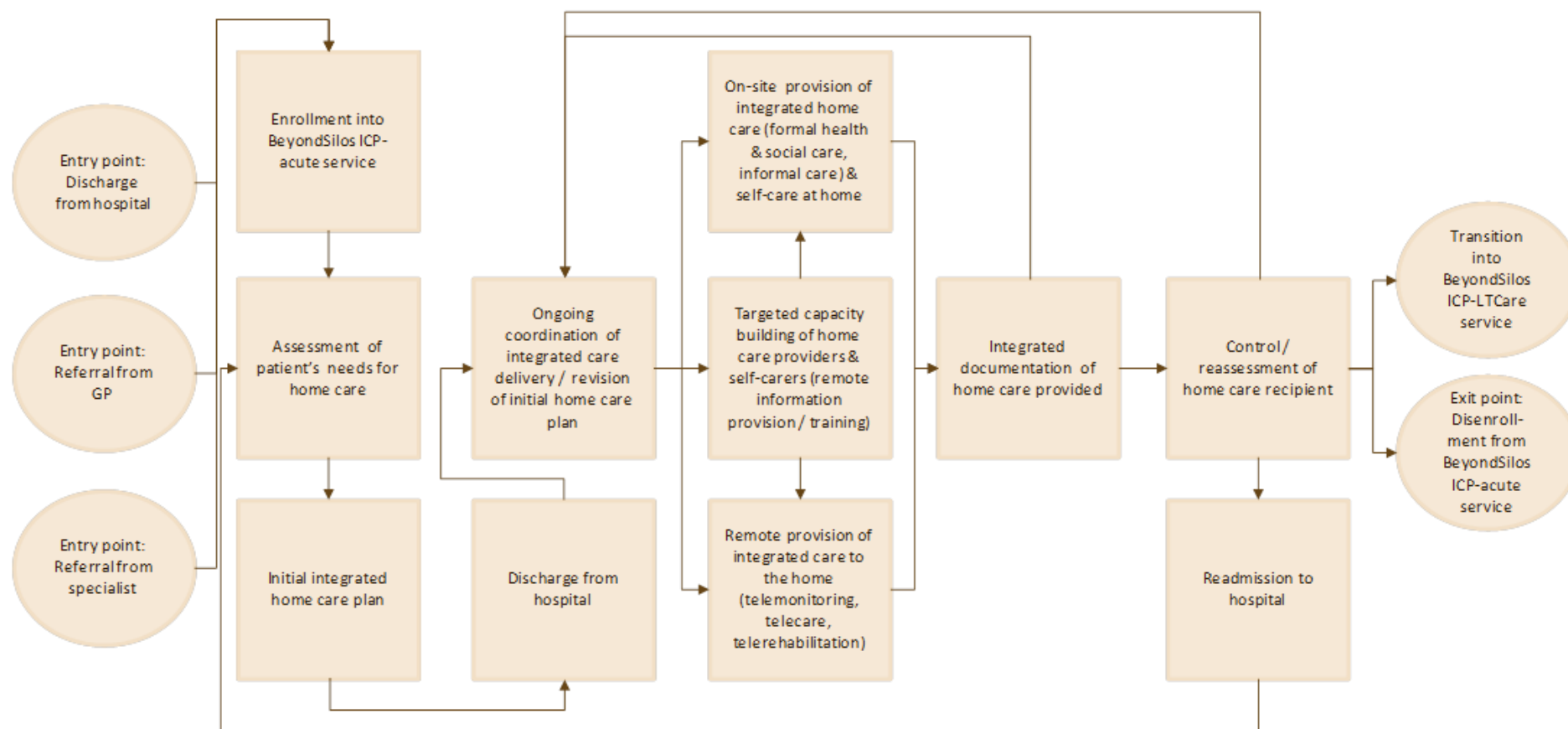


Figure 1: Integrated short-term home support after acute episode (Pathway #1 - ICP acute)

D1.1 Requirements for BeyondSilos Pathways and Integration Infrastructure

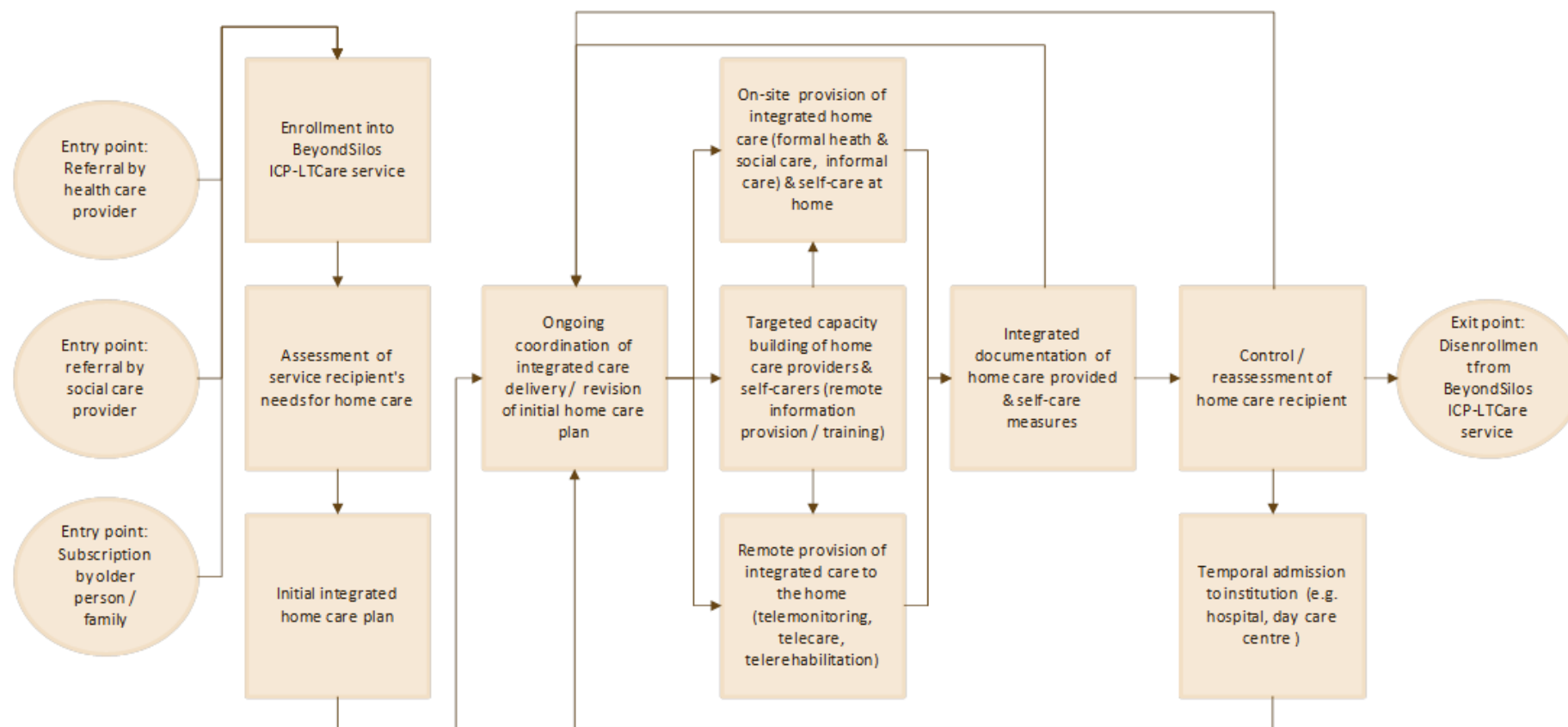


Figure 2: Integrated long-term home care support (Pathway #2 - ICP LTCare)

2.2 Pathway elements

2.2.1 Entry point

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

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

2.2.2 Assessment of the service user’s needs for integrated home care

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

2.2.3 Enrolment into BeyondSilos services

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

2.2.4 Discharge from hospital

In the case of the generic pathway #1 (ICP acute), the coordination transition of the patient to the home is supposed to be critical to his/her health and well-being. Patients, family caregivers and professional care providers all play roles in maintaining a patient's health after discharge. Coordinated discharge planning is seen as a significant step towards an integrated overall care plan.

2.2.5 Initial integrated home care plan

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

2.2.6 Ongoing coordination of integrated care delivery / revision of the initial care plan

This element focuses on ongoing tracking of BeyondSilos users when they receive professional home care and/or informal support from different parties as identified in the initial care plan. It enables professional and informal carers to coordinate delivery of required care interventions, and to utilise all potentially

available resources. The main aim is to effectively manage a system of targeted collaboration over time, thereby involving all relevant parties including the BeyondSilos service users themselves. A “link man” function (sometimes referred to as a case manager) may need to be established to ensure that any changing needs of the BeyondSilos users are identified. In response, the right mix of medical, social and informal care in line with user expectations is delivered. Beyond the involvement of health and social care expertise, a clear assignment of responsibilities is required when it comes to decision making on any care plan adaptations potentially required.

2.2.7 On-site provision of formal healthcare and social care

This step focuses on coordinated performance of care-related measures through professional health and social care staff and informal carers in the older person’s home. The range of tasks may require both medical interventions and/or non-medical custodial tasks and/or non-skilled care, such as assisting with activities of daily living such as dressing, bathing, and using the bathroom.

2.2.8 On-site provision of informal care

Beyond care provided by professional care staff, non-professional care may be provided by family members and/or other informal carers. This may include medical care tasks (e.g. taking vital sign measurements) or non-medical custodial tasks.

2.2.9 Remote provision of care to the home

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

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

2.2.10 Integrated documentation of provided home care

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

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

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

2.2.11 Control / reassessment

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

2.2.12 Temporary admission or re-admission to an institutional setting

Depending on the BeyondSilos service user's status, a temporary admission or re-admission into a stationary care setting may be required, e.g. a hospital or day care centre.

2.2.13 Exit point

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

3. From pathways to ICT-supported integrated care service delivery- The BeyondSilos approach

3.1 Concept and overall work plan design

The BeyondSilos project implements service process innovation complemented by adaptation of technology and introduction of new technology components in seven pilot sites across Europe. Integrated health and social care services to support short and long-term care needs are implemented, facilitated by an interoperable and open digital support infrastructure. During the whole implementation process, a clear demand-driven approach is pursued, avoiding all technology ‘push’.

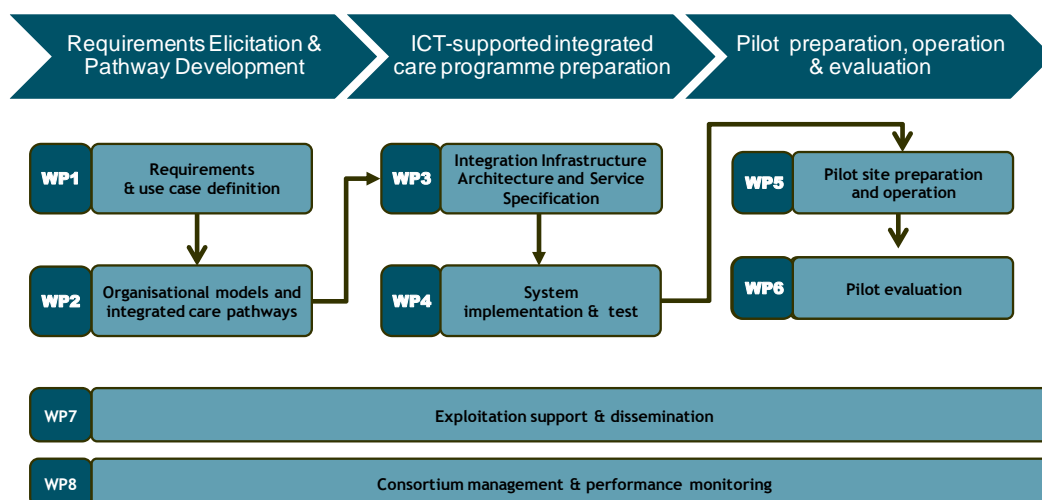


Figure 3: BeyondSilos Workplan

The BeyondSilos work plan supports this demand-driven approach by conducting a range of interrelated work steps across 7 work packages (see Figure 3) undertaken by each pilot site until field operation and evaluation of the pilot service starts. The overall approach is conceived as a cycle rather than a chain of steps, emphasising that development and deployment is a continuous rather than a finite activity, and also that it is iterative, relying on information flowing back and forth between the different steps of the different work packages. In a similar way, the steps are also not finite within the cycle, but ongoing, or rather recurring with varying intensity and overlapping to various degrees. As Figure 4 describes, work starts with the contextualisation of the two generic BeyondSilos pathways already developed during the proposal phase and the elicitation of the requirements of clients and service providers. In BeyondSilos, the two pathways represent a tool that helps to define & implement the services to be piloted, not an end in itself. For this reason, deviations from the pathways in the localisation are possible. However, contractual obligations (such as the one to integrate social and healthcare) are not negotiable.

Requirements work feeds iteratively into the subsequent steps of organisational model development, service specification, architecture development and prototype testing. It starts with a thorough analysis and documentation of key requirements for ICT-supported integrated care services, thereby taking into account the perspectives of different actor groups that will be involved in integrated care delivery, e.g. care recipients, care professionals, administrative staff and ICT providers / experts. The outcomes of requirements elicitation then inform the development of localised pathways reflecting concrete instances of integrated service delivery in the pilot regions.

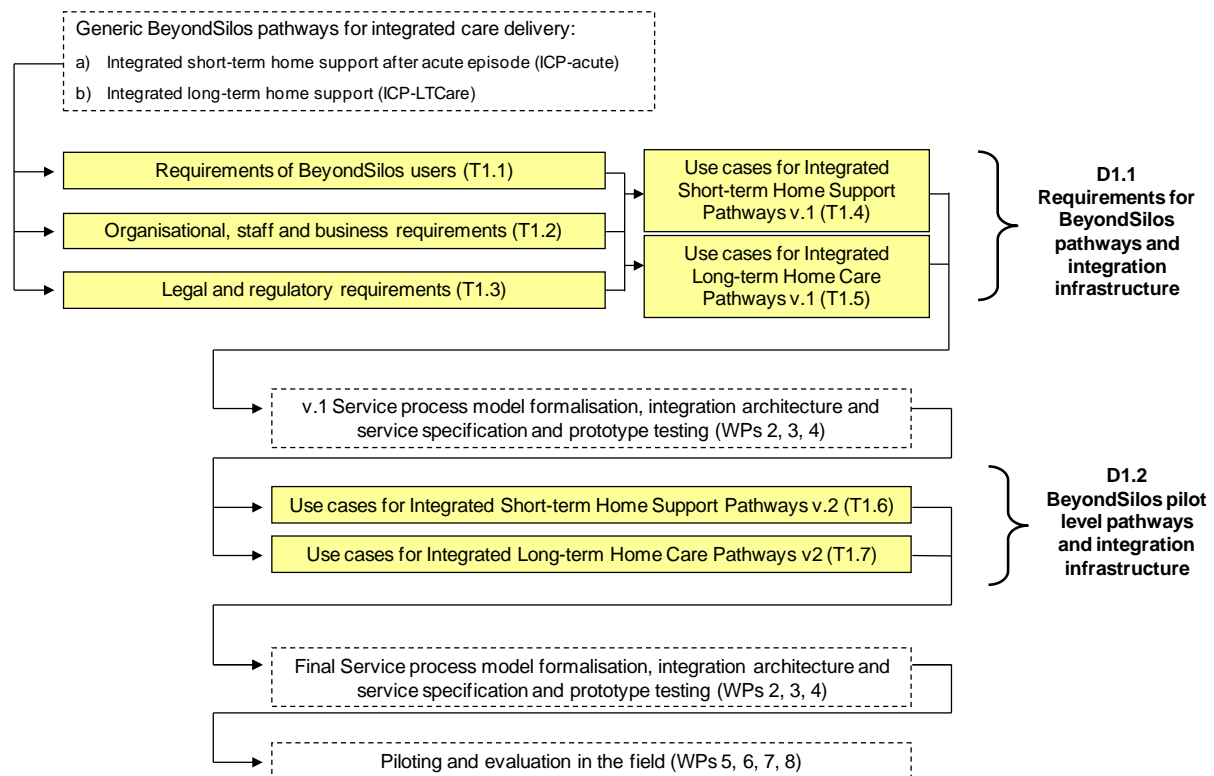


Figure 4: Interrelationships of WP1 tasks and deliverables

The requirements of the new services to be developed and later implemented are gathered in a comprehensive and systematic way. It is quite likely that the requirements of the different target groups, who will later be using or providing the new services, significantly differ from each other. Thus, the process of requirements analysis needs to involve all the target groups addressed. Only in this way is it possible to design a successful service that is satisfactory and usable for all actors involved. Apart from the older people themselves, the requirements of service providers will be thoroughly elicited. In this regard, recent evidence clearly suggests that a merely technology-driven integration approach is most likely to fail. For instance, a recent review of a 16 pilots of integrated care in the UK revealed that “values and professional attitudes were of great importance to the success of pilots, with shared values, a collective communicated vision, and efforts to achieve widespread staff engagement cited as strong facilitating factors. Where key staff groups were not engaged (e.g. GPs), it was difficult to make progress. It was much easier to make progress where staff could see clear benefits that would result from the changes proposed, and where they felt involved in the development of new services”⁶. In view of the diversity of current care systems across the EU Member States, and the specific circumstance prevailing at the pilot sites, in relation to organisational settings, roles, responsibilities, etc., sufficient attention needs to be given by the workplan to thoroughly understanding the key requirements for ICT supported care pathway integration. Representatives reflecting the characteristics, capabilities and experience of future users are involved at several stages of design and development of the new service, because they have valuable knowledge about the context of use, and are thus crucial to both requirement elicitation and service process design. Appropriate representatives ensure that user requirements can be identified for inclusion in service development. Iteration is necessary in order to minimise the risk that the new service fails to meet the user requirements.

⁶ RAND Europe, Ernst & Young LLP, National Evaluation of the Department of Health’s Integrated Care Pilots. Final Report. Prepared for the Department of Health. March 2012.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/215103/dh_133127.pdf.

Interviews and questionnaire are, for example, well-established methods to learn more about requirements. Both methods involve asking a set of questions to potential end users in order to capture issues such as users' subjective satisfaction, needs and possible anxieties. In addition to this, interviews and questionnaires are also useful for studying how the users will potentially use the new services, and what functionalities they would like to see included, and also what functionalities they dislike. The advantage of conducting face-to-face interviews is that the personal contact allows a deeper understanding of the person's life, routines and needs. The disadvantages are that they tend to be case studies that can be difficult to generalise except when a large number of interviews are conducted. Focus groups allow the involvement of a larger number of potential end users, but at the same time also allow an in-depth investigation of user needs and requirements. They present another important method that has proven to be quite successful for requirements elicitation. Focus groups are usually run by a moderator, and normally involve about six to nine users who, following a pre-set schedule, identify issues over a period of about two hours. Focus groups often bring out users' spontaneous reactions and ideas through the interaction between the participants.

As can be seen in Figure 5 below, version 1 use cases are to inform the definition of formalised organisational and service process models as a basis for v.1 prototype development and testing within subsequent WPs 2, 3 and 4. Depending on the outcomes of these work steps, the initially developed use cases may need to be revised before field piloting can start. The iterative approach is to ensure that stable and well tested prototypes will have become available before exposing hundreds of end users to BeyondSilos solutions.

It is clear that points of departure vary across individual pilot regions. While some regions may already have started a process of requirements elicitation and prototype testing, others may just have developed first ideas on how ICT is to be utilised for the delivery of integrated care services. In any case, it will be mandatory for BeyondSilos to demonstrate that relevant target groups have been involved in a systematic and coherent manner across all pilot sites when it comes to requirements analysis, use case development and pathway localisation. This is to be achieved by means of common reporting templates to be used by each region, presented in Annexes 1 & 2. Those regions that have already conducted empirical work with end users and other relevant actors for the purposes of requirements elicitation and use case development were requested to document the methodological approach adopted and outcomes achieved by means of a template provided by empirica. The other pilot sites should plan and conduct their requirements elicitation activities as described in the DoW. The table below presents a summary of the methods proposed for requirements elicitation purposes according to work tasks.

Table 1: Methods for BeyondSilos requirements elicitation phase

Work task	Methodological approach
Requirements of BeyondSilos users (T1.1)	Up to 3 focus groups with older people, informal and voluntary carers, social service and care staff, complemented by an appropriate number of interviews (n >14).
Organisational, staff and business requirements (T1.2)	2-3 fact finding interviews with decision makers and professionals; complemented by a joint meeting of site partners and technical partners
Legal and regulatory requirements (T1.3)	Desk research to identify the principle source of information in the pilot regions, complemented by fact-finding interviews with key knowledge-holders e.g. in national and local government

Work task	Methodological approach
Use cases for both pathways (T1.6, T1.7)	The process of use case generation is creative, requiring the participation of experts with good knowledge of the specific service domain. User involvement is also often necessary and appropriate, as use case development focuses strongly on service value output. Nevertheless the use case team also liaises with technical partners to ensure feasibility is maintained.

The next step in the BeyondSilos service design and implementation process is the definition and formalisation of integrated service delivery processes based on commonly agreed pathways for integrated care. Another strand of work focuses on defining and testing the BeyondSilos ICT infrastructure with a small number of users (WP3 and WP4), before the BeyondSilos integrated services are deployed and piloted under field conditions with the involvement of large numbers of users (WP5). Another strand of work focuses on evaluating the field pilots. Beyond this, relevant stake holders are supported in exploiting pilot outcomes beyond the immediate project duration in a well targeted manner, with a view to ultimately facilitating further up-scaling and replication of the BeyondSilos services beyond the pilot regions (WP6 and WP7). A range of deliverables go along with this process, where outcomes of dedicated steps of the overall process are reported.

Figure 5 below illustrates the logical interrelationship of the different steps in the BeyondSilos service design and implementation process.

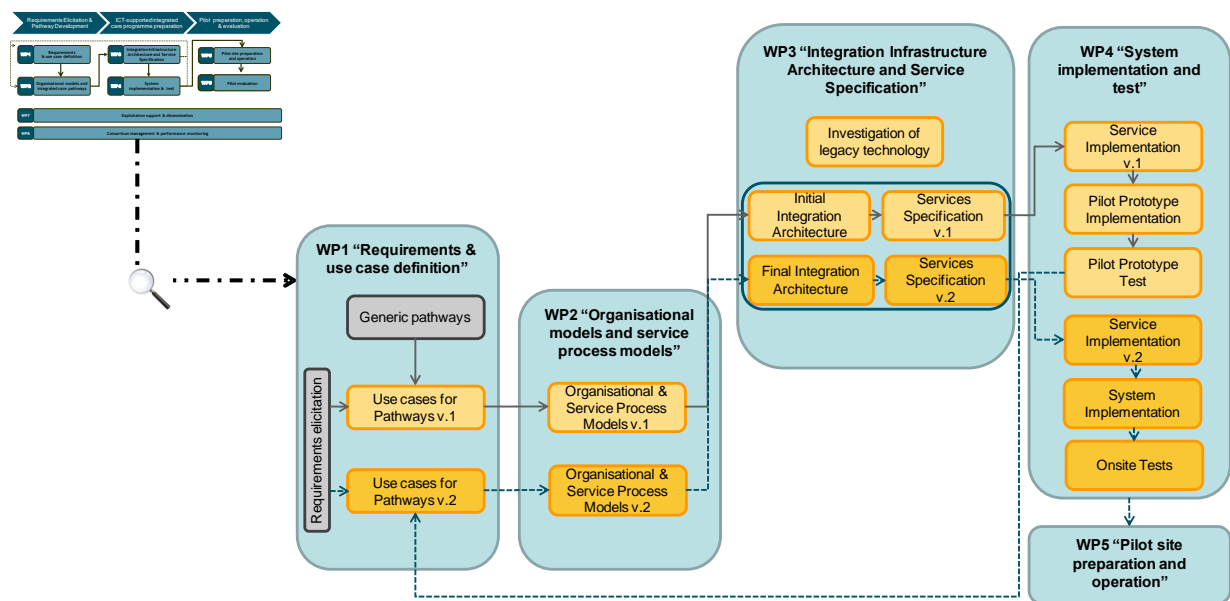


Figure 5: BeyondSilos service design and implementation process

3.2 Status of work at BeyondSilos pilot sites

All seven pilot sites have developed initial use case scenarios for the two common BeyondSilos pathways, with a view to systematically describing how these will be implemented under the particular circumstances prevailing in their site. Also, an analysis of key requirements on their practical implementation is ongoing in each pilot site. Preliminary outcomes of this work are presented in the remainder of this document; the consolidated results will be presented in D1.2. In parallel, the pilot sites are in the process of formalising the initial use case scenarios in terms of dedicated service process

models; the outcomes of this work strand will be presented in D2.1 in accordance with the workplan set out in the DoW.

At the same time, operational planning of the pilot has started with a final review of initial pilot plans, e.g. in relation to types & no. of users to be involved, training needs etc (WP5). If required, the initial plan will be adjusted to current requirements and circumstances, and documented at required detail. Based on the final pilot plan, user recruitment will start well in advance to the beginning of the pilot phase. Staff users will be instructed and trained how to operate the new integrated services and to respond to any events arising. Finally, a team at each pilot site will schedule and carry out installations of equipment at the premises identified in the pilot plan.

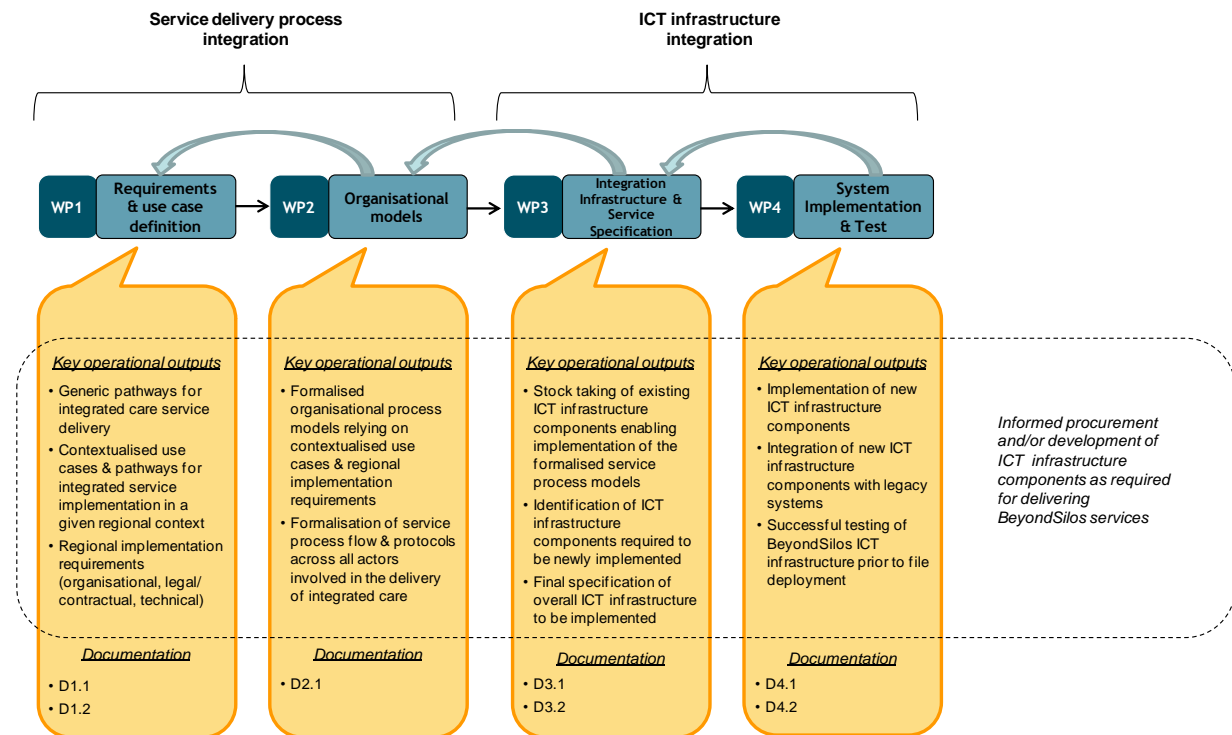


Figure 6: Key operational outputs per WP

Following thorough pilot preparation, BeyondSilos services will be operated at each pilot site and maintained at full quality under day-to-day conditions (WPs 5 & 6). A team at each pilot site will ensure that infrastructure, platforms and applications run smoothly during the pilot and provide help services to users. A dedicated help desk service will be set up to respond to problems faced by staff users and clients.

The evaluation team will define and execute the evaluation methodology centring on pre-defined data capture points (WP6 & WP7).

4. Contextualised implementation of the generic BeyondSilos pathways

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

Although many pilot sites start with facing similar challenges in the organisation of care services for older people, there is considerable diversity across the BeyondSilos pilot sites. This concerns for example the structural framework conditions within which integrated care service delivery is to be ultimately achieved, or the extent and nature of formal and informal support that is available to older people. Key actors and organisations involved in social and health care delivery tend to vary quite a lot across the pilot sites, and these tend to work to differing work practices and commercial models. Further diversity exists when it comes to ICT systems and technology already being used by the service providers in the BeyondSilos pilot sites. As a consequence, the health and social care sectors across the BeyondSilos pilot regions are serviced by many and varying organisations, with different ICT systems and infrastructures that have already been put in place. In general, this situation does not come as a surprise, as it largely reflects the historical variety of care system traditions in the EU⁷.

In view of this situation, a context-sensitive service integration strategy is being pursued in BeyondSilos, both technology wise and service process wise. A controlled migration from existing work practices and technologies towards a common approach is thus implemented in BeyondSilos. Almost by definition, this means that the project encounters a great deal of legacy technology along the way, created to support a range of processes and pathways prior to the BeyondSilos concept.

The following sections present the contextualised versions of the generic pathways, adapted to the framework conditions prevailing at each pilot site. During work in WP1, it turned out that there are usually only limited differences between the pathways for short- and long-term support, mostly referring to the characteristics of the patients / citizens to be enrolled, and the specific configuration of the entry and exit points. To avoid lengthy duplications of text, only one combined pathway description is given for each site, with differences between short- and long-term care being clearly marked.

⁷ C.f. for instance Garcés J., Ródenas F. And Hammar T. (2013): Converging Methods to Link Social and Health Care Systems and Informal Care – Confronting the Nordic and the Mediterranean Approaches. In: Leichsenring K., Billings J. And Nies K. (Eds.) (2013): Long-term Care in Europe, Improving Policy and Practice, p. 100 ff.

5. Amadora pilot site - contextualised pathways

5.1 Point of departure

Amadora is one of the largest cities in Portugal by population (despite the geographic area being only 23.8 km², it has a population of 175,558 inhabitants according to the preliminary results of the 2011 Census, which reflects its high population density). It forms a conurbation with the Portuguese capital Lisbon. Both cities share the same subway, bus and train network. It is also a major residential suburb of the capital. The landscape is mainly defined by large apartment blocks and some industry. Accessibility and proximity to Lisbon are pull factors, which has contributed to the great social and cultural diversity that characterises the Municipality of Amadora.

According to the "Social Diagnosis 2011 Amadora", elaborated by the Social Network of Amadora "the demographic context of the Municipality reflects, in the last years, the loss of resident population and its gradual aging, due to the combination of socio-economic factors". Also according to this document, 19% are aged over 65 years, and 42% of these are over 75; in parallel, the representativeness of young population is around 15%.

The progressive ageing of the population has been a key issue for all the relevant social and health care providers in Amadora. Although several efforts made by the key stakeholders at Amadora, namely Amadora Municipality, Social Security and representatives from non-profit sector, the delivery of social and health care services have not been integrated, either for ICT usage or links between social and health care.

Amadora Municipality has made an effort to gather all the key stakeholders into an umbrella association named CLAS (Amadora Municipality Assessment Unit) that started its activity in 2003. Since then, CLAS serves the purpose of establishing and reinforcing networks between health and social care providers, and discussing strategies to work in partnership. CLAS meets every quarter; since the association has existed, a lot of progress has been made regarding services provided in partnership.

Misericórdia of Amadora (SCMA) is one of the non-profit organisations taking part in CLAS, and has been delivering services for social and health care for 27 years. SCMA delivers services to different vulnerable groups; in the domain of elderly people living on a frail situation, it has different social responses such as nursing homes, day care centres, continuing care unit, carers' support unit; and a home care support service.

All these services require medical doctors; nurses and other health professionals. However, SCMA and Amadora Municipality work in partnership with other health actors on the council such as the hospital, public health care centre, and other private health services, that will be engaged in the BeyondSilos deployment site on the following dimensions:

- Referring clients with the appropriate profile to both pathways.
- Attending focus group sessions and other regular meetings to give inputs and contributions to maximise the quality of services provided.
- Providing services to clients that do not fulfil the criteria of the BeyondSilos deployment site.

Finally, the main relevance of SCMA relating to other Institutions is explained by the integrated services that SCMA provides in terms of social and health care, such as the home care service that delivers services to 150 clients daily. SCMA reaches 5300 clients daily through different services on education, social support, health and geriatrics.

Amadora Municipality and SCMA have been developing in the past years a strong partnership to deliver services to vulnerable groups: elderly people; citizens in a vulnerable social and economic condition; youngsters; immigrants, etc. In this case, Amadora Municipality and SCMA considered that they could join efforts to provide better social and health care to the population, namely through the integration of social and health care services and providers, and through the reinforcement and extension of the ICT in use.

Below, we show the current health and social care services provided, and the gains of scale that BeyondSilos can bring to Amadora.

Description of the current care delivery process

In order to enter the care and social system, the referral can be triggered by Health Authorities (Amadora Municipality, hospital, healthcare centre, other healthcare private stakeholders); by the Social Authorities (Amadora Municipality; Social Security); or by either the client him/herself or relatives.

During the process of referral, the health and social authorities pre-evaluate the better response to the client needs in terms of being institutionalised (nursing home; Continuing Care Unit (CCU); day care centre or home care support). This request is evaluated by the health & social professionals of SCMA. The then client enters the process.

The services provided encompass the following activities and ICT usage:

- Hygiene and food.
- Medication.
- Cleaning.
- Ludo pedagogical activities.
- Nursing and Physiotherapy.

With regards to ICT usage, services provided so far encompass the following:

- Help Phone: Misericórdia da Amadora and Amadora Municipality developed a partnership to ensure that all home services' users (156 users) are able to prevent and report accidents using a help-phone device.
- Geo-reference: Municipality of Amadora developed a geo-referencing system that consists of a permanent tracking system to identify all the older people who live alone or in a vulnerable situation in the entire Council territory.

BeyondSilos pilot will reinforce and extend integrated care to older people living in Amadora. The main differences start during the referral process that can either be addressed to either CLAS or directly to SCMA. After that, the Coordination Team of BeyondSilos, alongside the home care support team, will evaluate the situation; if the citizen meets the inclusion criteria, he/she will be enrolled in BeyondSilos. CLAS will summarise the participation of all the key health and social actors who will take part during the time that the citizen is enrolled. In addition to the integration of social and health care stakeholders, ICT improvement will be another key element in the process, including the following technical solutions:

- Tele-Assistance (panic button alarm and direct link with home care support team and a contact centre available after the end of business day and during the weekend).
- Tele-Monitoring (blood glucose, blood pressure, weight).
- Home Care Portal (that will summarise all the social and health incidents with different permissions regarding the types of actors).
- B-Learning tool to train formal and informal carers.

To develop the ICT components, a key stakeholder in Portugal regarding ICT tools is involved in the project. Portugal Telecommunications has several years of experience in the health ICT solutions domain, and has

been working with Amadora Municipality and SCMA in the past years on a joint programme to improve services provided to the population.

5.2 Pathway description

5.2.1 Actors and their roles

The pathways involve a number of different stakeholders or actors, including individuals and organisations either receiving or delivering the service based on the pathway. The following tables provide an overview of the different actors and a description of their role.

Differences between the two pathways are highlighted, with elements referring only to the short-term pathway being marked as “**ICP-Acute**”, and elements referring to the long-term care pathway as “**ICP-LTCare**”. Elements not specifically marked apply to both pathways.

Table 2: Client domain actors of contextualised pathways in Amadora

Care recipient (CR)	
Description of actor characteristics ICP-Acute	<p>End user of the services developed under BeyondSilos. Profile:</p> <ul style="list-style-type: none"> • Elderly people living at home. No age limit. • In a frail situation regarding social and/or health needs. • Enrolled in the project after hospital discharge or an acute health episode. <p>The process of enrolment may be triggered directly by: the end user; informal carers; CLAS (Amadora Municipality Assessment Unit); the hospital; or the health centre.</p> <p>After the referral and enrolment process, citizens will be monitored by Misericórdia of Amadora (SCMA) for the home care services that include health and social care (medication; physiotherapy; hygiene; food; home cleaning).</p> <p>CR will stay in the process just as long as he/she needs home care support, for a maximum period of 6 months. After that CR will be dis-enrolled, or, if the diagnosis changes to a chronic situation, moved to LT pathway.</p>
Description of actor characteristics ICP-LTCare	<p>End users of the services developed under BeyondSilos. Profile:</p> <ul style="list-style-type: none"> • Elderly people living at home. No age limit. • Having social and/or health care needs. • Enrolled in the project due to chronic situation regarding health & social needs. <p>The process of enrolment may be triggered directly by: end users; informal carers; CLAS (Amadora Municipality Assessment Unit); Social Security; Amadora Municipality; hospital; or health centre.</p> <p>After the referral and enrolment process, CRs will be monitored by Misericórdia of Amadora (SCMA) under the home care services, which include health and social care: medication; physiotherapy; hygiene; food; home cleaning.</p> <p>CR will stay in the process just as long as they need Home Care Support, and for a maximum period of six months. After that, they will be dis-enrolled, or if the diagnosis changes to a chronic situation, move to LT pathway.</p>

Description of role in service delivery / utilisation	<p>CR will be the end users of the Project and will benefit from the integrated care services package that Amadora will develop, that includes:</p> <p>1 - Integration between social care and healthcare:</p> <ul style="list-style-type: none"> • SCMA will be monitoring both services through the home care support services. • Referral process will be maximised through the direct link between civil society / organisations (health & social care providers of the Council) and CLAS & SCMA). <p>2 - Integrated technology to maximise well being:</p> <ul style="list-style-type: none"> • Tele-monitoring. • Tele-assistance. <p>3 - Gains of scale in terms of better services provided by the carers:</p> <ul style="list-style-type: none"> • Training to formal carers. • Training to informal carers.
Information handled in the context of service delivery / utilisation	<p>Integrated care services in Amadora will be provided through the following process:</p> <ul style="list-style-type: none"> • Home care support provided by SCMA linked with all the stakeholders of the Council. • Technology (tele-monitoring; tele-assistance; B-Learning training; home care portal).
Informal Carer (I/FC)	
Description of actor characteristics	<p>I/FC will play an important role in the project as they will deliver services to the CR.</p> <p>I/FC will be divided between two different but complementary actors:</p> <ul style="list-style-type: none"> • Relatives that live with CR or that in some way are responsible for them. • Volunteers that visit the CR weekly, delivering activities and/or participating in daily life activities.
Description of role in service delivery / utilisation	<p>I/FC will deliver the following Services to the CR at their homes:</p> <ul style="list-style-type: none"> • Daily life activities (relatives; volunteers). • Health monitoring (relatives). • Medication (relatives). • Physiotherapy (relatives). • Hygiene (relatives; volunteers). • Food (relatives; volunteers). • Ludo pedagogical activities (relatives; volunteers).
Information handled in the context of service delivery / utilisation	<p>The I/FC will have access to the following information, provided that the CR has consented to this and the I/FC has the necessary skills to access and use the information:</p> <ul style="list-style-type: none"> • Vital signs measurements. • Critical health incidents. • Care schedule. • Training contents implementation.

Table 3: Provider domain actors of contextualised pathways in Amadora

Social care provider (SCP)	
Description of actor characteristics	Misericórdia of Amadora (SCMA) will act as both social care and healthcare provider in the pathway.

Description of role in service delivery / utilisation	<p>SCMA has several social & health services for elderly and disabled persons, such as:</p> <ul style="list-style-type: none"> • Health care: continuing care unit; carer support unit; medical clinic. • Social & health care: two nursing homes; two day care centres; home care support. <p>SCMA, under BeyondSilos, will deliver home care support to 150 clients through the following activities:</p> <ul style="list-style-type: none"> • Support with activities of daily living. • Health monitoring. • Medication. • Physiotherapy. • Hygiene. • Food / nutrition. • Ludo pedagogical activities.
Information handled in the context of service delivery / utilisation	<p>SCP (formal carers and other professionals from SCMA) alongside Amadora Municipality / Portugal Telecommunications will develop the following roles and tasks:</p> <ul style="list-style-type: none"> • Coordination of all the information on the home care portal (HCP): outputs from support for daily activities (hygiene, food, medication...). • Monitoring of care schedule. • Monitoring of formal carers' schedule. • Monitoring and registration of all the critical incidents.
Health care provider (HCP)	
Description of actor characteristics	<p>Misericórdia of Amadora (SCMA) healthcare services will be provided through the Fernando da Fonseca Hospital and the ACESVIII healthcare centre. Furthermore, other organisations represented in CLAS (Amadora Municipality Assessment Unit) will be involved.</p>
Description of role in service delivery / utilisation	<p>Fernando da Fonseca Hospital and ACESVIII, along with other organisations represented in CLAS (monitored by Amadora Municipality) will refer citizens who will be enrolled in SCMA home care support services.</p> <p>After enrolment, SCMA professionals, along with Portugal Telecommunications call centre, will deliver the following services.</p> <ul style="list-style-type: none"> • Tele-monitoring to 20 clients. • Tele-assistance to 150 clients.
Information handled in the context of service delivery / utilisation	<p>HCP (formal carers and other professionals from SCMA) alongside Amadora Municipality / Portugal Telecommunications / hospital / healthcare centre) will develop the following roles and tasks:</p> <ul style="list-style-type: none"> • Coordination of all the information on the home care portal (HCP): outputs from the tele-monitoring and tele-assistance. • Monitoring of care schedule. • Monitoring and registration of all the critical incidents.
Third-sector care provider (TSCP)	
Description of actor characteristics	<p>Volunteers of Misericórdia of Amadora (SCMA) and Amadora municipality</p>

Description of role in service delivery / utilisation	SCMA will also monitor volunteers from SCMA and Amadora Municipality that actively participate on the daily activities of the citizens, namely through the following services: <ul style="list-style-type: none"> • Training on care provision (alongside Amadora Municipality and Portugal Telecommunications). • Supervision (alongside with Amadora Municipality and Portugal Telecommunications). • Planning / monitoring / evaluation of activities.
Information handled in the context of service delivery / utilisation	Volunteers will not have access to data, unless CR delegates that authorisation to them.

5.2.2 Description of pathway components

The following description relates to the components of the pathway as described in section 2.2 above, with each heading corresponding to one of the boxes in the pathway.

Again, differences between the two pathways are highlighted, with elements referring only to the short-term pathway being marked as “**ICP-Acute**”, and elements referring to the long-term care pathway as “**ICP-LTCare**”. Elements not specifically marked apply to both pathways.

Entry point **ICP-Acute:** There will be three different entry points for Clients in an acute situation (after hospitalisation, surgery, early discharge or any acute episode, including social issues):

- Discharge from the hospital/health care centre: after a hospitalisation, surgery, early discharge.
- Referral from the CLAS or any organisation belonging to CLAS, namely Social Security and Amadora Municipality: identification of elderly people living alone in need of home care support due to several and emergent constraints related to mobility and/or subsistence; and/or identification of clients being monitored for social & health reasons by other organisations but that could benefit from BeyondSilos workflow.
- Referral by Client itself or by any relatives: incapacity to continue living without social & health support.

When the actors above identify a client(s) with an acute episode regarding social and/or health care, they can trigger the process of referral to SCMA Home Care Support Service (HCSS). After that, the Coordination Team of HCSS, composed of nurses and social workers, will evaluate the situation, and in case of need, enrol the client into BeyondSilos workflow. If the Coordination Team considers that the potential client needs any different type of response, such as permanent assistance, or partial but on-site assistance, they can refer to other social & health services of SCMA, such as nursing homes, continuing care unit, or day care centre.

Entry point **ICP-LTCare:** There will be three different entry points for CRs with a chronic situation (worsening of health status: health failure; COPD; and/or worsening of social situation: living alone with no primary or secondary network; lack of means of subsistence or mobility):

- Discharge from the nursing home / day care centre / care continuing unit: Once the BeyondSilos deployment site supports the increase of services at home due to better quality in terms of improvement of skills in professionals domain (training) and also due to ICT components (tele-assistance improvement and tele-monitoring), it will allow some people who currently must live institutionalised to return to their homes and have access to the services they need without leaving home.

- Referral from CLAS or any organisation belonging to CLAS, namely Social Security: identification of elderly people living alone in need of home care support, and/or identification of clients being monitored by other social & health organisations, but that could benefit more from BeyondSilos services.
- Referral by CR him/herself, or by any relatives: unable to continue living without social & health support)

When the actors above identify a CR who is entering a chronic situation regarding social and/or health care, they can trigger the process of referral to SCMA Home Care Support Service (HCSS), composed of nurses and social workers. After that, HCSS will evaluate the situation, and in case of need, enrol the CR in BeyondSilos work flow. If the Coordination Team consider that the potential CR needs any different type of support, such as permanent assistance or partial but on-site assistance, the CR can be referred to other social & health services of SCMA, such as nursing homes; continuing care unit, or day care centre.

Assessment of the service user's needs for integrated home care: As mentioned above, in Amadora Pilot there will be three different Entry Points that will trigger the type of services that the CR will need, according to the following:

- a) Discharge from the hospital / healthcare centre / nursing home / day care centre / continuing care unit -> Medication prescription and healthcare plan-> Evaluation of social care needs by the BeyondSilos team (social workers, nurses) -> Enrolment in BeyondSilos services.
- b) Referral from the CLAS or any organisation belonging to CLAS, namely Social Security and Amadora Municipality -> Evaluation of social and health care needs by the BeyondSilos team (social workers, nurses) -> In case of need of healthcare diagnosis, new evaluation from the GP -> Enrolment in BeyondSilos services.
- c) Referral by Client him/herself, or by any relatives -> Evaluation of social and health care needs by the BeyondSilos team (social workers, nurses) -> In case of need of healthcare diagnosis, new evaluation from the GP -> Enrolment on BeyondSilos services. In this case, professionals from SCMA will assume the lead for the information related to incidents and monitoring.

After the enrolment of the CR, all the critical information will be recorded in the Home Care Portal (IT tool that encompasses administrative and technical procedures related to intervention) that will be accessible to all the key actors; regular face-to-face meetings between these actors will also take place.

The two different types of care should encompass the following services/activities:

- Social care:
 - Accompaniment for administrative purposes.
 - Accompaniment to/in hospital.
 - Accompaniment at home.
 - Administrative tasks.
 - Home care support.
 - Tele-Assistance (panic button).
 - Meals at home.
 - Cleaning.
 - Home fixing and repairs.
 - Follow-up schedule.
 - Wheel chair / crutch / articulated bed loan.
 - Volunteering service: Company and Ludo pedagogical activities.
 - Coordination healthcare centre / hospital.
 - Coordination with NGO.
 - Other support, information or resources management.

- Healthcare:
 - Remote monitoring: the most common devices installed are: blood pressure meter, oximeter, weight scale, glucometer, thermometer, and behavioural analysis through movement sensors.
 - Complex geriatrics treatment.
 - Convalescence.
 - Tests and special treatments (such as polysomnography, blood tests, etc...).
 - Medication adherence.
 - Rehabilitation at home (delivered by physiotherapists).
 - Health transportation.
 - Emergency transfers.
 - GP or nurse home assistance.
 - Pain management.
 - Wound care.
 - Forms filling to detect alert signs.

The CR can receive services from both domains, depending on the outcome of the assessment.

Enrolment into BeyondSilos pilot service: Enrolment into Amadora Deployment Site (ADS) will occur after a health and social evaluation provided by the clinical stakeholders and by the Coordination Team of ADS, which will jointly define the type of care that best meets the CR needs. CRs of ADS will be clients of the Home Care Support Service that could benefit from the new integrated care services. The Coordination Team at ADS defines the following general criteria for enrolment in the BeyondSilos service, in terms of health and social care:

- Social care:
 - Aged 65+ and living alone.
 - Living with partner, siblings or elder relatives.
 - Living with dependent people at home.
 - With home care needs or in exclusion risk due to illness or disability of any condition.
 - Elderly people discharged from hospital.
 - Lack of resources at home.
 - Main carer in hospital.
 - Lack of relatives during hospital admission or during the first two days.
 - Abuse or suspected abuse.
- Healthcare:
 - Aged 65+.
 - Patients early discharged from hospital.
 - Any other surgery that may demand cures and rehabilitation at home.
 - Terminal neoplastic or neoplastic illness.
 - Dementia and / or psychiatric handicap.
 - Hip fracture.
 - Lack of support at home.
 - With home care needs or in exclusion risk due to illness or disability of any condition.
 - Autonomous or in a dependency situation.

The target group defined for the Project consists of 150 clients, which means that the Coordination Team should guarantee that at any time during the project 150 clients are being monitored under ADS services. Any time a client leaves the project, a new client must be enrolled. All the clients enrolled in the project must have signed an Informed Consent Form.

Initial integrated home care plan: All the clients enrolled on ADS will have ex ante a Home Care Plan (HCP), which is the result of the evaluation of the Coordination Team along with all the necessary inputs

from the client and from all the stakeholders involved. This HCP reflects all the health and/or social care needs of the client, along with the types of treatments and frequency of them (namely if the client will use tele-monitoring) and the estimated start and end of the process.

The HCP will be available to all the key actors involved (health stakeholders, Coordination Team, Home Care Support Team, CR, I/FC, Contact Centre).

HCP information and details will be disclosed at the Home Care Portal that will be accessible to: health stakeholders, Coordination Team, Home Care Support Team, Contact Centre, and, in certain cases, to the Informal Carers (whenever informed consent was signed by the client and ICs have the necessary skills).

Any time one of the above key actors evaluates that some treatments are not suitable for the client, or that has been some regression, they should report it on the appropriate form; feedback from the Coordination Team will be provided, in line with all the health stakeholders. In certain cases, where doubts exist, these situations will be discussed and evaluated at ordinary or emergency project meetings.

All CRs will have two different contact points: the Home Care Support Team and the Contact Centre team.

Discharge from hospital ICP-Acute: When a client is about to be discharged from the hospital, the medical team of the hospital should contact either the CLAS or the Home Care Support Team of SCMA through completing and sending the referral template, which encompasses social and demographic information of the patient: clinical incidents, and Home Care Plan approach. After that, the Coordination Team along with the Home Care Support Team will evaluate this information, and will visit the client at his/her home to diagnose if the care needs can be provided by informal carers, namely relatives, or if the services must be provided by the Home Care Support Team. This visit also fulfils the purpose of better adapting the Home Care Plan to the specific needs of the client in terms of the services available.

Coordination of integrated care delivery / revision of the initial care plan: After the definition of the initial Home Care Plan, the CR will be enrolled in ADS integrated care services. At this stage, social and/or health care will be provided by the Home Care Support Team and monitored by the Coordination Team. In addition, the Contact Centre, which will be available after out of hours and during the weekend, will gather information related to the CR and to the Home Care Plan delivery. All the information and incidents will be recorded at the Home Care Portal.

The Home Care Portal will be accessible to all the relevant actors of ADS (Coordination, Health Stakeholders, Home Care Support Team, Contact Centre, and informal carers (in certain cases). It will encompass social & health care client profile, social & health care client schedule, social & health care monitoring (all the daily care will be recorded by the I/Formal Carers), social & health care critical incidents.

Any time one of the above key actors evaluates that some treatments are not suitable for the client, or that has been some regression, or that the patient no longer needs such intensive treatment, they should report it on the appropriate form; feedback from the Coordination Team will be provided, in line with all the health stakeholders. In certain cases, where doubts exist, these situations will be discussed and evaluated at ordinary or emergency project meetings.

Any time a CR needs to report some new needs or some critical information about the services that are being provided to him, he/she should contact the Home Care Support Team and/or the Contact Centre.

This process can trigger simple adjustments to the initial Home Care Plan or the revision of it.

On-site provision of formal social care: Clients enrolled on ADS with social care needs (living alone, in a frail situation, a social exclusion risk, being tele-monitored, in a dependency situation) will be monitored

daily in their homes by formal carers such as family helpers, social workers, nurses, physiotherapists and, when necessary by GPs; and also by informal carers, namely relatives and volunteers.

From a remote point of view, all the daily Incidents regarding each client will be reported on the Home Care Portal and analysed by all the relevant actors (as mentioned above).

For social care services that can be provided, see the listing under the “Assessment” paragraph above.

On-site provision of formal healthcare: Clients enrolled on ADS with healthcare needs (discharged from the hospital, crossing an acute episode, with chronic dependency, being tele-monitored; a social exclusion risk due to illness or disability of any condition), will be monitored daily at their homes by formal carers such as family helpers, social workers, nurses, physiotherapists and, when necessary by GPs; and also by informal carers, namely relatives and volunteers.

From a remote point of view, all the daily incidents regarding each client will be reported on the Home Care Portal and analysed by all the relevant actors (as mentioned above).

For healthcare services that can be provided, see the listing under the “Assessment” paragraph above.

On-site provision of informal care: Informal carers, namely relatives and volunteers, will have an important role in the project. Both will maximise the work of the formal carers, delivering more quality of service and time to the CR. Relatives and volunteers will be trained by the Coordination Team to maximise soft & hard skills regarding care delivery. After training, they will deliver services / activities for the CRs and will be supervised throughout the project (difficulties & constraints, and strategies to overcome these; identification of good practices; training contents refresh).

Informal carers will provide the following services / activities:

- Company.
- Medication.
- Taking vital signs.
- Hygiene & food.
- Cooking.
- Ludo pedagogical activities.
- Home fixing and repairs.

Remote provision of integrated care to the home (telecare, telemonitoring): Amadora's active participation in BeyondSilos will enable it to expand and maximise services provided to the population of the council, namely the elderly in a frail situation. Besides the active involvement of all the organisations of the council in delivering good quality of services at home or in nursing homes and day care centre, services provided so far have not triggered a real integration between social and health care, and have not included critical and emergent ICT, such as tele-monitoring.

BeyondSilos, through the partnership between a social & health care provider NGO (SCMA) along with a public authority (Amadora Municipality) and an ICT provider (Portugal Telecommunications) triggered the opportunity to maximise the services provided to elderly people at their homes, avoiding or delaying institutionalisation.

ICT services provided in Amadora only encompass, until now, a panic button for the clients of Home Care Support Services.

ADS will permit the integration of social & health care services through the link between all the relevant stakeholders that refer all the emergent situations to two complementary actors: CLAS and SCMA, which

will evaluate the needs and enrol CRs into the BeyondSilos workflow. But mainly, ADS will permit to introduce different but complementary types of ICT, such as:

- Tele-monitoring: blood pressure meter, oximeter, weight scale, glucometer, thermometer and behavioural analysis through movement sensors.
- Tele assistance: panic button and telephone linked to the Home Care Support Team and to the Contact Centre.
- Home Care Portal/PAD: online tool that encompasses all the social & health incident records of the clients, social & health care schedule, and social & health care client profile.

Integrated documentation of home care provided / self-care measures: ADS under BeyondSilos, as written before, will permit the introduction of different types of ICT. The Home Care Portal will be a critical tool in all the process; it will encompass the following functionalities:

- Client track record in terms of social & health care pathways.
- Home care schedule.
- Home care support team schedule: scheduling visits.
- Home Care Plan monitoring and clients needs progress.
- Tele-monitoring and tele-assistance record.

All the key actor on ADS will have access to the Portal, and must record in it all the critical information regarding the CR.

The Home Care Plan will be reviewed based on the information present on the Portal, together with decisions taken between the key actors.

Control / reassessment of the home care recipient: Control / reassessment of the CR will be made through on-site and remote monitoring based on the initial Home Care Plan defined. On-site monitoring will be performed by the formal carers (family helpers, social workers, physiotherapists) and by the informal carers (relatives and volunteers). Remote monitoring will be delivered through tele-assistance and tele-monitoring (Contact Centre, Coordination Team; health stakeholders).

All the information gathered by formal and informal carers and by remote devices will be entered into the Home Care Portal.

Any changes to health and/or social condition of the CR will be monitored daily by the Coordination Team, Home Care Support Team, and Contact Centre; depending on the urgency of the situation, decisions can be taken immediately, or evaluated during the normal weekly meetings of all the stakeholders of the project, in order to review the Home Care Plan of the CR.

Temporary admission into an institutional setting (e.g. hospital, day care centre): During the process of health & social care provision, improvements and/or deterioration of the status of the CR may occur. Any time that a deterioration of the CR is detected, a re-admission to hospital may be triggered. These kinds of situation are monitored daily by the Home Care Support Team, so all the professionals that work in that team are able to deal with them. All key actors of the project will be informed through the record of critical incidents on the Home Care Portal. Every time a re-admission to hospital is needed, the CR is temporarily dis-enrolled from the project.

Exit point: A CR can leave the project due to several reasons:

- Worsening of social and/or health conditions (re-admission to hospital; admission on nursing home; etc.).
- Improvement of social and, when it occurs, health conditions.
- Decision to move to another area.

- Self-decision to leave the project.
- No longer fulfilling the inclusion criteria.
- Death.

Every time this happens, the CR is formally dis-enrolled from the project, and all the key actor will be informed.

5.2.3 Anticipated impacts

The table below lists the impacts of the new pathways on the different actors, as anticipated at this stage. Actual impacts will be measured and analysed as part of the evaluation and cost-benefit analysis of the pilot deployment.

Impacts are split into positive impacts or benefits on the one hand, and negative impacts or costs on the other. In both cases, tangible as well as intangible effects can be included. For example, a positive impact can be an increase in a patient's self-perceived quality of life or satisfaction (intangible benefit) or saved costs due to more efficient service provision for a provider (tangible resource benefit). In a similar way, negative impacts can include the inconvenience caused by daily telehealth readings (intangible costs) or the investment in telecare equipment by a provider (tangible monetary cost).

Table 4: Anticipated impacts of contextualised pathways in Amadora

Care recipient (CR)	
Positive impacts / benefits	<ul style="list-style-type: none"> • Improvement of self-confidence and security. • Enhancement of the QoL. • Improved satisfaction with service delivery. • Perception of service-specific impacts such as safety and security, improved physical status, improved communication with care providers, reduced social isolation etc.
Negative impacts / costs	<ul style="list-style-type: none"> • Time taken for training in the use of equipment. • Loss of privacy. • Health & Social status monitoring overloading. • Time taken for doing telehealth readings. • During two years, patients will not pay anything for equipment. Amadora deployment site partners are already reflecting about sustainability strategies to maintain it free after the project ends.
Informal carer (I/FC)	
Positive impacts / benefits	<ul style="list-style-type: none"> • Training on health & social care. • Improvement of self-confidence and security. • Improvement of quality of CR's care delivery due to improvement of skills related to training.
Negative impacts / costs	<ul style="list-style-type: none"> • Time taken for training.

Social care provider (SCP)	
Positive impacts / benefits	<ul style="list-style-type: none"> • Training on health & social care. • Improved feeling of quality of service provision. • Reduction of the average time per case, when the CR, I/FC are trained enough. • Reduction in the number of visits (because of the empowerment of the I/FC or the use of telehealth tools), when the CR, I/FC are trained enough. • Services provider and local government will have gains of scale in terms of cost saving and income boosting due to: <ul style="list-style-type: none"> • More efficiency means less time spent with each client; • More efficiency means more quality on service provision, and consequently more interest from potential clients to request the services; • More time and the same resources to reach more clients.
Negative impacts / costs	<ul style="list-style-type: none"> • Increase in daily tasks due to increase in services: Tele-monitoring; Home Care Portal/PAD monitoring; more structured and complex process of recording information. • Time taken for training in the use of equipment. • Induction of stress.
Health care provider (HCP)	
Positive impacts / benefits	<ul style="list-style-type: none"> • Improved feeling of quality of service provision. • Reduction of the average time per case. • Reduction in the number of visits (because of the empowerment of the I/FC or the use of telehealth tools). • Reduction in the number of hospitalisations. • Services provider and local government will have gains of scale in terms of cost saving and income boosting due to: <ul style="list-style-type: none"> • More efficiency means less time spent with each client; • More efficiency means more quality on service provision, and consequently more interest from potential clients to request the services; • More time and the same resources to reach more clients.
Negative impacts / costs	<ul style="list-style-type: none"> • Time taken for training in the use of the Home Care Portal
Third-sector care provider (TSCP)	
Positive impacts / benefits	<ul style="list-style-type: none"> • Improved feeling of quality of service provision • Enrichment of their role in the care provision
Negative impacts / costs	<ul style="list-style-type: none"> • Time taken for training in the use of the platform

5.3 Implementation requirements

This section gives an overview of the current state of requirements analysis at the pilot site, broken down into different categories. At the time of the writing of this deliverable, requirements elicitation at the site was still ongoing. Final consolidated outcomes will be presented in D1.2.

5.3.1 End user requirements

- Identification of users is prior to any development and must comply with the legislation and organisation's normal procedures.

- Informed consent form signed by the CR or relative in charge.

5.3.2 Organisational, staff and business related requirements

- Existing workflows at the service provider organisations involved may need to be adapted, at least partially.
- Staff concerned may need to be qualified / trained respectively.
- Agents, namely formal and informal carers, involved on the BeyondSilos project will have to follow a training programme on the use of the technological devices.

5.3.3 Legal / regulatory / contractual requirements

- Specific requirements concerning privacy and security of health related data imposed by national regulation will need to be met.
- Clients have to give their written consent.

5.3.4 Technology / functionality related requirements

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

6. Badalona pilot site - contextualised pathways

6.1 Point of departure

Badalona Serveis Assistencials (BSA) is an integrated private health and social care organisation with entirely public capital that manages the Hospital Municipal de Badalona, the Homecare Integrated service, the socio health centre El Carme, seven primary care centres and the Centre for Sexual and Reproductive Health. It provides care to a total population of 419,797 inhabitants in a very populated suburban area of Barcelona.

BSA has a special characteristic that distinguishes it from all the other healthcare providers in Catalonia: it also provides the social care services for the region of Badalona and three other towns surrounding it. Originally in our country, a separation between the Department of Social Welfare and Family and the Department of Healthcare has existed. In terms of welfare, this separation has not proven to be the most suitable to provide effective and quality care to the patient who receives both types of care simultaneously. Because of that, from BSA and with the support of Badalona's Council, it was decided in 2000 to change the conceptual model, focusing it on the patient. This model was carried out at the operating level by transferring social services to BSA, a company originally dedicated to the provision of health services, thus obtained the perfect fusion between the conceptual and operational level.

The union of the older healthcare-oriented infrastructure (the Geriatric Department) dealing with all kinds of elderly typologies ranging from the healthy, the frail, ill, dependent or those in a late stage of life, along with a public Social Service department, renders BSA able to complement health-related interventions with social assistance on a level of almost unprecedented process consolidation. This situation, as a whole, effectively makes BSA work as an integrated care organisation, not only taking into account the transversality among assistance levels, but also being able to deal with and manage the complete social welfare situation among the whole reference population. The structure of the organisation is formed by a Primary Care unit, administering a reference population of 114.347; the Hospitalisation unit, located at the Hospital Municipal de Badalona; the Socio-Health Care unit and a Home Care Service; and all supported by state-of-the-art technology.

BSA is involved in a number of research and innovation projects, both national and European, dealing with the development of new services for their target population with the support of ICT, including all types of telemedicine and e-health solutions. BSA is constantly aiming to improve the services offered to the population that it is responsible for. In the last five years, the complexity of wellbeing related problems has greatly increased, especially in the social care area. The geriatrics, psycho geriatrics, neuropsychiatry, convalescence, rehabilitation and palliative care specialties are currently being complemented by several programmes that have been put in place in order to improve the services provided.

BSA has been providing social and health care services in an integrated way for quite a long time now, but there is still a long way to go. With BeyondSilos, BSA aims to better integrate the measurements that patients are taking at home with the corporate electronic medical record (EMR). Another challenge that BSA would like to achieve during the project timeframe is opening specific subsets of its EMR to the third sector organisations surrounding it, in order to increase the effectiveness of the integration beyond current levels.

6.2 Pathway description

6.2.1 Actors and their roles

The pathways involve a number of different stakeholders or actors, including individuals and organisations either receiving or delivering the service based on the pathway. The following tables provide an overview of the different actors and a description of their role.

Differences between the two pathways are highlighted, with elements referring only to the short-term pathway being marked as “**ICP-Acute**”, and elements referring to the long-term care pathway marked as “**ICP-LTCare**”. Elements not specifically marked apply to both pathways.

Table 5: Client domain actors of contextualised pathways in Badalona

Care recipient (CR)	
Description of actor characteristics ICP-Acute	<p>Patients recruited after a hospitalization, surgery, early discharge or any acute episode (including social issues). Living at home, autonomous or in a dependency situation, with home care needs or an exclusion risk due to illness or disability and living within BSA’s Healthcare Area.</p> <p>From a social point of view, CRs should be frail people, socially or physically excluded due to illness or disability with home care needs.</p> <p>In this pathway, the patients to be included would be those that are through an acute episode. They will probably leave the BeyondSilos pilot service as soon as that concrete care need disappears after the acute episode.</p>
Description of actor characteristics ICP-LTCare	<p>Patients suffering from any chronic disease, living at home, autonomous or in dependency situation, with home care needs or an exclusion risk due to illness or disability of any condition and living within the BSA’s Healthcare Area.</p> <p>From a clinical point of view:</p> <ul style="list-style-type: none"> • Patients (any age) living at home, autonomous or in dependency situation, with home care needs. • We also consider part of the BeyondSilos service pilot a second group of users which are the complex chronic patients. For forward explanation on the characteristics of those users look at the entry points section. <p>From a social point of view, CR should be fragile older people, socially or physically excluded due to illness or disability, with home care needs.</p>
Description of role in service delivery / utilisation	<p>The CRs will be consumers of the care services.</p> <p>Their main role is to be users of telemonitoring services and/or social services.</p>
Information handled in the context of service delivery / utilisation	<p>Information from their vital signs measurements and care schedule (available through the platform installed at home).</p> <p>Providers involved in the care process including the schedule to be delivered are handled through the care plan.</p>

Informal Carer (I/FC)	
Description of actor characteristics	Relatives (including family members) and caregivers employed by the CR.
Description of role in service delivery / utilisation	Their main role is to help older people on their daily tasks and participate in the care plan.
Information handled in the context of service delivery / utilisation	Information on the CR's vital signs measurements and care schedule.

Table 6: Provider domain actors of contextualised pathways in Badalona

Social care provider (SCP)	
Description of actor characteristics	<p>BSA is the provider of social services in the region of Badalona. The social workers are employed either by BSA or the City Council of Badalona.</p> <p>Besides the public body, BSA also subcontracts some of its activities to private companies to provide:</p> <ul style="list-style-type: none"> • Home care services (family workers). • Meals at home. • Laundry service. • Cleaning home. • Tele-assistance (panic button service). <p>All of those external activities carried out by private providers are centrally managed by the Home Care Department.</p>
Description of role in service delivery / utilisation	<p>They provide assistance of any type to elders that are in need of attention.</p> <p>Their main goal would be to provide social care and help when taking vital signs for dependent users, support for health education programmes, control and monitoring of clinical treatments, filling out forms to detect clinical alerts.</p>
Information handled in the context of service delivery / utilisation	<p>Coordination information. Detailed information related to the social care received / requested.</p> <p>Access to the whole shared care plan.</p> <p>Information related to the monitoring vital signs taken</p> <p>Internal users have full access to the EMR and SCR data set.</p> <p>External users (subcontracted providers) have access to some subsets of the information (demographics, shared care plan, among others...) through the Home Care Department software tool.</p>

Health care provider (HCP)	
Description of actor characteristics	<p>Regional public organisation provider of health services including:</p> <ul style="list-style-type: none"> • Primary care doctors and nurses (ATDOM team) and case manager (nurse for complex chronic patients) from several sub-areas from BSA. • Specialised care health services at Badalona's hospital. • Badalona's hospital emergency unit staff. • Home Care Department (SAID), home hospitalisation team. • Home palliative care service (PADES). <p>Besides the public body, BSA also subcontracts some of its activities to private companies to provide:</p> <ul style="list-style-type: none"> • Physiotherapy at home. • Rehabilitation at home. <p>All of those external activities carried by private providers are centrally managed by the Home Care Department.</p>
Description of role in service delivery / utilisation	They provide health assistance to citizens.
Information handled in the context of service delivery / utilisation	<p>Coordination information.</p> <p>Detailed information related to the health care received / requested.</p> <p>Information related to the monitoring of vital signs taken.</p> <p>List of prescriptions: medication reconciliation.</p> <p>Full access to all the information inside the EMR and the SCR.</p>
Third-sector care provider (TSCP)	
Description of actor characteristics	Local associations that provide support to CRs. Those include volunteer organisations and private foundations.
Description of role in service delivery / utilisation	<p>Their main role is to act as social services providers helping to reach goals that the public social care system does not reach through lack of funding. For example, the foundation "Fundació Llegat Roca I Pi" is very active funding home fixings in the households that BSA identifies as being in such need.</p>
Information handled in the context of service delivery / utilisation	They have no access to the CR data.

6.2.2 Description of pathway components

The following description relates to the components of the pathway as described in section 2.2 above, with each heading corresponding to one of the boxes in the pathway.

Again, differences between the two pathways are highlighted, with elements referring only to the short-term pathway being marked as "**ICP-Acute**", and elements referring to the long-term care pathway as "**ICP-LTCare**". Elements not specifically marked apply to both pathways.

Entry points **ICP-Acute**: There is mainly one starting point for this acute ICP. It would be when a patient has been referred to the BeyondSilos programme by:

- Any of the primary care centres of BSA.

- Badalona's municipal hospital.
- Social health centre "El Carme".
- Badalona's City Council Social Services.
- BSA's Home Care Department.

Potential participants suggested to be involved in the BeyondSilos programme, most probably after a hospitalisation, surgery, early discharge or any acute episode (including social issues) by any of these units will have to go through an evaluation performed by the Case Managers of BSA who are composed mainly of nurses and social workers.

Each Primary Care Centre and also the Hospital and the Social Health Centre do have their own Case Managers that are specialised in evaluating with their interdisciplinary teams the health and social risks of each individual, and subsequently arranging the needed services for each particular situation. They are the ones that will decide if the participant is likely to be included in the BeyondSilos programme.

Entry points ICP-LTCare: There are two entry points for this LTCare ICP.

The first is when a patient has been referred to the BeyondSilos programme by:

- Any of the Primary Care Centres from BSA.
- Badalona's municipal hospital.
- Social health centre "El Carme".
- Badalona's City Council Social Services.
- BSA's Home Care Department.

Potential participants proposed for the BeyondSilos programme by any of these units will have to go through an evaluation performed by the Case Managers of BSA, who are mainly nurses and social workers.

Each Primary Care Centre and also the hospital and the Social Health Centre have their own Case Managers that are specialised in evaluating, with their interdisciplinary teams, the health and social risks of each individual, and subsequently initiating the needed services for each particular situation. They are the ones that will decide if the participant is likely to be included in the BeyondSilos programme.

The second starting point would be when the Predictive Risk Stratification Programme from BSA detects an individual who is not yet included in any of the care attention programmes of BSA. That individual would be visited by the referent Case Manager from the relevant Primary Care Centre, and be evaluated as in the first starting point. The patients selected to be chosen in this proactive manner are the ones classified by BSA as "patients with complex chronic care conditions", who are at the top of the risk stratification pyramid. (See explanation of the model below)

Patients with Complex Chronic Conditions Care Model

One of the programs where BSA has invested more resources is the Care Model for Patients with Complex Chronic Conditions (MAMCC), which is meant to define the care model that must be followed by all the professionals from BSA in order to deal with the needs of those patients who are mainly characterised by a high mortality rate and a high average rate of resource consumption. The ageing population and the sustainability of the Catalanian National Public Health System are some of the factors that motivated BSA to move towards this model:

- Catalonia's life expectancy is one of the highest in the world. The target population of BSA presents an ageing rate of 18,9% and an over-ageing rate of 11,7%. This fact, together with the provision of care services to the population with multiple chronic conditions and/or in frailty / complexity

situations leads to the most challenging situation ever faced by the national health system. Currently, 2/3 of the Catalanian population suffer from at least one chronic condition.

- Because of the large increase in life expectancy and the low birth rates, the proportion of inhabitants older than 60 years old has increased more than any other age group in almost every developed country around the world. The ageing of the population can be considered a victory for public health policies and socioeconomic development, but it is still a great challenge for society, that must adapt its structures in order to promote health, the abilities of the older people, face the chronic diseases, and also their social inclusion and security.

To be successful in such a challenging situation, the Catalanian Health Plan for 2011-2015 defines six fundamental changes in the model:

1. Population view in order to know better both the patients and their needs.
2. It offers answers from the pre-clinical phase to the rest of the phases of the disease(s).
3. It promotes an active engagement of citizens and patients (personal accountability for health and disease).
4. It establishes a good base to achieve an integrated and coordinated care with primary care as the core of the intervention for the patients with multiple chronic conditions.
5. It takes advantage of ICT systems in order to provide an innovative and accessible service model.
6. It comprehends an interdepartmental dimension, specifically in relationship with the Department of Social Welfare and Family.

In order to develop the MAMCC, BSA designed a predictive model tool that allows risk stratification of the population between care needs that would arise during next year in order to “catch” those patients in a proactive way, rather than waiting for their institutionalisation. This model has a demographic focus, which has allowed BSA to organise its care units to provide a better service to chronic patients. All the data used by the stratification tool comes from the EMR and the SCR.

With the use of that tool, and through multimorbidity and frailty criteria, BSA can identify the risk of each particular citizen in order to provide the best care where is needed.

Because there is little consensus about frailty between different authors and consulted bibliography, BSA considers frailty to one of the following:

- Age > 85.
- The patient is inside the Domiciliary Care Programme (patients unable to go to primary care).
- Barber test (looking at frailty from a health and economic perspective) + dependants.
- Polypharmacy (>10 drugs).
- Social risk.
- Two hospitalisations at either the hospital or Social Health Centre, or two emergencies in the last year. Trauma and surgery processes are excluded.
- Disabling diseases.
- To study multimorbidity, BSA has elaborated a model based on economic and health variables that considers the multimorbidity, the autonomy and the healthcare complexity.

Depending on the multimorbidities BSA classifies the patients into different groups to adapt the needed resources:

0. Patients without any disease: Promotion and prevention.
1. 1-2 chronic conditions: Patient at risk: Self-empowerment.
2. 3-4 chronic conditions: Medium complexity patient. Assisted care. Disease management.
3. >5 chronic conditions: High complexity patient. Special care. Case management.



The main objective of such a programme is to offer patients with multiple chronic conditions, inside the region of influence of BSA, an integrated care model, provided from both social and health services, based on the optimisation and integration of resources to give a fast response to their needs.

Furthermore, the specific objectives include:

- Position the patient in the middle of the care model.
- Plan and realise interventions focused on identifying, preventing and treating in advance acute episodes to avoid further hospitalisations.
- Design and realise individual integrated care plans based on the evaluation of each particular need and the general geriatric evaluation.
- Promote the independent life of patients as much as possible, maintaining good quality of life.
- Coordinate the work of the interdisciplinary teams doing the interventions.
- Guarantee and provide a continuity of services.

The difference between both starting points is that the first group will be referred to the programme by any of the professionals working in those centres, and the second group will be proactively recruited through the Risk Stratification tool.

Assessment of the service user's needs for integrated home care: Interdisciplinary teams, managed by Case Managers and formed by both internal and external HCP, SCP and TSCP, define the needed interventions for each particular case in relation to home care.

Parameters such as the frequency of needs, inclusion in the telemonitoring service, the clinical devices to be installed in order to take the appropriate measurements, the precise care plans and the home care teams to be enabled, the activities to be introduced into the patient's schedule, and any other intervention related to each particular situation are precisely defined.

The decision, to join or not the BeyondSilos programme will be made in the coordination meetings held by the Home Care Department using all the information available from the EMR, SCR and also the data coming from any other stakeholders involved. The range of information to be analysed may include from health related conditions, to frailty tests (such as Barthel Index), economic status, and others.

The services to be provided by the health services may include:

- Remote monitoring: the most common devices installed are: blood pressure meter, pulse-oximeter, weight scale, electrocardiogram, glucometer, thermometer and behavioural analysis through movement sensors.

- Home hospitalisation.
- Complex geriatrics treatment.
- Convalescence.
- Treatment of multiple chronic conditions.
- Tests and special treatments (such as polysomnography, blood tests, etc...).
- Cognitive training.
- Medication adherence.
- Rehabilitation at home (delivered by physiotherapists).

On the other hand, the services to be provided by the social services may include:

- Tele-assistance (panic button).
- Personal tracking (by GPS when going outdoors).
- Meals at home.
- Cleaning at home.
- Laundry service.
- Home care support (delivered by family workers).
- Punctual accompaniment (either for medical reasons or administrative matters).
- Risk exclusion avoidance (by programming activities in the diary).
- Home fixings and repairs (delivered by BSA but paid by TSCP).
- Access to loan services (wheel chairs, adapted beds, etc...).
- Domotic safety and comfort tools, such as smoke and water detectors, or climate control and doors and window locks.

Enrolment into BeyondSilos pilot service: As was said above, there is a structure already in place to decide which interventions should be delivered by the Home Care Department to each individual CR. This coordination structure is managed by Case Managers (one from each centre at the organisation, and some located at the Home Care Department) and formed by interdisciplinary teams including all the actors involved in the process.

For the BeyondSilos pilot service, some of those professionals, specifically the ones at the Home Care Department, have already been involved within the BeyondSilos project in order to be able to evaluate whether or not it is interesting for each case to go into the BeyondSilos pilot service.

ICP-Acute: According to the entry point described in the first section of this use case, the enrolment procedure for this pathway will be as follows:

- Patients may be identified in any of the centres / services managed by BSA or Badalona's City Council Social Services (most probably after an early discharge from hospital or after surgery).
- These patients will be referred to the Home Care Department evaluation group.
- The evaluation group will do the corresponding evaluation for specific social and health services as they currently do. They will also check if the patient meets the inclusion and exclusion criteria defined in the BeyondSilos programme, to decide whether to include him/her or not.

The inclusion criteria for the **ICP-Acute** pathway are the following:

- Aged 65+.
- Patients early discharged from hospital.
- Hip fracture.
- Any other surgery that may demand care and rehabilitation at home.
- Lack of support at home.
- With home care needs or an exclusion risk due to illness or disability.
- Autonomous or in dependency situation.

ICP-LTCare: According to the entry points described in the first section of this use case, the enrolment procedure for this pathway will be the following:

- Patients identified in any of the centres / services managed by BSA or the Badalona's City Council Social Services. These patients will be referred to the Home Care Department evaluation group. The evaluation group will do the evaluation to initiate specific social and health services, as they currently do. They will also check if the patient meets the inclusion and exclusion criteria defined in the BeyondSilos programme, as to whether include him/her or not.
- Patients proactively identified by the Predictive Risk Stratification Program. The interdisciplinary teams at the Home Care Department are in charge of tracking all the patients that this software tool recognises proactively (with one year of anticipation) as possible frail ones. The normal procedure with them is to arrange a visit to their own home to make a proper evaluation and to identify their needs before they become hospitalised. Once identified, those patients will follow the same process already in place to see if they fit the criteria for selection for the BeyondSilos programme.

The inclusion criteria for the **ICP-LTCare** pathway are:

- Aged 65+.
- Lack of support at home.
- Patients suffering from any chronic disease (or multiple chronic conditions).
- Living at home.
- Autonomous or in a dependency situation.
- With home care needs or an exclusion risk due to illness or disability.
- Living within BSA's Healthcare Area.
- Patients inside the Complex Chronic Patient setting (see the entry points section for further explanation).

When a patient has been identified as a valid candidate for the BeyondSilos programme, he/she will be informed by the professional who referred them. The professional will deliver further information about the pilot service, and any information requested either by the patient or I/FC. The patient must sign an Informed Consent Form in order to participate in the pilot.

Initial integrated home care plan: An initial integrated Home Care Plan will be already in place at this stage for each individual being attended by the Home Care Department. This plan will be in place whether or not the patient has signed the Informed Consent Form, and hence whether or not they are entering the BeyondSilos programme. The integrated Home Care Plan is shared among all the involved stakeholders through the Home Care Department software, and is accessible to all depending on permissions according to predefined roles.

A specific medical measurements schedule is set up on the remote monitoring schedule; this is available at the CR's home, with appropriate reminders if he/she is not taking them, sent by email or SMS. A chain of security reminders is also set up in order to inform the HCP when the patient is not following the predefined schedule of medical measurements.

The CR and I/FC are informed of such a schedule (medical measurements and regime of visits) and are provided with two points of contact. The first one is the Home Care Department service point, which is available to manage any administrative issue (maybe a change in the regime of visits, or some particular situation the CR and/or I/FC wants to notify), and the specialised Contact Centre for emergency matters and any possible doubts regarding medical issues.

ICP-LTCare: The TSCP are also informed of the Home Care Plan through alerts in the system when appropriate, granting read-only access to them for the Home Care Plan, to see what they can provide from their volunteers in order to deal with each particular situation.

Discharge from hospital **ICP-Acute:** An early discharge from the hospital is likely to be the most common entry point into the BeyondSilos programme. The organisational structures to initiate the needed services have already been in place for many years. Usually, the physician in charge discharges the patient to the Home Care Department which as always evaluates the needs of each individual and initiates the required services. In these cases, it is very common to notify the rehabilitation team (for example after a hip surgery) and also home care support if there is no I/FC available.

Coordination of integrated care delivery / revision of the initial care plan: When a CR is referred to the Home Care Department, the first thing to do is go through its software tool which manages all the requests, holding the care plans, storing the demographic information of the CR, and from the I/FC, identifying who was the referrer, managing the discharges and also linking with the SCR and EMR. This tool was developed by BSA in 2003 in order to ease the process of delivering integrated services, where plenty of different stakeholders take part in the process.

During the delivery of the services, the particular needs of the CR may change. These changes will be identified and managed by the coordination team at the Home Care Department in their regular weekly meetings with all the involved stakeholders.

Any change in service delivery effected in the Home Care Department software tool, and subsequently made available to all the involved stakeholders. Changes derived from this process which affect the measurements taken by the patient at home will be applied to the technological platform and to its schedule.

The coordination team will also evaluate on a weekly basis if the CR still meets the inclusion criteria, in order to keep him/her in the BeyondSilos service pilot. **ICP-LTCare:** TSCP are also integrated in the meetings when appropriate in order to better deal with the CR needs.

On-site provision of formal social care: The patients included in the BeyondSilos programme are likely to have social needs. Whether they are in a dependency situation, in a risk of exclusion situation, in a frail or pre-frail status, or have installed telemonitoring tools at home, a set of social services will be initiated according to each particular need. Depending on the situation, these services, as mentioned above, will be enabled or disabled by the interdisciplinary Home Care Department coordination team.

For a list of possible social care services, please see the “Assessment” section above.

ICP-LTCare: TSCP will have access to the videoconferencing facilities when the patient needs this.

On-site provision of formal healthcare: The patients included in the BeyondSilos programme are likely to have health care needs. Whether they have one or multiple chronic conditions, if they are in the rehabilitation programme, or in the hospital (for example after surgery) or under the telemonitoring programme, they are likely to receive visits from HCP.

The HCP professionals visiting patients at home may include physicians, GPs, surgeons, nurses, physiotherapist among other specialised healthcare professionals. Depending on the situation, these services, as mentioned above, will be enabled or disabled by the interdisciplinary Home Care Department coordination team.

For a list of possible healthcare services, please see the “Assessment” section above.

On-site provision of informal care: The I/FC caregivers involved in the BeyondSilos programme within the CR's environment will provide all kinds of help and assistance to the CR. This may include helping the CR to take medical measurements, and helping him/her with the daily activities.

Remote provision of integrated care to the home (telecare, telemonitoring): One of the most important goals of this pilot, from BSA's point of view, is not just providing integrated care, which is something that has already been in place for many years now, but better integration of the telemonitoring tools inside the service model being offered by BSA to its inhabitants. Up to now, the telecare and telemonitoring tools have been delivered under the umbrella of many national and international research projects, but they are still not a clear item available to every inhabitant in the target population of Badalona.

A telemonitoring service, funded by the EU under the Competitiveness and Innovation Framework Programme (<http://ec.europa.eu/cip/>) has been piloted at BSA since 2010, and is currently under evaluation. The project, called Home Sweet Home (<http://apps.bsa.cat/drupal/?q=node/22>) was the first telemonitoring experience for BSA.

After this, some other initiatives have been tested or are already being tested such as: ITHACA Hypertension (<http://apps.bsa.cat/drupal/?q=node/12>), SIMAP (<http://apps.bsa.cat/drupal/?q=node/32>), Olfacweb (<http://apps.bsa.cat/drupal/?q=node/30>), and the Nomhad platform (<http://tsbtecnologias.es/>).

BSA has the strong feeling both that these tools are useful in order to better control the patient's health conditions, and that they are also able to promote self-empowerment of the users in the management of their own wellbeing. Because of this, BSA is still investigating how to better integrate them with the ICT infrastructure already in place, and also trying to find sustainable ways of funding them.

Integrated documentation of home care provided / self-care measures: At the moment, there are two platforms:

- One holds the shared care plan and all the interventions and tasks being delivered to the patients; this is the Home Care Department platform.
- The other stores the telemonitoring measurements and all the related items that can be remotely controlled, such as the behavioural analysis tools or the schedule management.

During the pilot, BSA would like to reach a better integration between the two platforms. A simple example of integration would be being able to access the telemonitoring platform from the EMR, SCR or the Home Care Department via a single sign-on process, in order to ease the work of the care professionals.

Control / reassessment of the home care recipient: One of the most important aspects of the telemonitoring tools is that professionals are able to track a larger number of patients in less time. Besides this, it is also clear that the amount of data available to be electronically processed increases with the telemonitoring tools. Just by adding a good alarm system, which is configured in order to track possible deviations from the normal range, we end up with a very good system to identify early possible deteriorations of the health status of the CR.

Of course, that would not be enough without a set of specialised professionals in the background controlling the platform and the measurements, and identifying changes in the health status of each CR. To achieve this, the platform will be controlled by a specialised Contact Centre (called Asmedic, and based in Barcelona) that will deal with the daily control of patients, and also with any doubt or issue they may have. If they envisage a worsening of the health status of the patient, they will inform the weekly coordination meetings of the Home Care Department.

Temporary admission into an institutional setting (e.g. hospital, day care centre): A worsening in the health conditions of the CR (or I/FC) may result in the need for a temporary admission to hospital. Such situations are the daily practice of the Home Care Department, and will be managed through them. All involved stakeholders will be able to see that the patient is in “temporary discharge” from the BeyondSilos programme through the Home Care Department software.

Exit points: There are many reasons that the CR could leave the service:

- Acute conditions disappeared.
- Worsening of the situation.
- The patient decides to leave the programme (drop-out of the BeyondSilos programme) for any reason.
- Death.
- No longer meeting the inclusion criteria.

6.2.3 Anticipated impacts

The table below lists the impacts of the new pathway on the different actors, as anticipated at this stage. Actual impacts will be measured and analysed as part of the evaluation and cost-benefit analysis of the pilot deployment.

Impacts are split into positive impacts or benefits on the one hand, and negative impacts or costs on the other. In both cases, tangible as well as intangible effects can be included. For example, a positive impact can be an increase in a patient’s self-perceived quality of life or satisfaction (intangible benefit) or saved costs due to more efficient service provision for a provider (tangible resource benefit). In a similar way, negative impacts can include the inconvenience caused by daily telehealth readings (intangible costs) or the investment in telecare equipment by a provider (tangible monetary cost).

Table 7: Anticipated impacts of contextualised pathways in Badalona

Care recipient (CR)	
Positive impacts / benefits	<ul style="list-style-type: none"> • Self-empowerment of their own health conditions. • Enhancement of the health-related QoL. • Improved satisfaction with service delivery • Perception of service-specific impacts such as safety and security, improved physical status, improved communication with care providers, reduced social isolation. • Reduced need for self-paid homecare due to the telemonitoring / telecare.
Negative impacts / costs	<ul style="list-style-type: none"> • Loss of privacy because of widespread technological deployment. • Time taken for making telehealth readings. • Time taken for training in the use of equipment.
Informal carer (IFC)	
Positive impacts / benefits	<ul style="list-style-type: none"> • Empowerment on the actions to be performed.
Negative impacts / costs	<ul style="list-style-type: none"> • Time taken for training in the use of equipment • Time taken helping the CR taking the measurements. • Reduction in the income for paid home-carers because of reduced demand.

Social care provider (SCP)	
Positive impacts / benefits	<p>Internal & external SCP:</p> <ul style="list-style-type: none"> Improved feeling of quality of service provision. Reduction of the average time per case, when the CR, I/FC are trained enough. Reduction in the number of visits (because of the empowerment of I/FCs or the use of telehealth tools), when the CR, I/FC are trained enough. <p>In addition, for internal SCP:</p> <ul style="list-style-type: none"> Reduction of the City Council costs.
Negative impacts / costs	<p>Internal & external SCP:</p> <ul style="list-style-type: none"> Time taken for training in the use of equipment. Time taken for the provision of services, when the CR, I/FC are not trained enough. <p>In addition, for external SCP:</p> <ul style="list-style-type: none"> Reduction of income because of the reduction in the number of visits.
Health care provider (HCP)	
Positive impacts / benefits	<ul style="list-style-type: none"> Improved feeling of quality of service provision. Reduction in the average time per case. Reduction in the number of visits (because of the empowerment of I/FCs or the use of telehealth tools). Reduction in the number of hospitalisations.
Negative impacts / costs	<ul style="list-style-type: none"> Time taken for training in the use of equipment. Assumption of the new tasks derived from the telemonitoring tools (controlling the CR). Time taken for the provision of services.
Third-sector care provider (TSCP)	
Positive impacts / benefits	<ul style="list-style-type: none"> Improved feeling of quality of service provision. Enrichment of their role in the care provision.
Negative impacts / costs	<ul style="list-style-type: none"> Time taken for training in the use of the platform.

6.3 Implementation requirements

This section gives an overview of the current state of requirements analysis at the pilot site, broken down into different categories. At the time of the writing of this deliverable, requirements elicitation at the site was still ongoing. Final consolidated outcomes will be presented in D1.2.

6.3.1 End user requirements

The choice of the user is a key factor and must be based on the characteristics of the target patient. The user must be identified with a unique ID.

Initially, the end users (I/FC, CR) could need special training in handling the equipment (glucometers, blood pressure meter, and with the computer equipment). They could need instructions on how to proceed in the event of a change in health status of CR. They need the telephone contact number for: HCP and Contact Centre; primary care doctors and nurses (ATDOM team) and case manager (nurse for complex chronic patients) from their sub-area of BSA (from their Primary Care Centre); and home hospitalisation team (SAID) or home palliative care service (PADES).

Other requirements:

- Training in self-care will be needed. All medical teams involved must contribute to give them eventually more empowerment in the process.
- Videoconferencing facilities are needed.
- Extension of the panic button functionality outside home is required.
- The platform should be simple, to be used by older people not used to computers.
- Screens must contain essential information. There must be a clear way of going back.
- Errors made by technical devices should be understandable by non-technicians.
- Human contact should never be exchanged by machinery.

All these new services should be complementary to the basic services.

6.3.2 Organisational, staff and business related requirements

The creation of a team is required in order to coordinate the project and to establish a link between the different providers involved in the provision of care. The organisation depends on different providers to coordinate the services provided. The coordinating team deals with the information handed to providers about the dynamics involved in the project work, monitors results, provides ICT support, coordinates the meetings between different providers if necessary, and reports to other project partners.

The involved staff have to know about the project, the providers involved, training about the devices that will be used at home, and the software used. The staff should be sufficiently qualified and trained. They will receive support from the coordinating team.

Some organisational changes will be required in order to better integrate the TSCP organisations into the provision of services envisaged in the BeyondSilos project. Probably, they should start attending the coordination meetings in order to be able to allocate the resources they provide where they are most needed.

6.3.3 Legal / regulatory / contractual requirements

Patients will have to give their written consent in order to take part in the study protocol of the BeyondSilos project.

Specific data protection requirements concerning privacy and security of health related data imposed by national regulations (LOPD in Spain) must be met.

All the service providers' organisations already have a contractual relationship with BSA in order to determine the rights and responsibilities of each party involved, including liability related aspects. The integration in the care model of the TSCP organisations can be challenging though.

The service may need to comply with quality requirements set out in the co-funding rules established under the national care funding / insurance schemes.

Established consent procedures currently followed by the service providers involved may need to be adapted in order to add new responsibilities and rights.

The study protocol defined by the BeyondSilos project will have to go through the local Medical Ethical Investigation Committee.

6.3.4 Technology / functionality related requirements

The project is based on the use of telemedicine; because of this, it is necessary to deploy a very efficient computer support. A support team must be established with clear functionalities and different levels of attention.

The software and hardware platform installed at patients' home must:

- Be intuitive in order to be used by any kind of user.
- Contain the essential information needed for CR and I/FC, trying to avoid screens full of data.
- Show understandable errors when something has gone wrong.
- Abide by the ethical principles as defined by the national legal regulations. Problems with webcams should be clearly defined and explained to users.

Apart from that, a better integration of the home monitoring devices with the EHR has been requested by the professionals dealing with them in order to favour continuity of care. To achieve this, the service provider implementing the integration will have to follow the interoperability standards defined by the ICT Department of BSA.

SCP and HCP use the same database, and all the teams from BSA involved in the process can have full access to all the subsets of the SCR and EHR. Professionals from other organisations only have access to some subsets of information, as established by the contractual relationship between BSA and their organisations.

Other requirements:

- Data transmission must always be over secure connections.
- Every user of the platform must have a password.
- All the activities undertaken on both sides of the platform must be tracked and properly logged for further legal requests.
- Communication within the TSCP organisations will be studied in order to change from traditional emails to a more secure and regulated access.

The portal to access the monitoring needs to have different access views according to different roles.

6.3.5 Any other requirements

- The chance to pay for these services should be given to users who can then pay for it if they want to.
- Look for co-funding models.
- Engage the decision makers in the process of converting this service as part of the normal service delivery model.

7. Campania pilot site - contextualised pathways

7.1.1 Point of Departure

Campania is a southern region of Italy, with about 6 million inhabitants. Politically, it is organised into five smaller areas, named Provincia, which coordinate the activities of the cities within their area.

Healthcare in Italy is public, is delegated by central government to the Regional government, which has a budget derived from governmental allocation of funds, and from regional taxes. The Region delegates healthcare through means of local health agencies, named ASL. In each Provincia, there might be more than one ASL; in Campania, in particular, they are organised as follows:

- A.S.L. Avellino (Corresponds to the Provincia of Avellino).
- A.S.L. Benevento (Corresponds to the Provincia of Benevento).
- A.S.L. Caserta (Corresponds to the Provincia of Caserta).
- A.S.L. Napoli 1 Centro (One of the 3 ASL of the Provincia of Napoli).
- A.S.L. Napoli 2 Nord (One of the 3 ASL of the Provincia of Napoli).
- A.S.L. Napoli 3 Sud (One of the 3 ASL of the Provincia of Napoli).
- A.S.L. Salerno (Corresponds to the Provincia of Salerno).

Each ASL is in charge for everything that relates to public health. The activities are delivered through means of Departments, which control the services of hospitals, outpatient clinics, laboratories, counselling points, public pharmacies, veterinary care, etc.

Social care is also controlled by the government, which delegates Municipalities, with an allocation of funds raised from taxes.

These two actors in Campania should interact; in particular, the delivery of integrated health and social care is regulated by government legislation which sets the standards to be adopted by each local government. Regional law 11/2007 regulates the delivery of integrated care at the place of the patient; in 2009, a decree from the Social Department of the Region formulated the operational indications for the Regional Social Plan. This interaction takes place in the Assessments Unit for Integrated Care (AUIC) which already exists, an evaluation office that includes ASL and Municipality staff who evaluate the needs of a client, and decide the level of assistance that has to be delivered. The AUIC can be accessed by the client only after a referral, that is started by either the GP of the client, or territorial social workers. Then an integrated team of care providers (usually geriatricians, nurses, physiotherapists and social workers), which is coordinated by the head geriatrician and takes the name of ADI, delivers the level of assistance decided by the AUIC.

Description of the current care delivery process:

During the process of referral, the health and social authorities evaluate the response to client needs in terms of: nursing home; care continuing unit; day care centre or home care support.

The services provided encompass the following activities and ICT usage:

- Hygiene.
- Medication.
- Cleaning.
- Nursing and Physiotherapy.

Very little ICT is currently involved at the place of the patient. In hospitals, there is an electronic chart where the responsible physician can manually enter data. This service is already in place in two ASL in Campania: Napoli 1 Centro, and Salerno, district of Battipaglia.

BeyondSilos pilot will reinforce and extend integrated care to elderly people living in these two districts.

For the purpose of the pilot, the ADI teams will evaluate the situation; if the client meets the inclusion criteria, he/she will be enrolled into BeyondSilos process.

Besides that integration of social and health care stakeholders, ICT improvement will be another key element in the pilot, including the following technical solutions:

- Tele-assistance: panic button alarm and direct link with Home Care Support Team and a Contact Centre available out of hours and during the weekend.
- Tele-monitoring: blood glucose, blood pressure, weight.
- Home Care Portal (that will summarise all the social and health incidents with different permissions according to the types of actors).
- B-Learning tool to train formal health and social carers as well as informal carers.

To develop the ICT components, a key stakeholder in Campania for ICT tools is TSD. TSD has several years experience in the health ICT solutions domain, and has been working in the past years with ASL Na1, the University Hospital of Federico II University of Naples, and the University Hospital of the Salerno University on a joint project to increase ICT provided to the hospitals and GPs. Wincare is a client based platform that allow access to patient data stored on the hospital server. Webcare is a web-based platform that already supports access to patients' workflow through authentication on a HTML powered server. Social carers will input data into the system by activating remote monitoring devices. There is no access to clinical data.

7.2 Pathway description

7.2.1 Actors and their roles

The pathways involve a number of different stakeholders or actors, including individuals and organisations either receiving or delivering the service based on the pathway. The following tables provide an overview of the different actors and a description of their role.

Campania is one of the pilot sites where there is, apart from the length of service provision, no difference between the two generic pathways in terms of services provided, providers involved and processes of care service delivery. Therefore, no distinction between both pathways is made in the following tables.

Table 8: Client domain actors of contextualised pathways in Campania

Care recipient (CR)	
Description of actor characteristics	<p>End users of the services developed under BeyondSilos. Profile:</p> <ul style="list-style-type: none"> • Elderly people living at home (65+). • In a frail situation regarding social and/or health needs. • Enrolled in the Project due to chronic situation regarding Health & Social needs. <p>The process of enrolment is triggered directly by AUIC, by the University Hospitals, or by the ASL clinics, GPs or social carers.</p> <p>After the referral and enrolment process, CRs will be monitored by the home care services provided by the ADI, including health and social care (medication, physiotherapy, hygiene, food, home cleaning).</p> <p>CR will stay in the process as long as they need home care support. After that they will be dis-enrolled., AUIC usually re-evaluates cases monthly.</p>

Description of role in service delivery / utilisation	<p>CR will be the end user, and will benefit from the integrated care services package that ADI will deploy; this includes:</p> <p>1- Integration between social and health care:</p> <ul style="list-style-type: none"> • ADI will monitor both services through the home care support services. • Referral process will be maximised through the direct link between ADI and GPs and the University Hospitals. <p>2- Integrated technology to maximise well being:</p> <ul style="list-style-type: none"> • Tele-monitoring. • Tele-assistance. <p>3- Gains of scale in terms of better services provided by carers:</p> <ul style="list-style-type: none"> • Training to formal carers. • Training to informal carer.
Information handled in the context of service delivery / utilisation	<p>Integrated CARE SERVICES in Campania will be provided through the following process:</p> <ul style="list-style-type: none"> • Home care support provided by ADI, linked with all the stakeholders of the Council. • Technology: Tele-monitoring; tele-assistance; B-Learning training; home care portal.
Informal Carer (I/FC)	
Description of actor characteristics	<p>I/FCs will play an important role in the project as they will deliver services to the CR.</p> <p>I/FC will be divided into two different but complementary actors:</p> <ul style="list-style-type: none"> • Relatives that live with CR or that in some way are responsible for them. • Volunteers that visit the CR weekly, delivering activities and/or participating in daily life activities.
Description of role in service delivery / utilisation	<p>I/FCs will deliver the following services to the CR at their homes:</p> <ul style="list-style-type: none"> • Daily life activities (FC, relatives, volunteers). • Health monitoring (FC relatives). • Medication (FC, relatives). • Physiotherapy (FC, relatives). • Hygiene (FC, relatives; volunteers). • Food (FC, relatives; volunteers). • Psychological support.
Information handled in the context of service delivery / utilisation	<p>I/FCs will monitor / exchange the following indicators:</p> <ul style="list-style-type: none"> • Vital signs measurements. • Critical health incidents. • Care schedule. • Training contents implementation.

Table 9: Provider domain actors of contextualised pathway in Campania

Social care provider (SCP)	
Description of actor characteristics	<ul style="list-style-type: none"> • ADI NA1Centro • ADI SA

Description of role in service delivery / utilisation	<p>ADI can provide home care support, assistance at the day living centre, and rehabilitation for elderly and disabled persons.</p> <p>ADI, under BeyondSilos, will deliver the following services:</p> <ul style="list-style-type: none"> • Home Care Support, including: <ul style="list-style-type: none"> • Daily Life Activities (FC, relatives; volunteers). • Health Monitoring (FC, relatives). • Medication (FC, relatives). • Physiotherapy (FC, relatives). • Hygiene (FC, relatives; volunteers). • Food (relatives; volunteers). • Psychological assessment.
Information handled in the context of service delivery / utilisation	<p>SCP (formal carers and other professionals from ADI):</p> <ul style="list-style-type: none"> • Coordination of all the information on the home care portal (HCP): outputs from daily activities support (hygiene, food, medication...). • Monitoring of care schedule. • Monitoring of formal carers schedule. • Monitoring and registration of all the critical incidents.
Health care provider (HCP)	
Description of actor characteristics	<ul style="list-style-type: none"> • ADI Na1 Centro. • ADI Sa. • AOU San Giovanni di Dio Ruggi d'Aragona. • ASL Na1 Department of preventive Medicine. • San Gennaro Hospital, Dept of rehabilitation.
Description of role in service delivery / utilisation	<p>The ADIs, the GPs and the hospitals will refer clients to the ADI.</p> <p>After enrolment, ADI will deliver the following Services.</p> <p>Remote-monitoring to 100 patients.</p>
Information handled in the context of service delivery / utilisation	<p>HCP (formal carers and other professionals from ADI) will develop the following roles and tasks:</p> <ul style="list-style-type: none"> • Coordination of all the information on the Home Care Portal (HCP): outputs from the tele-monitoring and tele-assistance. • Monitoring of care schedule. • Monitoring and registration of all the critical incidents.
Third sector care provider (TSCP)	
Description of actor characteristics	ADI
Description of role in service delivery / utilisation	<p>ADI will also monitor relatives and volunteers that actively participate in the daily activities of CRs, through the following services:</p> <ul style="list-style-type: none"> • Training in care provision. • Supervision. • Planning / monitoring / evaluation of activities.
Information handled in the context of service delivery / utilisation	<p>Relatives and volunteers will not have access to data, unless CR delegates that authorisation to them.</p>

7.2.2 Description of pathway components

The following description relates to the components of the pathway as described in section 2.2 above, with each heading corresponding to one of the boxes in the pathway.

Entry point: In Campania deployment site, the entry points for CRs having a chronic situation (living alone; on a dependency situation; worsening of social and/or health status) are:

- Discharge from hospital.
- Referral from the AUIC, GPs, Department of preventive medicine, or any organisation belonging to ADI.

When the actors above identify a client that has a chronic situation regarding social and/or health care, they trigger the process of referral to AUIC. After evaluation, and if the client meets the enrolment criteria, they enrol the client in BeyondSilos workflow. Alternatively, they leave it to the regular ADI. A limited number of patients will be enrolled in the BeyondSilos workflow; once this number is reached, new candidate clients will be registered that will receive standard ADI, but will serve as possible outcome controls.

Assessment of the service user's needs for integrated home care: We will use the following workflow:

- Clients referred to the AUIC will be subjected to:
 - Evaluation of social care and health care needs by the BeyondSilos team.
 - Preparation of a dedicated health and social care work programme, corresponding to one of the three levels of intensive care identified by the Italian health and social care system.

Two different types of care should encompass the following services/activities:

a) Social Care

- Accompaniment for administrative purposes.
- Accompaniment to /in hospital.
- Accompaniment at home.
- Administrative tasks.
- Home care support.
- Tele-assistance (panic button).
- Cleaning.
- Follow-up schedule.
- Wheel chair / crutch / articulated bed loan.
- Psychological service.
- Coordination healthcare centre / hospital.
- Coordination with NGO.
- Other support, information or resources management.

b) Healthcare

- Remote monitoring: the most common devices installed are: blood pressure meter, Oximeter, weight scale, glucometer, thermometer and behavioural analysis through movement sensors.
- Complex geriatrics treatment.
- Convalescence.
- Tests and special treatments (such as polysomnography, blood tests, etc.).
- Medication adherence.
- Rehabilitation at home (delivered by physiotherapists).
- Health transportation.
- Emergency transfers.
- GP or nurse home assistance.
- Pain management.
- Wound care.
- Forms filling to detect alert signs.

CR can benefit from one or both services, depending on the PROFILE EVALUATION.

Enrolment into BeyondSilos pilot service: Enrolment into Campania Deployment Site (CDS) will occur after a health and social evaluation provided by the AUIC, that will define the type of care that best meet the CR's needs.

CRs of CDS will be current clients of the ADI service that could benefit from the new integrated care services.

The Coordination Team at CDS defines the following general criteria to be enrolled in BeyondSilos Service, in terms of health and social care:

- a) Social care
 - +65 living alone.
 - Living with partner, siblings or elder relatives.
 - Living with dependent people at home.
 - With home care needs or an exclusion risk due to illness or disability.
 - Elderly people discharged from hospital.
 - Lack of resources at home.
 - Main carer in hospital.
 - Lack of relatives during hospital admission or during the first two days.
 - Abuse or suspected abuse.
- b) Healthcare
 - +65.
 - Patients early discharged from hospital.
 - Any other surgery that may demand care and rehabilitation at home.
 - Terminal neoplastic or neoplastic illness.
 - Dementia and / or psychic handicap.
 - Hip fracture.
 - Lack of support at home.
 - With home care needs or in exclusion risk due to illness or disability.
 - Autonomous or in a dependency situation

The target group defined for the project consists of 150 clients. In case a client leaves the project, a new client can be enrolled.

All the clients enrolled in the project must have signed an Informed Consent Form.

Integrated home care plan: All the clients enrolled on CDS will have ex ante a Level of Intensity (LEA, grade from 1 to 3) ADI program, that is the result from the evaluation of the AUIC along with all the necessary inputs from the client and from all the stakeholders involved. This LEA reflects all the health and/or social care needs of the CR, alongside with the types of treatments and frequency, and the estimated start and end of the process.

The LEA will be available to all the key players involved.

LEA information and details will be disclosed on the WEBCARE (client application) and WINCARE (html application) that will be accessible to ADI and, in certain cases, to the I/FCs.

Any time the ADI providers should evaluate that there is the need for a change to LEA, they should report it on the appropriate form to the AUIC and the chief geriatrician; feedback will be provided to all the health and social care stakeholders. For example, if social care givers should identify a change in the general condition of the patient that interferes with the regular delivery of care, they can start a process

of reassessment by the healthcare providers. In certain cases, where doubts exist, these situations will be discussed and evaluated at ordinary or emergency project meetings.

Coordination of integrated care delivery / revision of the initial care plan: After the definition of the initial LEA, the client will be enrolled in integrated care services. At this stage, social and/or health care will be provided by the ADI team and monitored by the head geriatrician and AUIC. Also, the Coordination Team of the project can be involved in the monitoring process. The information related to the CR and to the Home Care Plan delivery process will be stored in the ADI server, accessible through WINCARE and WEBCARE.

WINCARE and WEBCARE will be accessible to all the relevant actors of Campania Deployment Site.

Any time one of the above key actors evaluates that some treatments are not suitable for the client, or that there has been some regression, or that the patient no longer needs such intensive treatment, they should report it on the appropriate form; feedback will be provided. In certain cases, where doubts exist, these situations will be discussed and evaluated at ordinary or emergency project meetings.

Any time a CR needs to report some new needs or some critical information about the services that are provided to him/her, they should contact directly the ADI team and/or the Contact Centre.

This process can trigger simple adjustments to the LEA level, or a revision to it.

On-site provision of formal social care: CRs enrolled on CDS with social care needs (living alone, in a frail situation, an exclusion risk, being tele-monitored, or in a dependency situation) will be monitored at their homes by formal carers such as family helpers, social workers, nurses, physiotherapists and, when necessary, by GPs; and also by informal carers, namely relatives and volunteers.

All the daily incidents for each CR will be reported on a web based database for the CR, the Home Care Portal, and analysed by the Chief Geriatrician.

On-site social & health care will be provided through the following services:

- Accompaniment for administrative purposes.
- Accompaniment to /in hospital.
- Accompaniment at home.
- Administrative tasks.
- Home care support.
- Tele-assistance (panic button).
- Follow-up schedule.
- Wheel chair / crutch / articulated bed loan.
- Volunteering service: Company and Psychological support.
- Coordination healthcare centre / hospital.
- Coordination with NGO.
- Other support, information or resources management.

On-site provision of formal healthcare: CRs enrolled in CDS with health care needs (discharged from hospital, having an acute episode, with chronic dependency, being tele-monitored, an exclusion risk due to illness or disability) will be monitored daily at their homes by formal carers such as family helpers, social workers, nurses, physiotherapists and, when necessary, by GPs; and also by informal carers, namely relatives and volunteers.

All the daily incidents for each CR will be reported on the Home Care Portal and analysed by all the relevant actors.

On-site formal healthcare will be provided through the following services:

- Remote monitoring: the most common devices installed are: blood pressure meter, oximeter, weight scale, glucometer, thermometer and behavioural analysis through movement sensors.
- Complex geriatrics treatment.
- Convalescence.
- Tests and special treatments (such as polysomnography, blood tests, etc.).
- Medication adherence.
- Rehabilitation at home (delivered by physiotherapists).
- Health transportation.
- Emergency transfers.
- GP or nurse home assistance.
- Pain management.
- Wound care.
- Forms filling to detect alert signs.

On-site provision of informal care: Informal carers, namely relatives and volunteers, will have an important role on the project. Both will maximise the work of the formal carers, delivering more quality of service and time to the CR.

Relatives and volunteers will be trained by the Coordination Team to maximize soft & hard skills regarding care delivery.

After training, they will deliver services / activities for CRs, and will be supervised throughout the project (difficulties & constraints, and strategies to overcome them; identification of good practices; training contents refresh).

Informal carers will provide the following services / activities:

- Company.
- Medication.
- Taking vital signs.
- Hygiene & food.
- Cooking.
- Home fixing and repairs.

Remote provision of integrated care to the home (telecare, telemonitoring): Campania participation in BeyondSilos will allow it to expand and to maximise services provided to the population, namely the elderly in a frail situation, and to generate good practice to expand to other districts of the Region. Besides the active involvement of all the organisations of the council in delivering good quality of services at home or in nursing homes and day care centres, services provided so far have not included critical and emergent ICT, such as tele-monitoring.

BeyondSilos, through the empowerment of the ADI with the use of ICT and remote monitoring, will trigger the opportunity to maximise the services provided to elderly people at their homes, avoiding or delaying institutionalisation.

ICT provided in Campania at the moment is very limited and does not reach CRs at home. CDS will enable the introduction of different but complementary types of ICT, such as:

- B-Learning tool to train formal and informal carers, mixing face-to-face sessions with remote sessions.
- Tele-monitoring: blood pressure meter, oximeter, weight scale, glucometer, thermometer and behavioural analysis through movement sensors.

- Home Care Portal, an online tool that encompass: all the social & health records of the clients; social & health care schedule; social & health care client profile.

All these ICT components will contribute actively to others gains of scale that BeyondSilos will enable:

- Increasing self-confidence on the CRs.
- Increasing the autonomy of the CRs.
- Increasing security regarding their relatives.

Integrated documentation of home care provided / self-care measures: BeyondSilos, as noted above, will permit the introduction of different types of ICT. The Home Care Portal will be a critical tool in the process, once it encompasses the following functionalities:

- Client record in terms of social & health care pathways: The servers will be hosted at the site of the Chief Geriatrician.
- Home care schedule.
- Home care support team schedule: scheduling visits.
- Home Care Plan monitoring and CR needs progress.
- Tele-monitoring and tele-assistance record.

All the key actor on CDS (Coordination Team, health stakeholders, Home Care Support Team, Contact Centre) will have access to the Portal, and will share through WEBCARE and WINCARE all the critical information regarding the CR.

It will be based on the information present on the Portal that the LEA should review, and decisions taken between the key actors.

Control / reassessment of the home care recipient: Control / reassessment of the LEA will be made through on-site and remote monitoring regarding the initial LEA. On-site monitoring will be performed by the formal carers (family helpers, social workers, physiotherapists) and by the informal carers (relatives and volunteers). Remote monitoring will be delivered through tele-assistance and tele-monitoring.

All the information gathered by formal carers / informal carers and by remote devices will be entered through the Home Care Portal into WEBCARE and WINCARE.

Any changes to health and/or social condition of the CR will be monitored daily by the Coordination Team, Home Care Support Team, Contact Centre. Depending on the urgency of the situation, decisions can be taken immediately, or evaluated during the ordinary weekly meetings of all the stakeholders.

Temporary admission to an institutional setting (e.g. hospital, day care centre): During the process of health & social care provision, either improvements and/or deterioration of the status of the CR may occur. Whenever a deterioration is identified, a re-admission to hospital may be triggered. These kind of situations are monitored daily by the Home Care Support Team so that all the professionals that work in that team are able to deal with them. All key actors will be informed through the record of the critical incidents on the Home Care Portal. Every time a re-admission to hospital is needed, the CR is temporarily dis-enrolled from the project.

Exit Point: A client can leave the project for several reasons:

- Worsening of social and/or health conditions: re-admission to hospital, admission on nursing homes, etc.).
- Improvement of social and/or health conditions.
- Decision to move to another area.
- Self decision to leave the project.
- No longer meeting the inclusion criteria.

Every time this happens, the CR is formally dis-enrolled from the project, and all the key actor are informed.

7.2.3 Anticipated impacts

The table below lists the impacts of the new pathway on the different actors, as anticipated at this stage. Actual impacts will be measured and analysed as part of the evaluation and cost-benefit analysis of the pilot deployment.

Impacts are split into positive impacts or benefits on the one hand and negative impacts or costs on the other. In both cases, tangible as well as intangible effects can be included. For example, a positive impact can be an increase in a patient's self-perceived quality of life or satisfaction (intangible benefit) or saved costs due to more efficient service provision for a provider (tangible resource benefit). In a similar way, negative impacts can include the inconvenience caused by daily telehealth readings (intangible costs) or the investment in telecare equipment by a provider (tangible monetary cost).

Table 10: Anticipated benefits of contextualised pathways Campania

Care recipient (CR)	
Positive impacts / benefits	<ul style="list-style-type: none"> Improvement of self-confidence and security. Enhancement of the QoL. Improved satisfaction with service delivery. Perception of service-specific impacts such as safety and security, improved physical status, improved communication with care providers, reduced social isolation, etc.
Negative impacts / costs	<ul style="list-style-type: none"> Time taken for training in the use of equipment. Loss of privacy. Health & social status monitoring overloading. Time taken for taking telehealth readings.
Informal carer (IFC)	
Positive impacts / benefits	<ul style="list-style-type: none"> Training in health & social care. Improvement of self-confidence and security.
Negative impacts / costs	<ul style="list-style-type: none"> Improvement of responsibility on CR's care.
Social care provider (SCP)	
Positive impacts / benefits	<ul style="list-style-type: none"> Training in health & social care. Improved feeling of quality of service provision. Reduction of the average time per case, when the CR, I/FC are trained enough. Reduction in the number of visits (because of the empowerment of the I/FC or the use of telehealth tools), when the CR, I/FC are trained enough.
Negative impacts / costs	<ul style="list-style-type: none"> Increase in daily tasks. Time taken for training in the use of equipment. Induction of stress. Time taken for the provision of services.
Health care provider (HCP)	
Positive impacts / benefits	<ul style="list-style-type: none"> Improved feeling of quality of service provision. Reduction in the average time per case. Reduction in the number of visits (because of the empowerment of the I/FC or the use of telehealth tools). Reduction in the number of hospitalisation.

Negative impacts / costs	<ul style="list-style-type: none"> • Time taken for training in the use of the Home Care Portal. • Time taken for the provision of services.
Third-sector care provider (TSCP)	
Positive impacts / benefits	<ul style="list-style-type: none"> • Improved feeling of quality of service provision. • Enrichment of their role in care provision.
Negative impacts / costs	<ul style="list-style-type: none"> • Time taken for training in the use of the platform. • Time taken for the provision of services.

7.3 Implementation requirements

This section gives an overview of the current state of requirements analysis at the pilot site, broken down into different categories. At the time of writing this deliverable, requirements elicitation at the site was still ongoing. Final consolidated outcomes will be presented in D1.2.

7.3.1 End user requirements

- Identification of users is prior to any development and must comply with the legislation and organisation normal procedures.
- Informed consent form signed by the CR or relative in charge.

7.3.2 Organisational, staff and business related requirements

- Legal / regulatory / existing workflows of the service provider organisations involved may need to be adapted, at least partially.
- Staff concerned may need to be qualified / trained respectively.
- Agents, namely formal and informal carers, involved on the BeyondSilos project ,will have to follow a training programme in the use of the technological devices.

7.3.3 Contractual requirements

- Specific requirements concerning privacy and security of health related data imposed by national regulation must be met.
- Clients have to give their written consent.

7.3.4 Technology / functionality related requirements

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

8. Kinzigtal pilot site - contextualised pathways

8.1 Point of departure

Germany's healthcare system is divided into two sections: the inpatient sector with hospitals and residential homes, and the outpatient sector with GPs and specialists. Besides this division, there is a second one, between health care and social care sectors. Both used to be involved hand-in-hand in the care process for the patient. But in reality, they operate with different software systems and database architectures, which produce a big lack of information and communication flow.

For example, a medication change or other intervention because of a short stay in hospital for a long term patient in a residential home is not communicated properly between them. As addition, GPs are not well prepared during regular patients' visits to GPs, or the calls of GPs to residential homes. Another aspect is that GPs do not properly fill out prescriptions; this costs the formal carers a lot of time to resolve the mistakes.

Better communication between social care and healthcare institutions, for example in terms of pharmacotherapy or management of traumatic wounds, reduces the hospitalisation rate. A GP with adequate data about social care activities and the status of his patient is able to make calls to residential homes with less time resources. Therefore a better link between the social care database and the healthcare database in terms of a combined electronic patient record would optimise the care pathway of long term patients.

The idea of implementing mutually compatible electronic means of communication and data processing for cooperating providers has remained a utopia for German normal care, with 68% of primary care physicians working in solo practices, and another 31% in small group practices. The same holds for the idea of creating a system of electronic patient files accessible to all providers treating a given patient (patients' informed consent provided). By facilitating the cooperation of hospitals with other providers, e.g. though jointly developed care pathways, synchronising medications and electronic patient records across the sectors of care, *Gesundes Kinzigtal* aims to create the preconditions for a better-coordinated follow-up.

In 2013, the implementation of an electronic patient record system called CGMnet was finished, for GPs and specialists in *Gesundes Kinzigtal*, in cooperation with Compugroup medical. The chances for the physician to receive adequate information will rise, instead of asking the same questions a second or third time about patients' health status and treatments. Not only for the physician (by saving valuable time), but also for the patient and social care institutions. This is an important aspect in terms of getting a confidential relationship, relief of staff, and more transparency between the stakeholders in the care system, and a higher level of quality of care. The idea for BeyondSilos project is to expand the electronic information and communications system by adding social care institutions of *Gesundes Kinzigtal*. Till now, a linked documentation system between those two sectors does not exist. The social care provider owns a documentation database system which holds the patient's data referring to social attention, but has no access to the patient's medical records or information that may be useful, and in some cases important, for decision making. In the same way, social providers and healthcare providers maintain separate records of the assistance procured and services consumed by patients, without access or data sharing between them. There is no horizontal inter-organisation integration, making the coordination of activities more difficult. Against this background, the contextualised implementation of the BeyondSilos pilot service aims to provide a common framework that allows the coordination of health and social professionals, along with a common patient data set, that provides an integrated type of care, not only for discharge cases but also for patients' long term at home.

The residential home “Seniorenzentrum am Schlossberg”, with its home care services which is already member of Gesundes Kinzigtal, will be a partner in the pilot site. Relevant exchanged data will contain issues of mobility, nutrition, safety, personal hygiene, and communication. The date of the next meetings with caregivers will be defined much more closely.

The technical part will be realised by medical networks in cooperation with Compugroup medical to link the social care documentation system AscleonCare with the electronic patient record CGMnet.

Complemented by access for informal carers such as relatives or volunteers to a website portal to see particular information about the patient, it would give a feeling of safety to those who want to check the health status regularly, that the person is doing fine. Informed consent by the patient is mandatory. Based on questionnaire results, patients themselves are only partly interested to check their patient data via internet. But the high age of the target group (75+), and the probable related low affinity for web based tools, could be the reason for the results.

8.2 Pathway description

8.2.1 Actors and their roles

The pathways involve a number of different stakeholders or actors, including individuals and organisations either receiving or delivering the service based on the pathway. The following tables provide an overview of the different actors and a description of their role.

Kinzigtal is another pilot site where there is, apart from the length of service provision, no difference between the two generic pathways in terms of services provided, providers involved and processes of care service delivery. Therefore, no distinction between both pathways is made in the following tables.

Table 11: Client domain actors of contextualised pathways in Kinzigtal

Care recipient (CR)	
Description of actor characteristics	Usually elderly people who are in a frail situation, because of suffering a stroke, having age higher than 65 years. Receive home care services of care level 1 or 2 on the basis of the Krohwinkel (ADL) care concept. Are living autonomous or in dependency situation at home in the Kinzigtal region. Need medical care regularly.
Description of role in service delivery / utilisation	User of the web platform service and recipient of medical and social care information about himself. CR must give informed consent for other actors to access the documentation system.
Information handled in the context of service delivery / utilisation	Receive relevant information about their status on the web portal. For instance, a medication change, fall events, personnel deployment planning of the home care service team (who is coming to look after CR).
Informal Carer (I/FC)	
Description of actor characteristics	Relatives, neighbours,
Description of role in service delivery / utilisation	User of the web portal, recipient of medical and social care information about the CR, depending on the access rights given.
Information handled in the context of service delivery / utilisation	Receive relevant information on the web portal. For instance, a medication change, fall events, personnel deployment planning of the home care service team (who is coming to look after CR).

Table 12: Provider domain actors of contextualised pathways in Kinzigtal

Social care provider (SCP)	
Description of actor characteristics	Local and regional public entities, and private national organisations providing social care services. For the pilot site, Seniorenzentrum am Schloßberg, Hausach with its home care services. Staff working for local and private national organisations that provide social services.
Description of role in service delivery / utilisation	They provide assistance of any type to older people that are in need of attention. Their main goal would be to provide social care, and be a user of the electronic documentation system, sending tasks or messages to GP, assessment of potential clients for the service, and data documentation. SCP gives permission to HCPs or I/FC to access the documentation system.
Information handled in the context of service delivery / utilisation	Acquisition of clients and taking data. Coordination information. Detailed information related to the social care received / requested. Exchanging social care data with the HCP in terms of mobility, nutrition, safety, personal hygiene, communication. Further details need to be clarified.
Health care provider (HCP)	
Description of actor characteristics	GPs of network Gesundes Kinzigtal who are taking care of the home care patients of Seniorenzentrum am Schlossberg.
Description of role in service delivery / utilisation	Access the documentation system if SCP gives permission. Can read and change information in terms of mobility, nutrition, safety, personal hygiene, and communication, depending on access rights. Receive and send messages, carrying out tasks the SCP puts into the system.
Information handled in the context of service delivery / utilisation	Detailed information related to the healthcare received / requested. Exchanging healthcare data with the social care providers in terms of mobility, nutrition, safety, personal hygiene, and communication.
Third-sector care provider (TSCP)	
Description of actor characteristics	Are not in the main focus of the care process. Local associations that provide support to the CR; for example, self-help groups or social clubs can be integrated.
Description of role in service delivery / utilisation	Using the web portal and getting information to take care of the CRs. Access rights may differ from those of I/FCs.
Information handled in the context of service delivery / utilisation	Reading information on the web portal depending on the access rights given by the SCP.

8.2.2 Description of pathway components

The following description relates to the components of the pathway as described in section 2.2 above, with each heading corresponding to one of the boxes in the pathway.

Entry point: In Gesundes Kinzigtal deployment site, there will be two different entry points for the patient after an acute episode. First entry point is after discharge from hospital, when the hospital doctor decides

to provide home care services for the patient for a certain time, because he supposes that the patient is at social risk of any type. After the health insurance company permits the provision of a short term care service, the patient or his relatives, together with the home care provider, discuss the particular activities and benefits.

The second entry point is the patient visit to a doctor. If the GP suspects a patient to be at risk, for example because of an acute event (superficial stroke, fall) or needs a high communication level, the GP can decide that home care service should be provided for a predetermined time. After the health insurance company agrees to the short term care, the GP or the patient/relative gets in touch with the responsible home care provider.

There will also be two different entry points for the patient in long term care. First entry point is the patient visit to a doctor's practice. If the GP suspects a patient to be at risk, for example because of an acute event (superficial stroke, fall) or needs a high communication level, the GP can decide that home care service should be provided for a determined time. After the health insurance agrees to the short term care, the GP or the patient/relative gets in touch with the responsible home care provider.

Second entry point is when a relative or the patient himself takes the decision to order social care support because neither the patient nor the relative are able to handle the situation themselves. After the permission of the health care insurance, the patient or relative get in touch with an outpatient social care provider for a first consultation.

Assessment of the service user's needs for integrated home care: The local SCP will define the social attention that the patient may need in relation to any home care. In order to identify these needs, the SCP will have the notes taken by the HCP and several assessments to identify the risk.

In the German healthcare system, a lot of standard assessment procedures exist which are necessary to position the patient in a certain category. There are four different levels of assessment; Level four is the most cost intensive and complex one.

The assessments follow structures and procedures regulated by law. They contain questionnaires, interviews for different aspects of fall and decubitus risk or pain assessment. Depending of the defined indicators for the target group, the results of the assessments, the conclusion of the formal carers, and the medical data of the HCP, the decision is made to enrol the patient. The general indicators for the specific target group are:

- Age 65+.
- Living at home.
- Stroke patient.
- Care level 1 or 2.
- Regular medical treatment necessary.

The environmental and social factors for the monitoring service also play an important role. For example, does a informal carer exist who can take care of the CR.

Enrolment into BeyondSilos pilot service: After the home care service is agreed by the health insurance company, the CR of the Seniorenzentrum am Schlossberg will be a client of the Home Care Support Service that could benefit from the new integrated care services. The patient and the informal carer / relatives will be informed by either the GP or local SCP worker about the possible enrolment in the BeyondSilos project. The patient or the relative has to sign an Informed Consent to agree to share data with other actors, for example GP, hospital or Gesundes Kinzigtal for evaluation purpose.

If a new client is identified, SCP creates a new file in the documentation system with personal data (name, address, etc.), assessment and medical data, and gives access rights to particular information in this file to the responsible GP and other important actors (e.g. I/FC). If an account does not already exist for the CR, the service provider, in this case medical networks which is also hosting the web platform, must be informed to create a login with password protection. The patient, GP and the informal carer / relatives will be informed by Seniorenzentrum am Schlossberg when the login account is installed.

Initial integrated home care plan: The care plan is set up and coordinated between the patient, the HCP and the SCP that will be the agent in providing care to the patient, along with a schedule of actions and personnel responsible for the tasks. The social care staff work out the care plan by using the assessment procedure of ADLs, and document the results and linked interventions in the system. Depending on the access rights, the care plan can be seen by the CR.

Discharge from hospital: In case of a discharge from hospital in the acute pathway, the social worker discusses the acute situation with the patient and his relatives. If the social worker declares the need of outpatient care at home for a predetermined time, the care service provider will be informed and gets in touch with the patient for a first consultation.

Coordination of integrated care delivery / revision of the initial care plan: After the definition of the initial Home Care Plan, the client will be enrolled in the integrated home care services of Seniorenzentrum am Schlossberg. At this stage, social and/or health care will be provided by the Home Care Support Team, and monitored by the head of department. On the basis of the data in the system and the experience of the social care staff who are responsible for the patient, the initial care plan may be reviewed. The ADL will be checked every two to three months, and if necessary modified immediately after a specific event.

On-site provision of formal social care: The social care team provides the conventional on-site benefits to the CR, such as serving meals, washing the patient, giving medication, going for a walk etc. The data for the activities is entered directly via tablet into the electronic patient record.

From a social point of view the services that a user may be provided can be those of:

- Accompaniment for administrative purposes.
- Accompaniment to / in hospital.
- Accompaniment at home.
- Administrative tasks.
- Home tasks.
- Shipment of support products.
- Follow-up schedule.
- Home care support.
- Orthopaedic support management.
- Wound management.
- Wheel chair loan.
- Loan of articulated bed.
- Volunteering service: companionship.
- Translation for foreigners.
- Coordination with formal carers.
- Support for impairment recognition applications.
- Other support, information or resources management.
- Coordination healthcare centre / hospital.

On-site provision of formal healthcare: The GP appoints the CR to a ward round or makes a house visit if the CR is to immobile. By having the possibility to check explicit care data of the patient, maybe a house visit is not necessary, and the presented data is sufficient to give orders in terms of medical intervention.

If a house visit cannot be avoided, the GP can check health and social care data by looking on his tablet PC. Changes in intervention such as medication can be arranged at once.

- Health transportation.
- Emergency transfers.
- GP visit call.
- Education programmes on health issues.
- Pain management.
- Wound care.
- Forms filling to detect alert signs.
- Adherence to treatment programmes.
- Medication check.
- Vital parameter check.

On-site provision of informal care: In case the informal carer is on-site, he/she does regularly home visits at the patient's house. He supports the CR by doing the house keeping, shopping, cleaning, entertaining or going for a walk. If relatives are not living in the region, they do regular phone calls to check if the patient is fine. With the BeyondSilos platform, relatives are able to check the health status or the presence of a formal carer by accessing into the account at anytime. No active communication with the patient is necessary.

Remote provision of integrated care to the home (telecare, telemonitoring): No telecare or telemonitoring services are planned for the project BeyondSilos yet.

Integrated documentation of home care provided / self-care measures: The social care system of Seniorenzentrum am Schlossberg will exchange relevant data with the electronic patient record of the GPs. Healthcare data of the GP contains information such as diagnosis, medication, etc., and the social care data such as the assessment results, activities documentation, provision for medical aids or prescriptions.

Control / reassessment of the home care recipient: The reassessment will take place in the residential home or in the home of the patient, and is a follow up procedure of the initial assessment. The HCP will regularly review the conditions of the CR by looking into the documentation system to check whether changes and / or revisions are to be done at healthcare or social care level.

Similarly, the SCP or HCP will also review periodically the documentation to check if there are any changes provided in terms of medication, diagnosis etc., or there are deficiencies that require a reorganisation of the attention provided. The ADL will be checked every two to three months, and if necessary modified immediately after a specific event.

(Temporary) (re-)admission into institutional setting: According to the changes in the condition of the CR (either social or worsening of the clinical status), there may be a re-admission to a hospital or a temporary admission into a nursing home or day care centre. Patients will be involved again in the social care process when they are discharged.

Exit point: The end point of this pathway would be when the patient is no longer in need of medical or social attention, the patient revokes consent, or his participation in the programme is closed, the patient dies, or the pilot causes concerns or bothers patients or relatives.

8.2.3 Anticipated impacts

The table below lists the impacts of the new pathway on the different actors, as anticipated at this stage. Actual impacts will be measured and analysed as part of the evaluation and cost-benefit analysis of the pilot deployment.

Impacts are split into positive impacts or benefits on the one hand and negative impacts or costs on the other. In both cases, tangible as well as intangible effects can be included. For example, a positive impact can be an increase in a patient's self-perceived quality of life or satisfaction (intangible benefit) or saved costs due to more efficient service provision for a provider (tangible resource benefit). In a similar way, negative impacts can include the inconvenience caused by daily telehealth readings (intangible costs) or the investment in telecare equipment by a provider (tangible monetary cost).

Table 13: Anticipated impacts of contextualised pathways in Kinzigal

Care recipient (CR)	
Positive impacts / benefits	<ul style="list-style-type: none"> • Improvement of self care capacity. • Patient empowerment. • Improved satisfaction with service delivery. • Perception of service-specific impacts such as safety and security, improved physical status, improved communication with care providers, reduced social isolation, etc.
Negative impacts / costs	<ul style="list-style-type: none"> • Feeling of loss of privacy, bureaucratic initial procedures with confirmation for data protection. • Time taken to use the service. • Possible co-payment after the pilot.
Informal carer (I/FC)	
Positive impacts / benefits	<ul style="list-style-type: none"> • Better information level of the CR. • Information on demand, independent of time. • Feeling of more security about the status of the CR. • Improved satisfaction with service delivery. • Reduced carer burden.
Negative impacts / costs	<ul style="list-style-type: none"> • Assumption of new tasks, for example appointment at GP, shopping. • Excessive demand. • Time taken for the provision of support.
Social care provider (SCP)	
Positive impacts / benefits	<ul style="list-style-type: none"> • Higher information level. • Transparency about completed / not completed tasks in the care pathway. • More responsibility for documentation. • Legal security. • Easier and faster way of communication with health care providers, for example recalls at the GP. • Reducing time per case.
Negative impacts / costs	<ul style="list-style-type: none"> • Data overflow if irrelevant information comes into the common electronic patient record, new way of using the documentation software. • Time taken to train staff. • Time taken to provide service. • Technical malfunction disables care pathway.

Health care provider (HCP)	
Positive impacts / benefits	<ul style="list-style-type: none"> • Higher information level, easier way of communication with social care providers, time saving during the visit calls in the residence home. • Reduced visits at the patient's home.
Negative impacts / costs	<ul style="list-style-type: none"> • Data overflow if irrelevant information comes into the common electronic patient record, new way of using the documentation software. • Time taken to train staff. • Time taken to provide service. • Reduced income because loss of home visits.
Third-sector care provider (TSCP)	
Positive impacts / benefits	<ul style="list-style-type: none"> • Possibility to be more involved into the social care process.
Negative impacts / costs	<ul style="list-style-type: none"> • Data overflow if irrelevant information comes into the common electronic patient record, new way of using the documentation software. • Time taken to train staff. • Time taken to provide service. • Reduced income because loss of home visits • Receiving a new role and tasks in the care process, for example appointment management at GP, shopping etc. • Time taken for training in the use of the platform.

8.3 Implementation requirements

This section gives an overview of the current state of requirements analysis at the pilot site, broken down into different categories. At the time of the writing of this deliverable, requirements elicitation at the site was still ongoing. Final consolidated outcomes will be presented in the upcoming D1.2.

8.3.1 End user requirements

- Informed Consent Form signed by the CR or relative in charge.
- Identification of users is prior to any development, and must comply with the legislation and organisation normal procedures.

8.3.2 Organisational, staff and business related requirements

- The social provider and health providers already have information systems to coordinate the attention they provide. It will be necessary to create an upper layer that permits interoperability between these systems.
- Existing workflows in the service provider organisations involved may need to be adapted, at least partially.
- Staff concerned may need to be qualified / trained respectively.

8.3.3 Legal / regulatory / contractual requirements

- The individual service provider and the organisations involved may need to enter into a contractual relationship with each other in order to determine rights and responsibilities of each party involved, including liability related aspects.
- Patients have to give their written consent.

- Apart from general data protection requirements, specific requirements concerning privacy and security of health related data imposed by national regulation must be met. Therefore a meeting between care providers and the “Medizinischer Dienst der Krankenkassen” und “Heimaufsicht”.

8.3.4 Technology / functionality related requirements

- Data transmission over secure connections may be required, at least where health related data are concerned.
- Interoperability of legacy systems operated by the various service provider organisations involved needs to be ensured (e.g. call centre software, hospital information systems).
- General technological infrastructure such as tablets, PCs, Internet access must exist in the particular institutions of the care process.
- The portal will have to have different views according to the user profile login.

8.3.5 Any other requirements

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

9. Northern Ireland pilot site - contextualised pathways

9.1 Point of departure

In Northern Ireland (NI), health and social care are integrated at an organisational macro level. The Health and Social Care Board (HSCB) commissions health and social care services for the population of NI. HSCB performance manages the Health and Social Care Trusts, who deliver services to citizens, and contract with primary care providers (GPs, pharmacists, dentists and optometrists) to provide services.

In common with other regions across Europe, Northern Ireland is facing unprecedented economic and demographic pressures which impact on its ability to provide high quality, safe health and social care now and into the future.

Northern Ireland has one of the fastest growing populations within the UK. The Northern Ireland Statistics and Research Agency (NISRA) has projected the NI population to rise from 1.8 million in 2010 to nearly 2 million in 2025 - an increase of nearly 8%. They also project that over the same 15 year period, the numbers of people aged 65 and over will increase by 42% from 260,000 to 370,000. In contrast, the number of people of working age is projected to increase by only 1.4% from 1,109,000 to 1,124,000 in 2025.

The projected figures for the over-85 population show an even more dramatic increase. By 2025 the number of people aged 85 and over will have risen by 25,000 to 55,000 – an increase of 83%. The over-85 population will double by 2027 compared to 2010.

Coupled with an aging population, there is also an increased prevalence of long term (chronic) conditions; these factors have led to increased demand and over reliance on acute hospital beds. It is becoming more difficult to ensure clinical workforce supply, and there is a need to have better productivity and value for money.

Description of the current care delivery process:

In 2011, a review of health and social care services in Northern Ireland was undertaken. Its report 'Transforming Your Care' (TYC) identified a number of recommendations for change in the Health and Social Care (HSC) service. The engagement process that was undertaken in this review process highlighted the difficulties around timely and effective discharge from hospital for older patients. One of the key issues was the length of time taken to secure social care packages at home, a situation exacerbated by varied and complex communication links between health and social care providers. Another major issue was that even when a social care package is sourced, elderly patients living at home often experience a number of re-admissions to hospital in the weeks and months that follow initial hospitalisation.

TYC recommended that reablement should be implemented in order to encourage independence amongst the older population, and to help to avoid unnecessary hospital admissions. It is envisaged that the Integrated Care Partnerships (ICP) which have been set up could support the process of reablement, as older people would be supported following their discharge from hospital by a multidisciplinary team, and therefore would be able to remain in their own homes.

ICPs are collaborative networks of care providers, bringing together doctors, nurses, pharmacists, social workers, hospital specialists, other healthcare professionals and the voluntary and community sectors, as well as service users and carers, to design and coordinate local health and social care services. ICPs will provide a collaborative network for local health and social care professionals, working as part of a multi-disciplinary team to come together and work in a more integrated way to provide care and support on a

more complete range of services, in response to identified need and commissioner requirements. This would involve discussing, agreeing and taking action to improve how patients and service users are treated and dealt with throughout their interactions with health and social care services. Evidence has shown that by all parts of the system working closer together, unnecessary hospital visits and admissions can be prevented.

TYC also recommended more integrated working between and within hospital, community and social services, which again will be delivered by the ICPs. The Northern Ireland Electronic Care Record (ECR) is a key component of the ICP; it will be used to support the multidisciplinary health and social care teams in achieving truly integrated working, and supporting the reablement process for older people. The key focus of the BeyondSilos project in Northern Ireland will be to increase the information available via the ECR platform to health and social care professionals.

One of the key recommendations within TYC is that home should be the hub of care for older people. This is a key focus of the ICP, enabling older people to remain in their homes, with support from multidisciplinary health and social care professionals. Unnecessary or inappropriate emergency admissions are often a source of great distress to patients and clients and their families, and also place enormous pressure on the healthcare system. It is expected that the work undertaken by ICPs and the BeyondSilos project will help to reduce these unscheduled admissions, and reduce the associated costs by improving information flow and facilitating more efficient hospital discharge.

In 2013/14, the clinical priorities of ICPs are focusing on the care of older people, respiratory, diabetic and stroke care, and end of life care as it relates to these areas. ICPs will be embedded in the delivery system, and will use the power of networks to create a shared understanding and better coordinate the input of multiple sectors to: identify patients and clients at risk; agree clinical and care protocols; develop individual care plans and use improvements in technology, such as the ECR, to share health and social care information between those working in both the hospital and community settings.

HSCNI wish to use the BeyondSilos project to better integrate the care of elderly people in Northern Ireland. We wish to build on the Telemonitoring NI (TNI) service, and integrate it with the ECR, thereby providing health and social care teams with common access to patient and client data.

The TNI service operation in Northern Ireland provides an end-to-end managed service for remote monitoring of patients in their own homes. The service encompasses both telehealth (vital signs monitoring) and telecare, and operates across all five Health and Social Care Trusts.

The Northern Ireland Single Assessment Tool (NISAT) is designed to capture information required for holistic, person-centred assessment of the older person.

The tool comes in seven sections:

- Core screening.
- Core assessment.
- Complex assessment.
- Carer needs assessment.
- Specialist referral.
- Specialist summary.
- GP report.

It is available in an electronic format - eNISAT.

Interfacing the eNISAT with the ECR will enable the transfer of information, including risk assessments, between professionals, and will facilitate a smoother journey for the service user along the care pathway.

TNI service and eNISAT are both operational, and generating information which would be useful to decision makers and care givers, but which is not currently widely available to them. Thus the aim of HSCB BeyondSilos project to interface these systems to the NI Electronic Care Record (NIECR) will remain valid despite changes to care pathways.

It should also be recognised that the BeyondSilos project is to be applied to the whole of Northern Ireland. Care pathways will differ across organisations, and by condition; therefore the care pathway described below should be regarded as broadly indicative of actual practice on the ground.

9.2 Pathway description

9.2.1 Actors and their roles

The pathways involve a number of different stakeholders or actors, including individuals and organisations either receiving or delivering the service based on the pathway. The following tables provide an overview of the different actors and a description of their role.

Since actors are similar for both pathways in relation to their basic characteristics, their role in the service, and information handled, no distinction between both pathways is made in the following tables.

Table 14: Client domain actors of contextualised pathways in Northern Ireland

Care recipient (CR)	
Description of actor characteristics	<p>Frail elderly and those with long-term conditions living in their own home or in a homecare setting.</p> <p>For TNI service, LTC are COPD, CHF/CHD, diabetes and post stroke / TIA and clients in receipt of a telecare service.</p> <p>From eNISAT any patient or client for whom an eNISAT assessment is completed.</p> <p>CR may fall into either or both of the above.</p>
Description of role in service delivery / utilisation	<p>CRs will be consumers of the health and social care services. They will be referred to the TNI service and/or be subject to an eNISAT assessment. They will have no access to view the ECR.</p>
Information handled in the context of service delivery / utilisation	<p>For citizens on the TNI service:</p> <ul style="list-style-type: none"> • Telehealth: vital signs information collected by the system will become available for all appropriate health and social care personnel to view from the ECR. This may include (dependent on condition being monitored) blood pressure, blood glucose, SPO₂, weight, pulse, temperature, ECG. Actual readings and track and trend information will be available. • Telecare: details of any alarms or events will become viewable from the ECR. • eNisat: details of any of the relevant sections will become viewable from the ECR: <ul style="list-style-type: none"> • Core screening. • Core assessment. • Complex assessment. • Carer needs assessment. • Specialist referral. • Specialist summary. • GP report.

Informal Carer (I/FC)	
Description of actor characteristics	Relatives, friends and neighbours (keyholders for telecare) of the CR above.
Description of role in service delivery / utilisation	Providers of informal care to the CR. They will have no access to view the ECR.
Information handled in the context of service delivery / utilisation	<p>For citizens on the TNI service:</p> <ul style="list-style-type: none"> • Telehealth: vital signs information collected by the system will become available to view from the ECR. This may include (dependent on condition being monitored) blood pressure, blood glucose, SPO₂, weight, pulse, temperature, ECG. Actual readings and track and trend information will be available. • Telecare: details of any alarms or events will become viewable from the ECR. • eNisat: details of any of the relevant sections will become viewable from the ECR: <ul style="list-style-type: none"> • Core screening. • Core assessment. • Complex assessment. • Carer needs assessment. • Specialist referral. • Specialist summary. • GP report.

Table 15: Provider domain actors of contextualised pathways in Northern Ireland

Social care provider (SCP)	
Description of actor characteristics	<p>Care managers and social care staff employed by the HSC Trusts.</p> <p>TF3 telecare and service desk staff.</p> <p>Domiciliary care providers employed by the HSC Trusts or private sector care providers.</p>
Description of role in service delivery / utilisation	<p>Trust staff: Assessment of CR, completion eNISAT, referral to telecare and/or telehealth service if appropriate. Provide social care.</p> <p>TF3 staff: provide services associated with TNI service.</p> <p>Domiciliary care providers: provide hands-on care for CR; will feed into process where necessary.</p>

Information handled in the context of service delivery / utilisation	<p>For citizens on the Telemonitoring NI service:</p> <ul style="list-style-type: none"> • Telehealth: vital signs information collected by the system will become available to view from the ECR. This may include (dependent on condition being monitored) blood pressure, blood glucose, SPO₂, weight, pulse, temperature, ECG. Actual readings and track and trend information will be available. • Telecare: details of any alarms or events will become viewable from the ECR. • eNisat: details of any of the relevant sections will become viewable from the ECR: <ul style="list-style-type: none"> • Core screening. • Core assessment. • Complex assessment. • Carer needs assessment. • Specialist referral. • Specialist summary. • GP report.
Health care provider (HCP)	
Description of actor characteristics	<p>Clinical staff employed by HSC Trusts including doctors and nurses involved in assessing, referring and responding to alerts for CR on TNI service.</p> <p>GPs.</p>
Description of role in service delivery / utilisation	<p>Assessment of CR, completion eNISAT, referral to telehealth and/or telecare service if appropriate. Provide healthcare.</p>
Information handled in the context of service delivery / utilisation	<p>For citizens on the Telemonitoring NI service:</p> <ul style="list-style-type: none"> • Telehealth: vital signs information collected by the system will become available to view from the ECR. This may include (dependent on condition being monitored) blood pressure, blood glucose, SPO₂, weight, pulse, temperature, ECG. Actual readings and track and trend information will be available. • Telecare: details of any alarms or events will become viewable from the ECR; • eNisat: details of any of the relevant sections will become viewable from the ECR: <ul style="list-style-type: none"> • Core screening. • Core assessment. • Complex assessment. • Carer needs assessment. • Specialist referral. • Specialist summary. • GP report.
Third-sector care provider (TSCP)	
Description of actor characteristics	<p>Domiciliary care and other service providers employed by the voluntary sector.</p> <p>NI Hospice.</p>
Description of role in service delivery / utilisation	<p>Domiciliary care providers: provide hands on care for CR; will feed into process where necessary.</p>

Information handled in the context of service delivery / utilisation	No plans as yet to give third sector access to ECR. This may happen for NI Hospice.
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9.2.2 Description of pathway components

The following description relates to the components of the pathway as described in section 2.2 above, with each heading corresponding to one of the boxes in the pathway.

Differences between the two pathways are highlighted, with elements referring only to the short-term pathway being marked as “**ICP-Acute**”, and elements referring to the long-term care pathway as “**ICP-LTCare**”. Elements not specifically marked apply to both pathways.

Entry point:

ICP-Acute: Referral into the service will usually be from a hospital, but may be from another source if a CR is noted to be declining and requires a re-ablement / rehabilitation service to keep them out of an acute facility.

Possible sources of referral are:

- GP.
- District nurse.
- Professions allied to medicine e.g. physiotherapists, speech therapists, occupational therapists, podiatrists.
- Social care.
- Client / family / carer.

ICP-LTCare: Referral into the service could be from a number of sources, and may be after the patient has been on the acute/re-ablement pathway for 6 weeks:

- Hospital
- GP.
- District nurse.
- Professions allied to medicine e.g. physiotherapists, speech therapists, occupational therapists, podiatrists.
- Social care.
- Client / family / carer.

Referral is made by telephone directly into a call management centre where an on-line referral is completed, describing:

- Name.
- Address.
- Health Care Number (HCN) – unique identifier.
- Next of kin details.
- GP details.
- Free text – reason for referral.
- Referrers details.

Assessment of the service user’s needs for integrated home care: The call centre does a brief initial assessment of the reason for referral. If level of intervention required is likely to be very low, they will pass to social care rather than the Integrated Care Team (ICT). ICT comprises district nursing, occupational therapy, care managers and social workers.

ICT accepts the referral and contacts referrer to get further details regarding the nature of the referral and more background information.

- If hospital referral, check on-line records to ascertain if person is already in receipt of any services. Discharge meeting arranged involving ICT care manager, hospital Social Worker (SW), patient, family / carer (if possible) and ward staff. Hospital SW provides the pre-discharge Multi-Disciplinary Team (MDT) assessment. Currently they do not use eNISAT (electronic Northern Ireland Single Assessment Tool).
- For all non-hospital referrals: ICT meet with client and possibly their family / carer and a community social assessor if applicable. eNISAT process starts with core screening. GP is contacted to provide NISAT medical assessment.

Dependent on outcome the person will either be:

- referred to a care facility; or
- remain at / return home with a package of care.

Care packages are people centred, and designed around the assessed needs of patients and clients.

Services available in a care package may be:

- Domiciliary Care: may be provided by HSC Trust, private provider or voluntary / community organisation:
 - Personal care.
 - Meals.
 - Medication.
- Occupational Therapy:
 - Telecare (Telemonitoring NI service).
 - Aids and adaptations.
- District nursing.
- Physiotherapy.
- Speech therapy.
- Podiatry.
- Specialist nursing services.
- Telehealth (Telemonitoring NI service)

Enrolment into BeyondSilos pilot service: As the BeyondSilos project in NI is going to focus on the integration of ECR with TNI system and eNISAT, any person referred to and in receipt of the TNI telehealth or telecare services, and anyone for whom an eNISAT assessment has been completed, will become part of the pilot. (eNISAT is not yet fully operational across NI; some areas of some Trusts are still using paper NISAT).

Initial integrated home care plan: Care plans and care plan timetables already exist for all persons receiving services from Trust Health and Social Care staff. BeyondSilos pilot will enable them to access telemonitoring data and eNISAT assessment from the ECR where appropriate, and with suitable permissions to enable them to make more informed decisions.

Discharge from hospital ICP-Acute: See Assessment of Users needs.

Coordination of integrated care delivery / revision of the initial care plan: CR will be monitored and reviewed for a period of up to six weeks to assess their progress. On each occasion, the eNISAT is updated to reflect the change. Any amendments to the telemonitoring service provided to the CR are reflected in the TNI system.

On-site provision of formal social care: Impact of the BeyondSilos project: CRs on the TNI service for telecare will have a selection of the following equipment installed:

- A home unit - with a personal trigger.
- Personal pendants.
- Safety pull cord.
- Fall detector.
- Bogus caller alert.
- GPS Tracking.
- Smoke detector.
- Flood detector.
- PIR movement detector.
- Bed occupancy sensor.
- Chair occupancy sensor.
- Epilepsy sensor.
- Pressure mat.
- Property exit sensor.
- Carbon monoxide detector.
- Temperature extremes sensor.
- Natural gas detector.
- Pillow alert.

They may also be in receipt of meals, personal care and assistance with medication. Full details of the package will be viewable from the ECR in the future (outside the scope of BeyondSilos project) but should be available within project timescale.

On-site provision of formal healthcare: Impact of the BeyondSilos project: CRs on the TNI service for telehealth will have a home hub and peripherals to measure a variety of vital signs:

- Blood pressure.
- Weight.
- Temperature.
- Pulse oximetry.
- Blood glucose.
- ECG.

On-site provision of informal care: Impact of the BeyondSilos project: none. Informal carers will not have access to the ECR. There is a patient portal for the TNI service which CR and their carers or family may choose to access. People in receipt of the TNI service can request portal access from the service provider. Once on the portal, they can see all the vital sign readings they have submitted, together with track and trend graphical information. They also have access to disease specific information, and links to other useful sites, e.g. diabetic patients can link easily to the British Diabetic Association site.

Remote provision of integrated care to the home (telecare, telemonitoring): TNI service exist – see above.

Integrated documentation of home care provided / self-care measures: The BeyondSilos project in Northern Ireland will seek to implement the integration of TNI and eNISAT systems with the NIECR.

Control / reassessment of the home care recipient ICP-Acute: CR on an acute / reablement pathway are re-assessed after six weeks. They will either be discharged if reablement / rehabilitation has been successful, or they may be referred into a longer term service.

Control / reassessment of the home care recipient *ICP-LTCare*: CRs are subject of a formal review twice a year, and more frequently if their condition or circumstances change. On each occasion, the eNISAT is updated to reflect the change. Any amendments to the telemonitoring service provided to the CR are reflected in the TNI system.

Re-admission to hospital *ICP-Acute*: Should the CR require admission to hospital, this may not result in a change to the eNISAT assessment, but will result in a suspension of the telemonitoring service; this will be reflected in the systems.

Temporary admission to an institutional setting (e.g. hospital, day care centre) *ICP-LTCare*: Should the CR require temporary admission to an institutional setting, this will result in a change to the eNISAT assessment and a suspension of the telemonitoring service; this will be reflected in the systems.

Exit point *ICP-Acute*: CR will exit the service after six weeks. They will either be discharged if reablement / rehabilitation has been successful, or they may be referred into a longer term service.

Exit point *ICP-LTCare*: CR will exit the service if their condition improves to such an extent that they no longer require home monitoring or telecare or any further interventions, or upon death.

9.2.3 Anticipated impacts

The table below lists the impacts of the new pathway on the different actors, as anticipated at this stage. Actual impacts will be measured and analysed as part of the evaluation and cost-benefit analysis of the pilot deployment.

Impacts are split into positive impacts or benefits on the one hand and negative impacts or costs on the other. In both cases, tangible as well as intangible effects can be included. For example, a positive impact can be an increase in a patient's self-perceived quality of life or satisfaction (intangible benefit) or saved costs due to more efficient service provision for a provider (tangible resource benefit). In a similar way, negative impacts can include the inconvenience caused by daily telehealth readings (intangible costs) or the investment in telecare equipment by a provider (tangible monetary cost).

Table 16: Anticipated impacts contextualised pathways in Northern Ireland

Care recipient (CR)	
Positive impacts / benefits	Care planning should be improved as more information will be available to the care professional making decisions about the CR and their treatment, leading to improved quality of life.
Negative impacts / costs	Some CRs may not wish details of home monitoring or care assessment to be available for other professionals to view.
Informal carer (IFC)	
Positive impacts / benefits	Improved care planning for the CR should lead to more peace of mind for the I/FC.
Negative impacts / costs	See above.
Social care provider (SCP)	
Positive impacts / benefits	Enable improved service / care planning for CR by enabling access to eNISAT assessment (identified risks) and also TNI information via the ECR.

Negative impacts / costs	SCP are not healthcare experts and may not be able to interpret health information; thus it is important that there is communication within the integrated team.
Health care provider (HCP)	
Positive impacts / benefits	Enable improved service / care planning for CR by enabling access to eNISAT assessment (identified risks) and also TNI information via the ECR.
Negative impacts / costs	Similar to SCP.
Third-sector care provider (TSCP)	
Positive impacts / benefits	n/a during duration of pilot.
Negative impacts / costs	n/a during duration of pilot.

9.3 Implementation requirements

This section gives an overview of the current state of requirements analysis at the pilot site, broken down into different categories. At the time of the writing, requirements elicitation at the site was still ongoing. Final consolidated outcomes will be presented in D1.2.

9.3.1 End user requirements

- At this point there are no plans to enable patient/clients or their carers to access the ECR.

9.3.2 Organisational, staff and business related requirements

- Health & social care staff with access to the NIECR will be able to access patient / client information held in eNISAT and TNI systems. The actual detail of what is viewable on ECR dashboard will be decided by the ECR Clinical Content Group.
- Define what information exists in eNISAT and TNI.
- What information on eNISAT and TNI would be of use to health & social care professionals on ECR? Go through list of information and select items to be displayed in ECR – may be all or a sub-set.
- Clinical and operational staff must be involved.
- How do they want data displayed?

9.3.3 Legal / regulatory / contractual requirements

- TNI not held on HSC network, access by secure VPN – access issues need clarified.
- eNISAT/TNI records: client / patient must be positively identified before record is admitted to ECR – Health & Care Number (HCN) is unique identifier.
- HCN synchronises with Enterprise Master Patient Index (EMPI) and reconciles.
- Check HCN, forename, surname, date of birth, gender and GP match before importing record.
- ECR, eNISAT and TNI all currently exist and are working.
- Integration of eNISAT and TNI to ECR will only involve contractual change requests – procurement exercise not required as services to do this exist within the contracts.

9.3.4 Technology / functionality related requirements

- How do we get information out of eNISAT/TNI and transport it to ECR?
 - Real time?

- Hourly?
- Daily?
- Weekly?
- Other?
- Will information 'push out' in real time or batch file, or will ECR query?
- How will queries work? If info pushed into ECR will be stored in data base – click on flag to access.
- How does TNI push data out – set rules – all records or just some?
- Defined mechanism to transport data to where ECR can pick it up.
- When record amended in eNISAT or TNI how is this reflected in ECR?

10. Sofia pilot site - contextualised pathways

10.1 Point of departure

Centre for Protection of Rights in Healthcare (CPRH) is an independent non-governmental and non-profit organisation working for public benefit. For seven years, we have worked exclusively in the field of protection of rights in healthcare. Besides providing information, consulting and legal assistance to individuals and organisations, we organised and implemented breast cancer screening programmes.

In the context of BeyondSilos, we have to stress that according to the Bulgarian legislation, we cannot provide social and health services and assistance; we will therefore subcontract these activities alongside the development of the electronic integrated CR record.

Currently there is no electronic health record system installed in Bulgaria. A prototype system will be set up for piloting purposes in the project, and will be filled in with data and shared between health and social partners.

Our objective is to validate that the provision of integrated social and health care through ICT innovation to the elderly population improves quality of life and is more efficient than the traditional way of service provision.

In Sofia region (as well as in the whole of the country), social services and social assistance are provided by governmental agencies or municipalities funded by the State budget. Social services are divided into two parts: institutional services (homes for elderly, homes for disabled); and community based services, especially personal assistant, social assistant, home helper. The only service financed by municipality is home social patronage, providing mainly meals and home cleaning. People pay for institutional services, 70% from their incomes, or price of home social patronage.

Health services are provided at three levels: GP, outpatient specialised healthcare, and hospital care. Healthcare is funded by the National Health Insurance Fund (NHIF). All medical establishments for hospital care in Bulgaria are registered as commercial companies.

At the moment, there is no system to integrate social and health care to the elderly population in Bulgaria. This situation poses a great challenge to our pilot site, because besides implementation we will have to advocate for legislative changes to ensure wider deployment of the integrated services in the future.

So far we have the support of the Minister of Health, the Minister of Labour and Social Policy, and the Mayor of Sofia Great Municipality for the implementation of the BeyondSilos pilot. We believe that this institutional support, and involvement of the authorities in the early stages of project implementation, will foster successful deployment and will catalyse the legislative initiative.

Currently, after a hospital discharge patients have the right of two control examination at the hospital. In the discharge letter, the physician can prescribe patient rehabilitation services or personal support devices. Generally, the GP provides the post- acute follow up care to patients.

There are no integrated electronic health records or electronic social records for the patient. The GP, the outpatient specialist, and the hospital keep fragmented health data about the patient, sometimes in electronic format.

If the patient is eligible for social support services, he/she will also enter the system for social support at home. Social services will create (in accordance with the law) a social assessment of his/her status, also

taking into account the health information which the patient will provide (from medical examinations, discharge letters).

There is little coordination and no integration between the health and social services provided to patients after a post- acute episode.

10.2 Pathway description

10.2.1 Actors and their roles

The pathways involve a number of different stakeholders or actors, including individuals and organisations either receiving or delivering the service based on the pathway. The following tables provide an overview of the different actors and a description of their role.

Differences between the two pathways are highlighted, with elements referring only to the short-term pathway being marked as “**ICP-Acute**”, and elements referring to the long-term care pathway as “**ICP-LTCare**”. Elements not specifically marked apply to both pathways.

Table 17: Client domain actors of contextualised pathways in Sofia

Care recipient (CR)	
Description of actor characteristics ICP-Acute	Elderly people over the age of 65, after a hospitalisation, surgery, early discharge or any acute episode, living at home, autonomous or in dependency, with special home care needs or at risk of exclusion due to illness or disability.
Description of actor characteristics ICP-LTCare	Elderly people over the age of 65, suffering from any chronic disease, living at home, autonomous or in dependency, with special home care needs or at risk of exclusion risk due to illness or disability.
Description of role in service delivery / utilisation ICP-Acute	CRs will use the integrated care service in their homes. They will receive personal care, telemonitoring and tele-consultation from health and social specialists.
Description of role in service delivery / utilisation ICP-LTCare	CRs will use the integrated care service in their homes. They will receive personal and telemonitoring attention from health and social specialists.
Information handled in the context of service delivery / utilisation	CRs will handle the data from installed devices when it is not automatically transmitted. They will also receive information on treatment plans and objectives, and the scheduled visits of social and health carers. They will be able to access their electronic health data.
Informal Carer (I/FC)	
Description of actor characteristics	Relatives, neighbours, friends.
Description of role in service delivery / utilisation	These actors will assist the CR in routine tasks, and will also participate in the care plan.
Information handled in the context of service delivery / utilisation	The CR will give written consent that I/FCs shall have access to health information and care plan details.

Table 18: Provider domain actors of contextualised pathways in Sofia

Social care provider (SCP)	
Description of actor characteristics	Staff working for public organisations that provide social services. Employees of our subcontractor Arcadia.
Description of role in service delivery / utilisation	The main role of these actors is to provide social care and assistance to the CR when it is needed, including tele-consultation.
Information handled in the context of service delivery / utilisation	ICT supported coordination information. Detailed information in relation to the social care received / requested. Access to EHR.
Health care provider (HCP)	
Description of actor characteristics	Providers of health services including: <ul style="list-style-type: none"> • GP is responsible for the follow up and regular check-ups of the CR. He/she gives referrals to specialists or hospital care if necessary. • He/she receives and stores CR health record, including hospital discharge letters, lab & examination results. • Employees of our subcontractor “Medical Centre Divaro” (outpatient care). • Hospitals. • Emergency care Services.
Description of role in service delivery / utilisation	These actors provide health services to CR to maintain and improve the physical and mental well-being of the elderly people, including teleconsultation and telemonitoring
Information handled in the context of service delivery / utilisation	Health information handled by GP, specialists and other health professionals: <ul style="list-style-type: none"> • ICP coordination information. • Detailed information on the healthcare received / requested. • Patient health data EHR.
Third-sector care provider (TSCP)	
Description of actor characteristics	Volunteers of local NGOs, support groups and relevant patients organisations.
Description of role in service delivery / utilisation	The exact role needs to be defined.
Information handled in the context of service delivery / utilisation	n/a.

10.2.2 Description of pathway components

The following description relates to the components of the pathway as described in section 2.2 above, with each heading corresponding to one of the boxes in the pathway.

Again, differences between the two pathways are highlighted, with elements referring only to the short-term pathway being marked as “**ICP-Acute**”, and elements referring to the long-term care pathway as “**ICP-LTCare**”. Elements not specifically marked apply to both pathways.

Entry points ICP-Acute: There are three starting points for an elderly person to enter the integrated pathway for acute short-term care: a referral from the Divaro Medical centre (based on the recommendations in the hospital discharge letter), from Arcadia, or the public social services in Sofia Municipality, where the acute condition was treated.

There are two ways for inclusion: medical evaluation and referral from a physician (at Divaro), or social evaluation and referral by a social worker (at Arcadia or the state social service).

Potential care recipients proposed for the BeyondSilos programme will most probably be patients after a hospitalisation, surgery, early discharge or any acute episode, which will require a combination of medical follow-up and social assistance at home for a period of 30 days. This time period is selected on the basis of scientific literature review and available definitions, and is common sense from a medical perspective. Patients could then be enrolled into the long term integrated care providing that they meet the eligibility criteria.

Referrals will be considered by the BeyondSilos Evaluation Commission formed by CPRH; the Commission will propose potential CRs for admission to the integrated system and care.

Entry points ICP-LTCare: There are three starting points for an elderly person to enter the integrated pathway for long term care: a referral from Divaro medical centre, a referral from Arkadia, or the public social services in Sofia municipality. There are two ways for inclusion: medical evaluation and referral from a physician (at Divaro), or social evaluation and referral by a social worker (at Arkadia or the state social service). The referrals will be considered by the BeyondSilos Evaluation Commission which will propose admission of potential CRs to the integrated system.

Assessment of the service user's needs for integrated home care: The needs of the service user will be assessed at two dimensions: social and health needs. A healthcare professional (GP or a specialist at Divaro Medical centre) will determine the scope of the medical services that the care recipient needs at home, the frequency of the needed attention, and eventual measured parameters by means of telemonitoring and other health elements of the care plan.

A SCP (a social worker at Arcadia) will determine the scope of the social services that the CR will need at home. Besides an interview, the SCP will rely on any records available at the local social services.

From a medical perspective, the options for services (not exhaustive) can include:

- Arrangement of home visits by the GP or a nurse.
- Tele-consultation.
- Prescribed treatment oversight.
- Emergency alerts.
- Remote (tele) monitoring of health parameters.
- Education on health issues.
- Assistance with documentation.
- Health services provision.

From a social perspective, the options for services (not exhaustive) can include:

- Support for home daily tasks.
- Arrangement of technical appliances (wheelchair, etc.).
- Accompaniment to GP, hospital or government institutions.
- Assistance with relevant documentation.
- Co-ordination of tasks by volunteers or I/FC.
- Home care support (visits by social worker).

- Tele-assistance (panic button).
- Telemonitoring of environmental parameters.

Enrolment into BeyondSilos pilot service: Enrolment into the BeyondSilos pilot service will be managed by the BeyondSilos Evaluation Commission. The Commission will consist of representatives of CPRH, the subcontractors, and the other service providers.

The admission starts from the entry points:

- Health referral to the CPRH Evaluation Commission: from the GP or from Divaro medical centre.
- Social referral to the CPRH Evaluation Commission: from Arcadia or state social service in Sofia Municipality.

The criteria for inclusion in the BeyondSilos pilot services include:

- Age of 65 +.
- Lack of support at home (people living alone).
- Need of home care & assistance or at risk of exclusion due to illness or disability; according to Art. 38, p. 3 of the Law for Social Support, social exclusion is: "If someone does not have an ability to participate in the social life". (Eligibility for social service support).
- Autonomous in self services.
- Have at least one chronic disease.
- Resident of Sofia Municipality.

When a potential user is identified to be eligible for the BeyondSilos programme, the medical or social professional who referred him/her informs the prospective CR of the option to be included in the pilot. The elderly person must sign a written Informed Consent Form to be enrolled in the programme, as well as a Data Protection Declaration according to the national Data Protection Law.

Initial integrated home care plan: The definition of the integrated home care plan sets a personalised schedule for the CR included in the BeyondSilos pilot. The integrated care plan will be stored in the EHR. The plan defines the co-ordinated efforts of the CR, the HCP, the SCP, the TSCP and I/FC. It includes the distribution and schedules for the defined tasks relating to the individual CR. If the CR requires telemonitoring, the integrated home care plan sets out the vital parameters to be measured, and provides the necessary ICT devices. The CR is provided with the means of communication with his/her carers.

Discharge from hospital ICP-Acute: An early discharge from the hospital is expected to be the most common entry point to the BeyondSilos programme. The organisational structures for enrolling the patient into the BeyondSilos integrated service will be set up in advance.

The physician in charge refers the patient to the CPRH Evaluation Commission to evaluate the concrete needs of each individual, and to enable the required services. An initial care plan is set up, which will in many of the cases include rehabilitation team and home care support if there is no I/FC available.

Coordination of integrated care delivery / revision of the initial care plan: The enrolment of the elderly person in the BeyondSilos pilot and the definition of the home care plan are only the initial steps in the delivery of the ICP service. The process is continuous, and involves constant efforts to observe, analyse and alter the composition of the services provided, because new services may be needed, or included services may become redundant.

The co-ordination and revision process will be assisted by relevant ICT tool,s in particular the Integrated Health and Social Record (IHSR) that will be shared with all the service providers in order to include all the performed task, services and other activities. The IHSR will be developed by our sub-contractor Saorsa.

The service delivery process will be co-ordinated through the BeyondSilos platform, and accessed via a web-based portal.

During the pilot project, the service needs of the user may change due to a variety of reasons, including deterioration / improvement of the health status, changes in the home environment (a relative moves in), etc. All the service providers will be able to initiate a change to the initial care plan, but the amendments will take place only with the approval of the BeyondSilos Evaluation Commission.

On-site provision of formal social care: According to the initial assessment of the CRs' needs, some of them will require the provision of social services at home. This care will be provided by the SCPs (state social services and Arcadia). The specific tasks and their schedule are determined in the care plan, and are tracked through the web-based portal. Some of the services may be:

- Accompaniment for administrative purposes.
- Accompaniment to / in hospital.
- Accompaniment at home.
- Administrative tasks.
- Home tasks.
- Follow-up schedule.
- Home care Support.
- Telecare.
- Coordination healthcare centre / hospital.
- Coordination with NGO.

On-site provision of formal healthcare: Medical attention at the home of the CR may also be included in the integrated care plan. The medical services will be provided by HCP, such as the GP or a nurse, emergency care (according to national law), or health workers from the project partner Divaro Medical Centre. Some of the services may be:

- Emergency transfers.
- GP or nurse home assistance.
- Remote telemonitoring, tele-consultation.
- Education programs in health issues.
- Adherence to treatment programs.

ICP-Acute: Depending on the social status of the CR, in accordance with the national law he/she might be accompanied to hospital / other healthcare facility for a check up. The specific tasks and their schedule are determined in the care plan, and are tracked through the web-based portal , which will give access to the EHR to health and social providers.

On-site provision of informal care: This type of care is provided by I/FCs as specified in the care plan. These carers help with daily routine tasks, such as cleaning, cooking, washing and provide moral support.

Remote provision of integrated care to the home (telecare, telemonitoring): Telecare and telemonitoring present the greatest challenge in the pilot in Sofia region, because there is no local relevant experience. The telemonitoring centre will be located at MC Divaro premises, and will be operated by project staff based on 'on duty' principle. The telemonitoring data will be automatically transmitted to EHR twice daily. The monitoring system will signal if the data are out the reference range for the relevant parameter.

The provision of integrate care to homes will involve systematic efforts to co-ordinate the work of the different care providers in order to avoid repetition of the performed tasks, which saves time and costs). This endeavour will be supported by a variety of ICT tools such as web-based portal, integrated health

record, alarm buttons, vital signs measurements, environmental parameters. In the first year of the pilot, we will deploy on site only simple reliable telemonitoring devices that will allow us to gain valuable experience and extend the scope of the technology used. The pilot EHR and web portal are planned to be established and operational at the time of enrolment of the first 10 CRs at the end of year 1.

Integrated documentation of home care provided / self-care measures: The integrated health and social record will be completed with data from all the documentation related the home care provided. The IHSR will be shared by all care providers, and will be accessible through a web-based portal.

The platform will gather the information on the services which the CR has received, and will enhance the distribution of tasks to the different actors, and the coordination among them in real time. The web portal will be accessed from service providers, and CR via PC or a mobile device

Control / reassessment of the home care recipient: The HCP will periodically assess the results obtained through telemonitoring, regular visits and other health-related activities. This may lead to changes to the scope of the provided medical services. The SCP will periodically assess the documentation to evaluate how the provided services are used, or there is a gap in the initial care plan. These assessments will be presented to the BeyondSilos Evaluating Commission which can take a decision on the necessary measures to improve the provision of the integrated care.

Re-admission to hospital ICP-Acute: The need of the CR to be re-admitted to hospital alters the course of the integrated pathway. These changes will be considered by the BeyondSilos Commission that may order suspension of the service or discharge from the pilot.

Temporary admission an institutional setting (e.g. hospital, day care centre) ICP-LTCare: The need for the CR to be admitted to hospital or a social institution alters the course the integrated pathway. These changes will be considered by the BeyondSilos Commission, which may order suspension of the service or discharge from the pilot.

Exit points ICP-Acute: The reason that a CR may leave the pilot can be:

- The acute condition was overcome, but due to chronic illness or incapacity to perform every day activities, the patient is re-routed into the long term integrated care pathway of the project, providing that he/she meets the criteria.
- Stable remission and no need of home care and supervision.
- The patient decides to leave the programme.
- No longer meeting the inclusion criteria.
- Death.

Exit point ICP-LTCare: There are a variety of case closure scenarios. The CR can exit the pilot if there are problems with receiving the care, and the user withdraws his/her consent. Another reason may be that the elderly person no longer needs medical and social attention due to a positive impact from family care.

10.2.3 Anticipated impacts

The table below lists the impacts of the new pathway on the different actors, as anticipated at this stage. Actual impacts will be measured and analysed as part of the evaluation and cost-benefit analysis of the pilot deployment.

Impacts are split into positive impacts or benefits on the one hand and negative impacts or costs on the other. In both cases, tangible as well as intangible effects can be included. For example, a positive impact can be an increase in a patient's self-perceived quality of life or satisfaction (intangible benefit) or saved

costs due to more efficient service provision for a provider (tangible resource benefit). In a similar way, negative impacts can include the inconvenience caused by daily telehealth readings (intangible costs) or the investment in telecare equipment by a provider (tangible monetary cost).

Table 19: Anticipated impacts of contextualised pathways in Sofia

Care recipient (CR)	
Positive impacts / benefits	<ul style="list-style-type: none"> • Improvement of health and social status, and the overall quality of life. • Avoid redundant visits to hospital or GP. • Confidence and less fear due to monitoring of condition. • Active patient involvement in managing his/her condition.
Negative impacts / costs	<ul style="list-style-type: none"> • Intrusion by a multitude of carers and technology. • Time taken for training in the use of equipment. • Time taken to take telehealth readings.
Informal carer (IFC)	
Positive impacts / benefits	<ul style="list-style-type: none"> • Empowerment of people permitting them to better perform their care role.
Negative impacts / costs	<ul style="list-style-type: none"> • Increased workload.
Social care provider (SCP)	
Positive impacts / benefits	<ul style="list-style-type: none"> • Enrichment of their role. • Better informed about CR needs. • Establishing collaboration culture with HCP. • Reduced number of visits by SCP staff to the home.
Negative impacts / costs	<ul style="list-style-type: none"> • Increased workload. • Time taken to provide services. • Time taken for training in the use of equipment.
Health care provider (HCP)	
Positive impacts / benefits	<ul style="list-style-type: none"> • Timely provision of care when needed. • More specialisation and gaining valuable ICT experience. • Less time wasted from redundant visits. • More efficient use of personnel. • Establishing collaboration culture with SCP. • Reduced number of visits to the HCP.
Negative impacts / costs	<ul style="list-style-type: none"> • Time taken to provide services. • Time taken for training in the use of equipment.
Third-sector care provider (TSCP)	
Positive impacts / benefits	<ul style="list-style-type: none"> • Enrichment of their role, making them participant in the care act of elders.
Negative impacts / costs	<ul style="list-style-type: none"> • New tasks, more responsibilities.

10.3 Implementation requirements

This section gives an overview of the current state of requirements analysis at the pilot site, broken down into different categories. At the time of the writing, requirements elicitation at the site was still ongoing. Final consolidated outcomes will be presented in D1.2.

10.3.1 End user requirements

The assessment of users' needs will be done in compliance with the existing organisational rules and procedures, by the HCP on the basis of CR's medical file, and by the SCP on the basis of social assessment documents. Final confirmation for enrolment will be done by the CPRH Evaluation Committee.

10.3.2 Organisational, staff and business related requirements

- Current rules and procedures of the service providers involved will need to be adapted.
- Employees of the service providers will have to be trained to obtain the skills to work with the ICT platform.
- Existing information systems may need additional interfacing to become compatible with the integrated care system.

10.3.3 Legal / regulatory / contractual requirements

- Privacy and security of health related data will have to be guaranteed by the technology used (only for the electronic systems maintained by the NHIF).
- HCP and SCP may need to engage in co-operation contracts.
- Consent procedures have to be established at all levels.

10.3.4 Technology / functionality related requirements

- Compatibility with existing databases and systems of NHIF have to be taken into account.
- The web-based portal has to provide levels of access and role management.
- ICT devices have to be integrated into a single platform.

11. Valencia pilot site - contextualised pathways

11.1 Point of departure

BeyondSilos Acute Care Pilot is organised around the Health Department Valencia-La Fe, belonging to the Comunidad Valenciana Regional Health Care System. This Health Department covers a geographical area located in the city of Valencia, and coordinates all the healthcare services provided in the territory, for all health levels (including primary care, GPs, secondary and tertiary care, hospitals and specialised healthcare centres). The health department is coordinated by a big hospital that manages all the care delivery in the geographical area. Primary care is directly managed by a primary care manager that belongs to the management structure of the Health Department.

The Region of Valencia (East Spain) is one of the 17 Autonomous Communities of Spain, located in central and south-eastern Iberian Peninsula. The Region is divided into three provinces (Alicante, Castellón and Valencia) and thirty-four counties. The largest city in the Region is its capital: Valencia. The Region of Valencia has 518 km of Mediterranean coastline and covers 23,259 km² of Spain (4.6% of Spain, 8th) with 5.02 million inhabitants (2008) (10.6% of Spain, 4th). In the last few years, the concentration into the main cities and their metropolitan areas has grown considerably, especially in all the coastal cities. The Region's population is nowadays clearly urban and coastal, although also influenced by seasonal tourism. There are 13 towns with more than 50.000 inhabitants. Valencia is the capital and most populous city of the Autonomous Community of Valencia, and the third largest city in Spain, with a population of 814,208 people (2009). It is the 15th most populous municipality in the European Union.

All Spanish regional healthcare systems are divided into Health Care Area Units. Each autonomous region defines its own Health Care Area Units according to various demographic and geographic criteria. In Valencia region, there are 23 Health Care Area Units, called Health Departments. Each Health Department is composed of several primary care centres and one or more hospitals. In total, the region of Valencia has 28 hospitals and 500 primary care centres.

Each Health Department covers a concrete geographic area and its population, receiving financial resources according to the population covered, following a capitation model. The financial resources are later adjusted according to three considerations:

- Number of family physicians per 10.000 inhabitants in the Health Area.
- Percentage of small towns in the Health Area.
- Percentage of population over 65 years old in the Health Area.

The health services in the Spanish public health system are free at the point of delivery for those citizens with coverage (basically all the population), with the exception of drugs prescribed outside hospitals, which must be co-paid by citizens, with different percentages depending on their income. There is no reimbursement scheme, as the system directly covers the costs of healthcare and no direct payment is made by users.

Description of the current care delivery process:

Valencia-La Fe Health Department includes one hospital: Hospital La Fe, one of the biggest hospitals in Spain. The Health Department contains 16 Primary Health Areas including eight Primary Care Centres and eight Auxiliary Medical Offices. The Valencia Health Plan 2010-2013 is the instrument of planning and programming of the health system in Valencia.

Conscious of its strategic importance, the Regional Ministry of Health, by means of the Valencia Health Agency (AVS), made a firm commitment to improve the health information systems, with a significant investment effort in this area. Thus, the Health Information System of the Generalitat Valenciana (SISAN) has a strong integrative approach that considers homogeneously all aspects of such a complex organisation:

- Primary care (Abucasis).
- Hospital care (ORION).
- Extra-hospital emergency care (CORDES).
- Central Services and Public Health.

The integrated care at home programme (which exists already today) provides patients and informal care givers with comprehensive care at home, favouring transition from hospitalisation to home care. The programme includes several services particularly valuable for the older population: specific home based training for patients and caregivers, to empower patient's self-management and increase adherence to treatment; a specific score for the stratification of the risk of falls, and a set of intervention guidelines to prevent the occurrence of falls; mental health and cognitive decline assessment test for early diagnosis and prevention; multidisciplinary integrated care teams supporting patients and informal care givers at home. The service includes specific ICT support: home monitoring devices, electronic health and social care records both in primary care and hospital, and mobility support for professionals while doing home visits. The programme was started in the Health Department in 1990, together with three other locations. Since then, it has been extended to another 20 locations within the Region, by the transfer of best practices coming from the initial units.

The programme is coordinated by the home hospitalisation unit (UHD) of the Hospital La Fe of Valencia, but includes health and social care professionals in the team, thus providing a combination of health and social services within an integrated care path for citizens. The activities of the unit have been improving along the years, including new innovations, and consolidating them into best practices in a continuous evolution. The present programme is the result of this innovation process, evolving from a basic hospital-at-home unit. The unit includes several social care professionals (psychologist, social worker) that perform several social care tasks within the normal work of the unit. For example, they contribute to the assessment of the patient's eligibility to be part of the programme according to his/her social profile, they provide emotional and psychological support to patients and families about coping with a chronic disease, coping with disability, bereavement, etc. They also provide occupational therapy to patients, and support families to access social funds, handle family disputes in relation to patients, etc. They develop a patient's profile in relation to social care, and they use validated questionnaires to obtain different scorings in relation to the patient's status (cognitive decline, quality of life, depression, etc).

Additionally, the Health Department has been pioneer in the usage of ICT technologies to support the unit work, including a specific healthcare record, before the corporate health information systems were deployed. This software and the related guidelines and processes, designed, developed and validated in the unit in collaboration with the Universitat Politècnica of València, was firstly upgraded and scaled-up in a pilot in 2002-2003 in the Hospital of Alcoy (in Valencia Region, province of Alicante) within the digital city initiative. As a result of this pilot, a second upgrade was done to include particularities of other locations; the solution was transferred to the Valencia Health Agency, which adopted it as part of the corporate solution. This solution has been scaled up to all the units in the region following deployment of the corporate information system.

Finally, the technological solution developed in the unit was selected as a reference by the Hospital Marqués de Valdecilla in Santander (another region of Spain) for the development of the ICT tools (ORCONERA) for their home hospitalisation unit in 2004-2005, which was developed by the same technical

team based on the best practices of the Hospital La Fe. The tool was deployed, tailored, validated and is currently in use.

The following picture provides an overview of the service flow as it is before BeyondSilos project:

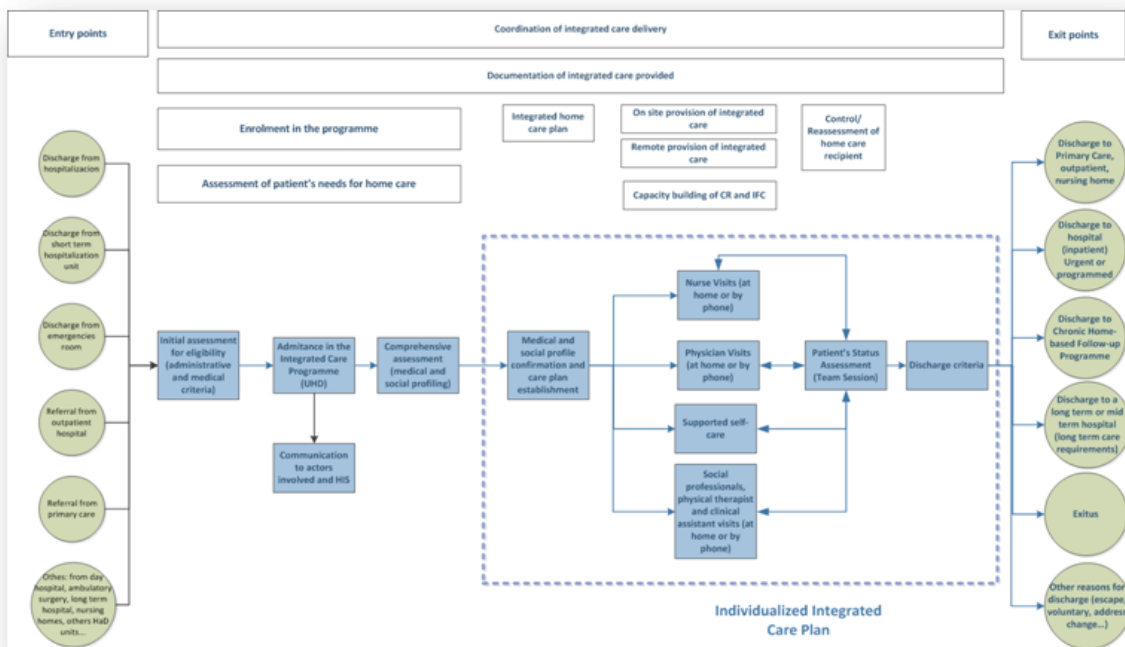


Figure 7: Current service flow in Valencia

11.2 Pathway description

11.2.1 Actors and their roles

The pathways involve a number of different stakeholders or actors, including individuals and organisations either receiving or delivering the service based on the pathway. The following tables provide an overview of the different actors and a description of their role.

Differences between the two pathways are highlighted, with elements referring only to the short-term pathway being marked as “**ICP-Acute**”, and elements referring to the long-term care pathway as “**ICP-LTCare**”. Elements not specifically marked apply to both pathways.

Table 20: Client domain actors of contextualised pathways in Valencia

Care recipient (CR)	
Description of actor characteristics ICP-Acute	Elder patient belonging to the Health Department Valencia-La Fe, and suffering from a chronic condition that has an acute event.
Description of actor characteristics ICP-LTCare	Elder patient belonging to the Health Department Valencia-La Fe, and suffering from a chronic condition which is more or less stable.

Description of role in service delivery / utilisation	CRs will be users of the care services. Their main role is to be users of healthcare services, telemonitoring services and social services.
Information handled in the context of service delivery / utilisation	Information from their vital signs measurements, questionnaires, care schedule, health and social care needs and providers. They will also have available information on the care plan. Possibility to report 'informal' information on the patient status.
Informal Carer (I/FC)-1	
Description of actor characteristics	Family members acting as informal carers of the CR.
Description of role in service delivery / utilisation	Their main role is to help older people in their care, and participate in the care plan, most probably not in a daily basis. Many times they also take care decisions on behalf of the CR, and want to be informed of their health status.
Information handled in the context of service delivery / utilisation	Information on the CR vital signs measurements, general status, care plan and care schedule, upon CR consent form. Possibility to manage care appointments on behalf of the CR, validation of care decisions if they act as patient's proxy. Possibility to report 'informal' information on the patient status.
Informal Carer (I/FC)-2	
Description of actor characteristics	Spouse of the CR acting both as an informal care giver and as a CR.
Description of role in service delivery / utilisation	Their main role is to help older people in their care and participate in the care plan in a daily basis. Many times they also take care decisions on behalf of the patient, and want to be informed of their health status. They have a combined role patient/care giver.
Information handled in the context of service delivery / utilisation	Information on the CR vital signs measurements, general status, care plan and care schedule, upon CR consent form. Possibility to manage care appointments on behalf of the patient, validation of care decisions if they act as patient's proxy. Possibility to report 'informal' information on the patient status.
Informal Carer (I/FC)-3	
Description of actor characteristics	Employed informal carer with no specific knowledge or training in care provision.
Description of role in service delivery / utilisation	Their main role is to help older people in their daily tasks and participate in the care plan.
Information handled in the context of service delivery / utilisation	Information on the care tasks to be performed with the patient. Possibility to report 'informal' information on the patient status.

Table 21: Provider domain actors of contextualised pathways in Valencia

Social care provider (SCP)	
Description of actor characteristics	<p>Local and regional public entities and private organisations providing social care services.</p> <p>Staff working for public organisations that provide social services. These can be local or regional institutions.</p> <p>Staff working for private organisations that provide social services in the region, such as the Red Cross.</p>
Description of role in service delivery / utilisation	<p>They provide assistance of any type to elders that are in need of attention.</p> <p>Their main goal would be to provide social care to dependent users and take vital signs, support on health education programmes, control and monitoring of clinical treatments, filling out forms to detect clinical alerts, psychological support, occupational therapy or rehabilitation, social support in relation to living conditions, access to subsidies, etc.</p>
Information handled in the context of service delivery / utilisation	<p>Coordination information. Detailed information related to the social care received / requested.</p> <p>Information related to the monitoring of vital signs taken.</p> <p>Minimum set of patient clinical information.</p> <p>Questionnaires for social service purposes.</p>
Health care provider (HCP)	
Description of actor characteristics	<p>Regional public organisation provider of health services including:</p> <ul style="list-style-type: none"> • Primary care doctors and nurses from the Health Department Valencia-La Fe. • Emergency services. • Specialised healthcare services from the Health Department Valencia-La Fe. • Local pharmacies.
Description of role in service delivery / utilisation	<p>They provide different levels of healthcare services to citizens in the Health Department.</p>
Information handled in the context of service delivery / utilisation	<p>Information handled by health professionals:</p> <ul style="list-style-type: none"> • Coordination information: Detailed information related to the healthcare received / requested. • Information related to the monitoring of vital signs taken. • Patient EHR. • Drugs and prescription information. • Access to partial social care information.
Third-sector care provider (TSCP)	
Description of actor characteristics	<p>Local associations that provide support to CRs.</p>
Description of role in service delivery / utilisation	<p>Their main role is to provide the elders with different kinds of support: training, emotional, technology helpdesk.</p>
Information handled in the context of service delivery / utilisation	<p>They have no access to the CR data. Possibility to report 'informal' information on the patient status.</p>

11.2.2 Description of pathway components

The following description relates to the components of the pathway as described in section 2.2 above, with each heading corresponding to one of the boxes in the pathway.

Again, differences between the two pathways are highlighted, with elements referring only to the short-term pathway being marked as “ICP-Acute”, and elements referring to the long-term care pathway as “ICP-LTCare”. Elements not specifically marked apply to both pathways.

Entry point ICP-Acute: The starting point of this integrated care pathway would be when a patient has been proposed to be included in the BeyondSilos acute pathway while they are hospitalised for a condition that is part of the possible services provided by the UHD (e.g. severe decompensation in HF).

A specific ‘eligibility’ simple questionnaire (as a checklist) will be provided to assess initial basic eligibility. Once the patient has been pre-selected, his medical and social condition is profiled in order to validate their full eligibility, and create an admission proposal. This proposal will be evaluated by a coordinated commission in charge of admission (or a specific professional to whom the commission has delegated this decision) for final admission into the programme. The commission is coordinated by the UHD, and takes into account health and social information.

Entry point ICP-LTCare: The starting point of this integrated-care pathway would be when a patient has been proposed to be included on the Beyond Silos programme, by one of these means: primary care, specialised care, hospital discharge, home hospitalisation unit, social services, or from Beyond Silos short term care programme.

A specific simple ‘eligibility’ questionnaire (as a checklist) will be provided to assess initial basic eligibility by the proposer. Once the patient has been pre-selected, his/her medical and social condition is profiled in order to validate their full eligibility and create an admission proposal. This proposal will be evaluated by the telemedicine coordinator for final admission in the programme, taking into account health and social information.

Assessment of the service user’s needs for integrated home care: A collaborative team of HCP will define the medical attention that the patient may need in relation to any home care, taking into account the health and social profile of the CR. This decision will be made based on the patient information collected from the Hospital Information Systems (HIS) and the initial joint assessment (profiling).

Once the main healthcare programme has been decided, the SCP, either the local SCP or the hospital social worker, will define the social attention that the patient may need. In order to identify these needs, the SCP will have an interview with the patient (this step could be skipped if the information gathered in the initial profiling is sufficient to develop the social care plan), and will rely on the profiling and information available in the HIS.

From a social point of view the services that a user may be provided can be those of:

- Accompaniment for administrative purposes.
- Accompaniment to / in hospital.
- Accompaniment at home.
- Administrative tasks.
- Home tasks.
- Follow-up schedule.
- Home care Support.
- Home care Private Support.

- Telecare.
- Orthopaedic support management.
- Support in access to subsidies.
- Family support (e.g. solving potential conflicts around the patient).
- Psychological or emotional support.
- Wheel chair loan.
- Loan of crutch.
- Loan of articulated bed.
- Submission of reports to court by violence of gender.
- Coordination with CARITAS, Cruz Roja or Casa de la Caridad volunteering service.
- Support for Impairment recognition Applications.
- Other support, information or resources management.
- Coordination healthcare centre / hospital.
- Coordination with NGO.

From a medical point of view the services that a user may be provided can be those of:

- Health transportation.
- Emergency transfers.
- GP or nurse home assistance.
- Home hospitalisation.
- Remote telemonitoring.
- Education programmes on health issues
- Training.
- Pain management.
- Palliative care.
- Wound care.
- Questionnaires for prevention.
- Adherence to treatment programs.
- Medication support.
- Supply of healthcare devices (e.g. oxygen).
- Referral to other care levels or professionals.
- Expedition of drug prescriptions.
- Prescription of tests.

And will be provided according to the social and medical profile of the patient.

Enrolment into BeyondSilos pilot service: A health and social assessment needs to be done as an initial data input before entering in the programme. Explicit consent by the patient needs to be obtained.

Initial integrated home care plan: An initial plan will be defined to provide care support through BeyondSilos. The initial care plan will be defined by the UHD team, taking into account the CR's profile.

ICP-Acute: The initial care plan will be defined by the UHD team taking into account the patient's profile.

ICP-LTCare: The initial care plan will be defined by the telemedicine coordinator in collaboration with the different specialists that treat the patient and his primary care doctor.

ICP-Acute: The visit and check-up plan of the CR will be defined, including phone calls and home visits by HSC and/or SCP, together with the main criteria for evaluating the patient's status. This schema will be planned according to several criteria such as the patient's clinical profile, if having an active social role, or living in dependency situation

If CR is included on the telemonitoring programme, the templates will be configured including vital signs, questionnaires, frequency and other elements of the care plan (directly on the system). The CR will either be provided with biomedical devices and technology, or use his own devices.

ICP-LTCare: First of all, and if the user is included in the telemonitoring programme, the templates will be configured including vital signs, questionnaires, frequency and other elements of the care plan (directly on the system). The patient will either be provided with biomedical devices and technology, or use his own devices. Phone calls and/or home visits by HSC and/or SCP could also be planned. This decision will be taken according to several criteria such as the patient's clinical profile, whether they having an active social role, or are living in a dependency situation.

In both pathways, a coordinated schedule will be defined between the patient, the HCP, the SCP, the TSCP and/or I/FC that will be agents in providing care to the patient, along with a schedule of actions and personnel responsible of the tasks. All the participants will have the opportunity to agree with the schedule, and will receive all the information about the programme for each patient.

The patient will also be provided with a contact point (centralised in the UHD, by phone) to be able to communicate with his carers when needed. Patients will use this Integrated Care Coordination point of contact (Contact Centre) to request care needs and to access the schedule. Additionally, if the patient is in the telemedicine programme, he will be able to communicate with the professionals in his care team individually through an embedded mailbox service.

Discharge from hospital **ICP-Acute:** Discharge from hospital will be supervised by Home Hospitalisation Unit (UHD) staff, who will evaluate the patient's adequacy to be discharged from the hospital, to be included into the Home Care BeyondSilos programme. The UHD team is a multidisciplinary unit combining specialised nurses, doctors of different specialities (internists, pulmonologist, cardiologists, etc), psychologists and social workers. They will reassess eligibility according to the initial evaluation to assure that the conditions of the CR have not changed so that the programme is no longer adequate for him/her. Once the eligibility is confirmed at the discharge point, the UHD will coordinate the transport of the CR to his home, and the training of the CR and I/FC so that they can properly use the platform and the available resources from day one, as the first days after discharge are quite critical. Additionally, the nurse paying home visits in the following days will also revisit the training of the CR and I/FC once at home, to reassure them in the optimal usage of the tools, and answer possible doubts.

Coordination of integrated care delivery / revision of the initial care plan: When a CR is included in the BeyondSilos programme, he/she will be provided with a set of services that will be used by him (or not) depending on his needs and situation, and at different moments in time. Therefore, there will be an essential continuous revision of the services provided and requested by the patients and the coordination plan by the UHD team (in periodic patient assessment meetings), as part of the patient status assessment.

ICP-LTCare: Whenever a specialised opinion is required, the case management nurse will contact the telemedicine coordinator or the corresponding specialist to support the patient's status assessment. The system will incorporate guidelines for the case management nurse to decide on this assessment, expert opinion or referral.

In order to ease this task, a platform will hold all the information and services provided to CRs. This platform will register the coordinated action plan, the ICP schedule, and the agents responsible for providing the care, the services provided and the new services requests. This platform will be used to identify needs, assign responsibilities, coordinate care, and register actions; the information related to the care provided will be registered on this platform, which is in the responsibility of the Health Department. The HSCP will be supported by the legacy systems that store the patient information. The SCP will also be

supported by the patient's data records, accessing only the data needed to perform the social care tasks. The platform will execute the collaborative care plan, and will inform the different actors of their respective care tasks, as well as giving them access to the required information to take the best possible decisions.

During the pilot, the CR may change needs due to several conditions: enhancement or deterioration of their health, no longer in a risk situation, in need of more services, no longer eligible, etc. It is important that the CR has a procedure to communicate with the pilot to review his requirements. A request for a change in the patient needs can be launched by any of the care levels involved (including the CR and I/FCs); this request will be evaluated by the UHD team. If the request is confirmed, the integrated care plan will be adjusted accordingly.

On-site provision of formal social care: Depending to the CR's profile, some level of social care at home could be needed. The provision of these services can be done by the public SCP, by private companies providing some kinds of social support, or by a person specially hired to develop these tasks. Depending on the patient characteristics, these services could be subsidised by the government. The tasks performed by the SCP will, if possible, be coordinated with the integrated care plan of the patient.

On-site provision of formal healthcare: Depending to the CR's profile, some level of professional health care at home may be needed. The provision of these services will be done by the public HCP; they could be supported in some cases by a private company, or professional hired to provide more complete healthcare at home. The tasks performed by these professionals will be part of the integrated care plan of the CR. The home care tasks will initially be carried out by hospital staff (by means of the Home Hospitalisation Unit) for a short period after hospital discharge. Once the patient has been stabilised, care will be transferred to primary care, or the patient will be enrolled in the Long Term programme. An intermediate case will be when phone calls are made by a professional to check up on a patient before deciding on a visit or sending the patient to the medical centre.

On-site provision of informal care: Informal care tasks will be provided either by employees with no professional education performing basic tasks (cooking, cleaning, accompanying, etc), by the CR's family, or by a combination of both. Some of the tasks performed by them will be included in the integrated care plan. They will also support the patient in his self-care tasks (e.g. medication compliance, doctor's appointment). In Spain, it is very common that you hire somebody individually to perform these tasks (not only for the elderly, but in many homes for example for cleaning). It is a direct contract with the person (paying social security and everything); normally they do not have any specific training.

Remote provision of integrated care to the home (telecare, telemonitoring): One of the main goals of this pilot is not only to provide integrated care to patients, but also the coordination of actors to avoid duplication of the activities provided and to ensure that the most appropriate carer carries out the various care tasks in each case, generating a more efficient use of resources. Other goals are the tracking of CR wellbeing, to promote the empowerment of the CRs in the management of their own health, making them co-responsible to maintain and keep good practices on health issues, and to acquire more complete information to support professionals in personalising care plans. Therefore, some of the services will be provided on a remote basis. Some examples are the self-telemonitoring of vital signs, and questionnaires for the patient or I/FC at home, the provision of these measurements to the HCP, the reminder of events (such as HCP visits or others) thanks to the shared schedule, calls made by the SCP to know about the CR health status, alarm calls thanks to push-button devices or geo-positioning devices provided to users, and collaborative care plans that inform each care giver of the tasks that are assigned to them on each patient's care plan, etc.

A telemonitoring service is being deployed and evaluated in the Health Department Valencia-La Fe, tackling high risk chronic patients. This service will be broadened to include patients recovering from an acute event, and to incorporate SCP and I/FC. To do so, the service will enable the SCP to incorporate their own questionnaires and alarms in the remote monitoring system, to complete the current care plans which are mostly health focused. In addition, the service will incorporate support for the SCP and I/FC through a specific interface where they can access guidelines and education for the care tasks they have to perform for the CR, and also by enabling them to report relevant signs or symptoms that could be of interest for the patient's assessment.

Integrated documentation of home care provided / self-care measures: The central point will be the platform that will hold the information on the services that a user can benefit from, the actions provided, the delegation of tasks to agents, and the coordination between agents. This platform will be managed by the Contact Centre located in the telemedicine area of the Health Department, and will provide all the information that is required to provide an integrated care plan. Each actor will be able to access the reports of the patients under his/her responsibility, which include the information he/she is entitled to see: both current information on vital signs, and questionnaires, as well as the history of the patient. Some of this information will also be uploaded into the EHR of the hospital, and become part of the patient's health record.

Control / reassessment of the home care recipient: Telemonitoring services need a follow-up of the measurements taken, usually in the form of tracking alerts and alarms. This will be performed by the HCP. Depending on the seriousness of the alert, the HCP will evaluate the need to provide special care, new services, or emergency services such as ambulance transport. Specific case management nurses will be the first entry point for this data, and will perform triage (supported by the platform) to decide on: not acting, acting, or referring the CR if needed, according to his integrated care plan. The referrals could include either the HCP or the SCP (or both), depending on the CR's need (e.g. need for psychological support).

The HCP will periodically review, through the documentation, the conditions of the CR that are benefiting from the telemonitoring service, to check whether changes and/or revisions are needed to the service provided or initial care plan.

Similarly, the SCP will also periodically review the documentation to check the use of the services by the CR, and identify if they are really used, or if there are deficiencies that require a reorganisation of the services provided.

If that is the case, the pilot Committee will be notified, and will provide on-going coordination of integrated care delivery / revision of initial home care plan.

Temporary admission into an institutional setting (e.g. hospital, day care centre): Depending on changes in the condition of the CR (either social or worsening of the clinical status), there may be a readmission to hospital or social institution. These cases will be evaluated by the BeyondSilos Committee, as it may imply the temporary suspension or disenrollment of the patient from the pilot.

Exit point: The end point of this pathway would be when the CR is no longer in need of medical or social attention, the CR is excluded from the medical programmes, the CR revokes consent, participation in the program is closed, the CR dies, or no longer meets the minimum eligibility criteria, or CR needs to be referred to other services: long term care, hospital, etc.

11.2.3 Anticipated impacts

The table below lists the impacts of the new pathway on the different actors, as anticipated at this stage. Actual impacts will be measured and analysed as part of the evaluation and cost-benefit analysis of the pilot deployment.

Impacts are split into positive impacts or benefits on the one hand and negative impacts or costs on the other. In both cases, tangible as well as intangible effects can be included. For example, a positive impact can be an increase in a patient's self-perceived quality of life or satisfaction (intangible benefit) or saved costs due to more efficient service provision for a provider (tangible resource benefit). In a similar way, negative impacts can include the inconvenience caused by daily telehealth readings (intangible costs) or the investment in telecare equipment by a provider (tangible monetary cost).

Table 22: Anticipated impacts of contextualised pathways in Valencia

Care recipient (CR)	
Positive impacts / benefits	<ul style="list-style-type: none"> • Enhancement of QoL. • Better health status. • Perception of more connection with the healthcare system. • Holistic support, not only disease treatment.
Negative impacts / costs	<ul style="list-style-type: none"> • Loss of privacy. • Discomfort due to the need to report or measure vital signs more frequently. • Perception of worsening of health status due to more care actions. • Anxiety due to alerts or system feedback.
Informal carer (IFC)	
Positive impacts / benefits	<ul style="list-style-type: none"> • Empowerment of people permitting them to better perform their care role. • More information about the patient's status.
Negative impacts / costs	<ul style="list-style-type: none"> • Assumption of new tasks. • Anxiety due to alerts or system feedback.
Social care provider (SCP)	
Positive impacts / benefits	<ul style="list-style-type: none"> • Enrichment of their role with more proactive participation in the care process. • Closer collaboration with HCP. • Specific questionnaires for social related assessment of patient status. • Possibility to develop personalised social care to patients in need.
Negative impacts / costs	<ul style="list-style-type: none"> • Assumption of new tasks. • Anxiety due to alerts or system feedback.
Health care provider (HCP)	
Positive impacts / benefits	<ul style="list-style-type: none"> • More specialisation and lessening of low-value tasks, thanks to transferring these tasks to other roles. • More information about the patient's real status. • Possibility to develop more personalised healthcare plans, including a holistic perspective. • Closer collaboration with other HCP and SCP.

Negative impacts / costs	<ul style="list-style-type: none"> • Effort of adaptation to the new more specialised role. • Fear to lose competences. • Fear of unauthorised practice of the health profession. • Potential conflicts in care plan due to problems in multiple actors collaborating. • Accountability and liability (perception about who is the responsible for the patient's situation if something happens?)
Third-sector care provider (TSCP)	
Positive impacts / benefits	<ul style="list-style-type: none"> • Enrichment of their role making them participants in the care delivery chain.
Negative impacts / costs	<ul style="list-style-type: none"> • Assumption of new role and new tasks.

11.3 Implementation requirements

This section gives an overview of the current state of requirements analysis at the pilot site, broken down into different categories. At the time of the writing, requirements elicitation at the site was still ongoing. Final consolidated outcomes will be presented in D1.2.

11.3.1 End user requirements

- Remote monitoring.
- Specific support (including education) for informal care givers during acute events.
- Home sensors.
- Common schedule with all medical and social appointments.
- Affordable cost of the service.
- Ensuring continuity of care after the acute event.
- More access to rehabilitation.

11.3.2 Organisational, staff and business related requirements

- Assignment of more professionals.
- Integration between social and health care beyond political barriers.
- Specific training for professionals in relation to elderly.
- Better management of integrated care (communication between professionals) during the acute event.

11.3.3 Legal / regulatory / contractual requirements

No specific requirement was identified in this category.

11.3.4 Technology / functionality related requirements

- Easier technological deployments with fewer burdens for the involved actors.
- Better reliability of ICT systems.
- Full technological integration between information systems.
- More specialised technological solutions for social care.

11.3.5 Any other requirements

- Reducing the influence of political problems (e.g. corruption, budgetary cuts) in health and social care.