



D5.1 CareWell system implementation plan

WP5 testing and pilot preparation

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STATEMENT OF ORIGINALITY

This deliverable contains original unpublished work except where clearly indicated otherwise.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



Executive Summary

This deliverable describes the testing and implementation preparation of CareWell prototypes, a previous phase of pilot operation. CareWell prototypes include the integrated care pathways and organisational models developed in Work Package 3 (WP3), and the service specifications and architectures depicted in Work Package 4 (WP4).

Following a common methodology, all pilot sites have explained how the testing procedures have been performed, specifying the protocol used, the staff involved, and the ICT tools required. The services composing the prototypes are framed within the two CareWell pathways, Integrated Care and Coordination, and Patient Empowerment and Home Support pathways.

In addition, pilot sites have described the service roll-out, which is the first step of the real-life implementation of CareWell interventions.

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1. Introduction

1.1 Aim of this deliverable

This deliverable describes the testing procedure of CareWell pilot prototypes before the implementation phase. The organisational models and pathways built in WP3, together with the technological infrastructure and service specifications defined in WP4, form the so-called prototype. The content of this deliverable includes the explanation of the testing protocols followed by pilot sites, the users involved in the simulation, and the platforms and devices required for that purpose.

In view to the pilot operation, this deliverable also compiles information on the implementation roll-out plans for each pilot site, describing the service deployment planning.

1.2 Structure of the deliverable

After the Introductory Chapter, Chapter 2 first presents a brief description of the testing methodology followed by the pilot sites in order to better understand the testing procedures.

Chapter 3 sets out how each pilot site has tested the new services and/or technological adaptations carried out during CareWell pilot preparation phase. Additionally, service deployment planning of each site is explained.

Chapter 4 briefly describes the next steps towards the pilot implementation.

1.3 Glossary

API	Application Programming Interface
A&E	Accident and Emergency
BPEL	Business Process Execution Language
CM	Care Manager
CRM	Client Relationship Management
D	Deliverable
ECG	Electrocardiogram
EHR	Electronic Health Record
EMD	Electronic Medical Documentation
EMH	Ericsson Mobile Health
FER	Faculty of Electrical Engineering
GP	General Practitioner
GPRS	General Packet Radio Service
HIS	Hospital Information System
ICCP	Integrated Care Coordination Pathway
ICT	Information and Communication Technology
IHR	Individual Health Record
LTE	Long Term Evolution



LSV	Lower Silesia
MHOL	My Health Online
MS	Microsoft
NFC	Near field communication
NWIS	NHS Wales Informatics Service
OOH	Out Of Hours
PC	Personal Computer
PDF	Portable Document Format
PEF	Peak Expiratory Flow
PEHP	Patient Empowerment and Home Support Pathway
PHF	Personal Health Folder
SOA	Service Oriented Architecture
TV	Television
ULSS	Unità Locale Socio Sanitaria
UMTS	Universal Mobile Telecommunications System
WCCG	Welsh Clinical Communication Gateway
Wi-fi	Wireless fidelity
WP	Work Package

2. Methodology

The steps which represent the methodology carried out by CareWell pilot sites within WP5 are shown in the following figure.

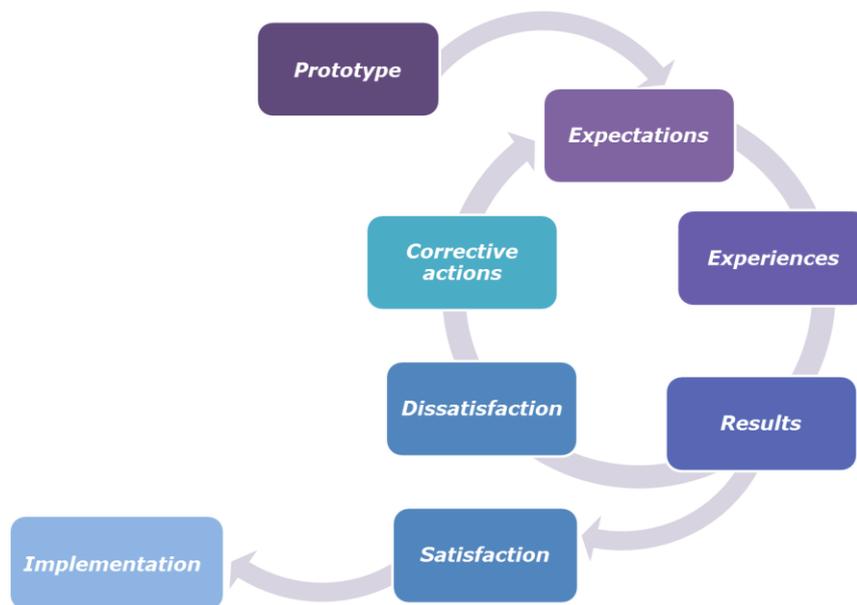


Figure 1: WP5 methodology

The procedure followed has been inspired by the Service Design concept which is the activity of planning and organising people, infrastructure, communication and material components of a service in order to improve its quality and the interaction between service provider and customers. Based on this idea, the testing methodology has been designed as follows:

- **Definition of the prototype:** the service procedure and/or the technology adaptation newly introduced in CareWell are defined by each pilot site according to the improvement areas previously identified (see D3.1 and D4.1).
- **Description of the expectations:** how the prototype (service procedure and/or technology) is expected to ideally perform is described step-by-step.
- **Experiences:** a testing methodology (protocol required, staff involved and ICT tools needed) is defined according to the expectations.
- **Analysis of results:** registration of the results obtained by each pilot site in each testing step. In order to carry out a comprehensive analysis, distinct aspects are considered: involvement of the corresponding staff, time needed to finalise the procedure, performance of ICT tools used, deviation from the expectations.
- **Satisfaction/Dissatisfaction:** a final assessment of the testing is done based on the analysis of results above, resulting in a satisfactory or unsatisfactory experience.
- **Corrective actions:** if the testing has not been completed successfully, corrective actions are defined to improve those aspects that have not performed as expected. Once these actions are agreed, the testing procedure re-starts (expectations-experiences-results-satisfaction/dissatisfaction loop).
- **Implementation of the service:** once the testing of procedures and technologies is positively completed, the prototype is considered to be ready for implementation.



In section 3, each pilot site describes the final service testing procedures carried out before the pilot operation phase.

3. Final service implementation, testing and preparation

3.1 Basque Country

The Basque Country has made efforts to improve service procedures and technological functionalities related to both the CareWell pathways: Integrated Care and Coordination pathway (ICCP) and Patient Empowerment and Home-Support pathway (PEHP).

Concerning the ICCP pathway, the work procedures of two relevant roles have been modified in order to ensure coordination between healthcare professionals and the continuity of care at hospital discharge. First, the reference internist is the main contact of the frail elderly patient during hospitalisation and he/she is responsible for coordinating those specialists in care delivery. Second, the hospital liaison nurse becomes an essential linking point between primary care and secondary care at discharge. The nurse is in charge of contacting the primary care nurse, and transferring all the relevant information related to the patient's discharge (drug treatment, education provided, clinical assessment, etc.).

Additionally, new technological functionalities have been developed which facilitate the coordination and communication between healthcare professionals. On the one hand, a wider access to e-prescription has been implemented, by which community pharmacists can then consult this information. This functionality also gives primary care professionals the possibility to view the drug treatment defined during hospitalisation. On the other hand, healthcare practitioners at distinct care levels now share more clinical information thanks to the convergence between primary and secondary care EHRs.

In terms of technology adaptations, the ICCP presents various improvements that aim to enhance the coordination and information sharing between healthcare professionals. The integration between the CRM and the EHR permits transferring telemonitoring information from the patient's home to the healthcare system, so all practitioners can access to these data, while the system convergence between primary and secondary care EHRs widens the information sharing between professionals of different care levels. An extra technological adaptation that has been included in ICCP is that of the data business warehouse, which standardises the data collection from several systems to automate the risk stratification score calculation. This information allows professionals to have an identified pool of patients who are considered frail elderly and require CareWell services.

For the PEHP, the Basque Country has focused on improving three main service procedures. Firstly, the nurses from the eHealth Centre have widened their functions to include scheduled follow-up calls to patients, especially during the weekends. In addition to this, patient follow-up has also been improved by implementing different remote monitoring modalities: a) eHealth or primary care nurses periodically call patients to check their health status by following a validated questionnaire, and b) patients fill in the questionnaire by accessing to their Personal Health Folder (PHF). In both monitoring modes, GPs are aware of patient's health situation. By using the PHF, patients can exchange messages with their practitioners; this enables non face-to-face communication to solve doubts, reinforce treatment adherence etc.

In terms of patient and caregiver empowerment, two services have been included in CareWell pathway. Patients (and caregivers) will not only have the opportunity to access educational material through the web portal, but will also be offered participation in a face-to-face specific educational programme.

3.1.1 Technology adaptations

Technology adaptation 1: Wider access to electronic prescriptions.

Expectations	Testing methodology
<p>In order to improve the coordination between practitioners, the range of professionals accessing the e-prescription has to be widened. Until now, drug information has been shared by GPs; it is expected that primary care professionals have access to the drug prescriptions carried out from the hospital after discharge, when the therapeutic plan usually changes considerably.</p>	<p>Technical staff from the Information System Department open a subset of the e-prescription (hospital prescription) data to the primary care professionals which can be viewed from the EHR. Testing is based on the verification of this procedure.</p>

Technology adaptation 2: Promote patient and caregiver empowerment through educational material in Osakidetza's web portal.

Expectations	Testing methodology
<p>Primary care nurses are responsible for promoting patient and caregiver empowerment through the web portal. Nurses have to ensure that patients and caregivers have the technological elements required (PC / mobile phone / tablet, and internet connection) and are able to navigate the internet.</p> <p>On the other hand, Information System Department is in charge of uploading the new educational material to the web portal and guaranteeing the correct functioning of the new interface.</p> <p>The educational material will also be uploaded into the PHF, including tools to improve patient self-management and control by themselves.</p>	<p>Firstly, technical staff have to confirm that the educational material in the web portal is accessible. This procedure is in-house testing.</p> <p>Concerning the procedure testing, primary care nurses have to explain to patients and caregivers how to enter Osakidetza's web portal, and specifically how to access to the educational portal (called Health School). This explanatory session is carried out during a face-to-face visit at the GP office.</p> <p>In order to verify that the patient or caregiver are not experiencing any problems, the nurse contacts them one week after the explanatory session. If any difficulty is detected, patient / caregiver are given instructions by phone. If problems still remain, patient / caregiver visit the GP office and receive a second in vivo training.</p>

Technology adaptation 3: Deployment of messaging between patients and/or caregivers and healthcare practitioners through the Personal Health Folder.

Expectations	Testing methodology
<p>The clinicians (GPs and specialists) and patients can exchange messages via Personal Health Folder. Through this procedure, the patient can communicate through a secured channel with his/her clinicians in order to clarify any doubt about his/her symptoms, drug treatment, diet and physical exercise guides. Similarly, the clinicians can contact the patient via messaging to investigate his/her health status and adherence to treatment, and to</p>	<p>The testing of the bidirectional messaging between clinicians and patients is based on the following procedure:</p> <ul style="list-style-type: none"> • Clinician explains to the "test patient" how the messaging via the PHF works (demo) during a face-to-face visit. Clinician has to confirm that the patient (or caregiver) understands the procedure and properly handles



Expectations	Testing methodology
reinforce educational messages.	the interface. <ul style="list-style-type: none"> • The “test patient” is then provided with PHF link, username and code. • The “test patient” is asked to send a message via PHF to the clinician from the PC at home or mobile phone the following day. • Clinician verifies if he/she has received the message from the patient. If yes, the clinician answers accordingly, so the testing is considered as successfully finalised. If not, the clinician contacts the patient and reminds him/her to do so. The testing is finished when the patient sends the message to the clinician.

Technology adaptation 4: Integration between CRM and EHR.

Expectations	Testing methodology
Information System Department is in charge of confirming that the monitoring data registered in the CRM (coming from either the PHR, or directly entered by nurses of the eHealth Centre) are correctly and automatically transferred to the EHR.	Technicians verify that the integration protocols work well, so that the complete set of monitoring data is sent automatically. The monitoring information has to be viewed with a specific configuration within the EHR.

Technology adaptation 5: System convergence between EHRs from primary and secondary care.

Expectations	Testing methodology
EHRs used by primary and secondary care professionals share limited information compiled in the e-book. It is expected that by increasing the amount of information shared, the coordination between practitioners will be improved and the decision making process will be more effective. Therefore, a wider system convergence has been carried out between both EHRs.	During the testing process, the technical staff have to verify that the integration between both EHRs functions well, meaning that the communication channel linking both platforms is correctly established. After this validation, technical staff confirm that the integration allows wider access to patient's clinical information from the EHRs used by practitioners of primary and secondary care.

Technology adaptation 6: Data business warehouse development.

Expectations	Testing methodology
The independent variables needed to calculate the risk stratification score, developed in the Basque Country, come from several administrative and clinical databases (hospitalisation, emergency visits, consultation, prescription, diagnosis, demographic data, etc.). All this data needs to be linked at patient level. During the CareWell project, a data business warehouse	Testing of the correct functioning of the data business warehouse is based on the following procedure: <ul style="list-style-type: none"> • Technical data confirms that the corresponding information from a patient coming from different databases is collected. • Mathematicians ensure that the algorithm on which the risk



Expectations	Testing methodology
<p>has been developed which allows the data collection from several databases in standardised way.</p> <p>By this data collection, the prediction risk algorithm is applied manually; the outcome of the risk stratification at patient level is uploaded into the EHR.</p> <p>The risk stratification score allows identification of patients with high complex needs who can benefit from CareWell pathway.</p>	<p>stratification is based is applied correctly to the information gathered.</p> <ul style="list-style-type: none"> Once the stratification risk score is obtained, a group of clinicians validate if the output is acceptable, meaning that the patients identified are real frail elderly following clinical criteria. All confirmed patients are labelled in the EHR, so all healthcare professionals are aware of their health condition.

3.1.2 Service procedures

Service procedure 1: Wider deployment of new roles of reference internist.

Expectations	Testing methodology
<p>The reference internist is responsible for the coordination of the specialists treating a frail elderly patient during hospitalisation. Irrespective of the department where the patient is hospitalised (admission or ER), the reference internist has to be notified; he/she will be in charge of care management (clinical assessment, care plan, pharmacological treatment and follow-up) during hospitalisation.</p>	<p>All departments of the hospital (cardiology, pneumology, endocrinology, etc) have to define and set up the corresponding protocol to contact the reference internist. The procedures established in all departments are:</p> <ul style="list-style-type: none"> Everyday checking of the hospitalised patients. Identification of frail elderly patients (these patients are marked in the EHR). Nurses of each department are in charge of contacting the reference internist to inform him/her about the patients. This contact is made by sending them an interconsultation. The patient is referred to the reference internist. <p>The testing is based on a one week trial where the procedures of all departments are evaluated. The fulfilment of the procedure above is analysed.</p>

Service procedure 2: Wider deployment of new role of hospital liaison nurse.

Expectations	Testing methodology
<p>The hospital liaison nurse is the main link between secondary and primary care, together with the reference internist, at hospital discharge, in order to ensure continuity of care. She/he has to notify the primary care nurse of the patient's discharge, and inform on patient's clinical assessment, drug treatment, and educational training provided.</p>	<p>All hospitals have to nominate a hospital liaison nurse who coordinates with the reference internist. The protocol performed by the hospital liaison nurse to be tested is:</p> <ul style="list-style-type: none"> Summarise the most relevant clinical activities carried out during the patient's hospitalisation. This discharge letter includes: results of clinical assessment, drug treatment, follow-up planning and health education provided. This information is registered in the EHR, so all healthcare professionals treating the patient are aware of it. Contact primary care nurse to confirm that she/he receives the discharge letter, and that continuity of care is ensured. Arrange a face-to-face visit in the GP office seven days after discharge. <p>The testing is based on a one-week trial where the procedures are evaluated by healthcare professionals of both primary and secondary care.</p>

Service procedure 3: Adaptation of existing care pathways for frail elderly patients in order to extend the role of eHealth Centre (follow-up calls).

Expectations	Testing methodology
<p>The nurses in the eHealth Centre are in charge of performing the follow-up of frail elderly patients during the weekend. When the clinician considers that the patient's health status needs to be controlled during the weekend (e.g. hospital discharge on Friday), the eHealth Centre receives a specific request from the clinician and a validated protocol is triggered.</p>	<p>The procedure agreed is tested during one week, and the results are then analysed by the project working team. The procedure consists of the following steps:</p> <ul style="list-style-type: none"> • When the clinician considers that a given patient requires a follow-up call due to his/her unstable health status (recent hospital discharge, a mild worsening of symptoms, need of health education reinforcement), the clinician notifies eHealth Centre by booking an appointment. • According to the scheduled appointment, nurses of the eHealth Centre call the patient and investigate his/her health status following a validated questionnaire. Based on the answers gathered, the actions to be taken may be different. • Nurses of the eHealth Centre register the answers collected in the CRM; these are automatically transferred to the EHR. All healthcare professionals are therefore aware of the patient's clinical assessment.

Service procedure 4: Deployment of different modalities of monitoring patients (questionnaires in Personal Health Folder and phone calls by eHealth Centre).

Expectations	Testing methodology
<p>In order to closely control patient's health status, GPs can offer different monitoring modalities. If the patient or caregiver are sufficiently skilled, and have the required technological elements (PC or mobile phone, and internet connection), monitoring via the PHR is suggested. This is based on completing a specific questionnaire hosted in the PHF.</p>	<p>The GP chooses a frail elderly patient whose profile meets the criteria explained. The testing procedure is:</p> <ul style="list-style-type: none"> • The patient and/or caregiver receive a proper explanation on how to use the PHF (a demo is carried out so the interface can be shown). In addition a user guide leaflet is given to the patient. • The GP establishes the frequency at which the patient (or caregiver) has to transmit his/her monitoring information. • Based on this frequency, the patient starts the monitoring. • Every time the patient fills in the questionnaire in the PHF, it is automatically transferred to the EHR. The GP then accesses patient's monitoring data through the EHR, and acts accordingly. <p>The project working group evaluates if the procedure has been followed as agreed.</p>
<p>When patients are not able to use the PHF for monitoring purposes, the eHealth Centre / primary care nurse are in charge of performing the monitoring of frail elderly patients. The questionnaire to be used in this process is the same as in monitoring via PHR, so the results can be</p>	<p>The procedure agreed is tested during one week, and the results are then analysed by the project working team. The procedure consists of the following steps:</p> <ul style="list-style-type: none"> • When the GP considers that a given patient has to be periodically monitored by the eHealth Centre / primary care nurses, he/she defines a follow-up call plan. • According to this plan, nurses call the patient on a regular basis, and investigate his/her health status using the validated questionnaire. Based on the



Expectations	Testing methodology
aggregated and are comparable.	answers gathered, the actions to be taken may be different. <ul style="list-style-type: none"> The answers collected are registered in the EHR, allowing all healthcare professionals to be informed.

Service procedure 5: Development of a standardised educational programme for frail elderly patients and caregivers.

Expectations	Testing methodology
Self-management is a key element in the management of frail elderly patients. A standardised educational programme for patients and caregivers has been implemented in order to improve their knowledge of their condition, symptom identification, management of their condition, and improving therapeutic adherence.	Focus group of frail elderly patients and caregivers will be set up to test the educational programme. During the focus group, the following aspects will be explored: <ul style="list-style-type: none"> Usability of the material. Understanding the messages and content. Explore the motivations of those patients and the knowledge that they have around their condition. Explore the practicability of the program in terms of time, content, tools and interest. The results of the focus group will help to improve the programme.

3.1.3 Service roll-out

There are four areas involved in care which are composed of one hospital and several primary care health centres. Although CareWell services will be implemented in all health centres, the testing procedures have been performed only with healthcare professionals belonging to specific centres (pioneers). Once the services are successfully tested and implemented in this limited environment (February-March 2014), the remaining centres (followers) will start incorporating the new services (April-May). From February to April, healthcare professionals from the second wave centres will receive an intense training in order to ensure the correct functioning of the services. By June 2015, the Basque Country expects to have all patients recruited.

3.2 Croatia

Within the CareWell healthcare service, Ericsson Mobile Health (EMH) technology will be used for automated and faster transfer of patient data between the field nurse and GP. In addition, EMH will also be used as the ICT based educational tool, that will enable field nurses to educate patients in a unified and structured manner; it will also allow patients to access the same educational content via their smartphones, using EMH Android application, or a smart TV viewer developed by Faculty of electrical engineering (FER), even after the nurse has left the patient's home.

The central point of the CareWell service will be formed around the home visits performed by field nurses, but also it will rely on patient self-education and patient empowerment.

During the patient visit, field nurses will educate patients about their diseases and healthy lifestyle, and collect vital sign measurements, based on the schedule and care plan defined by patient's GP. After the nurse has finished the patient education and collected vital sign measurements, patient data will be sent to the central storage, from where the data will be accessed by GP for analysis. Field nurse and GP will have regular and structured meetings during which they will analyse the results, and agree on changes in therapy or on activities to be performed on the following patient visit. In

between the field nurse visits, the patient and his/her caregiver will be enabled to perform self-education, using the EMH educational tool on Android smartphone or smart TV set. The patient and/or caregiver will also be able to contact the field nurse directly and ask for advice.

From the nurse perspective, implementation of the described ICT will enable field nurses to perform consultations with doctors even though they might not be in the same room or building. Consultations will be done by looking at the same data, which is currently not possible since doctors and field nurses use two separate patient records. In addition, new medical devices will be used by field nurses on a regular basis; during the CareWell pilot, field nurses will be able to record 12-lead ECG or spirometer measurements with the same quality as if the measurement was performed in a clinic. Besides automated data collection and the ability to access the field nurse patient data, regardless of time and location, nurses will now have access to standardised educational tools and content, so it will be easier for them to educate patients; this education will be of the same quality for every patient. Patients' learning curve will be much steeper, since they will have access to the education materials even when the nurse is not with them.

3.2.1 Technology adaptations

Technology adaptation 1: Adaptation of Ericsson Mobile Health (EMH) Android smartphone application to meet the requirements of both pathways, ICCP and PEHP. EMH Android application will be adapted to provide educational content, and work on tablets for ease of work and convenience of field nurses. EMH Android application for smartphones will be made easier to use, so that both patients and caregivers can use it to access the educational content, even after the nurse has left their homes.

Expectations	Testing methodology
<p>EMH Android application for tablets must be able to connect with <u>all supported medical sensors</u>, collect the data, and send it to the backend system automatically.</p> <p>Supported medical sensors: ECG, PEF, pulse oximeter, glucometer, and blood pressure monitor.</p>	<p>Protocol: Log in to EMH Android application for tablets with the visiting nurse user credentials and access the measurements functionality. Perform medical measurements using all the supported medical sensors. After the measurements have been performed, access the EMH application local storage and check for any pending measurements that were not synced with backend system automatically.</p> <p>Staff: Field nurse.</p> <p>ICT & equipment: EMH Android application, medical sensors, tablets.</p>
<p>EMH Android application for tablets must be able to show all the questionnaires defined in the backend system, and enable data input and automatic data transfer with the backend system.</p>	<p>Protocol: Log in to EMH Android application for tablets with the visiting nurse user credentials and access the questionnaires functionality. Check if all questionnaires defined in the backend system are shown on EMH Android application. Access all the questionnaires, provide input for all questions, and submit the questionnaire results to the EMH backend system. Access the EMH application local storage and check for any pending questionnaires that were not synced with backend system automatically.</p> <p>Staff: Field Nurse.</p> <p>ICT & equipment: EMH Android application, medical sensors, tablets.</p>
<p>EMH Android application, for tablets must be able to record photographs and send them to the EMH backend system.</p>	<p>Protocol: Log in to EMH Android application for tablets with the visiting nurse user credentials and access the camera functionality. Take the photo and submit to the backend system. Access the EMH</p>



Expectations	Testing methodology
	application local storage and check for any pending medical measurements that were not synced with backend system automatically. Staff: Field nurse. ICT & equipment: EMH Android application, Medical sensors, tablets.
EMH Android application for tablets and smartphones must be able to show all performed medical inputs (measurements, questionnaires, notes, photos) for the selected patient.	Protocol: Log in to EMH Android application for tablets and smartphones with the visiting nurse user credentials. Open the PHR functionality, and check if performed medical measurements and submitted questionnaires appear in the PHR viewer. Staff: Field nurse. ICT & equipment: EMH Android application, medical sensors, tablets and smartphones.
EMH Android application for tablets and smartphones must be able to play all the educational content defined in pathway requirements. Available educational content: cardio/pulmo and diabetes, disease general info, self control and prevention, therapy info, workout and nutrition.	Protocol: Log in to EMH Android application for tablets and smartphones with the visiting nurse user credentials and access the educational tool functionality. Check if all educational content is working seamlessly, check for picture and sound quality. Staff: Field nurse. ICT & equipment: EMH Android application, tablets and smartphones.
EMH Android application for tablets must enable app message exchange with the EMH backend system.	Protocol: Log in to EMH Android application for tablets with the visiting nurse user credentials and access the messaging functionality. Send an app message to the doctor and wait until you receive the feedback from doctor. This test should be performed simultaneously on EMH backend system and EMH Android application. Staff: Field nurse, GP. ICT & equipment: EMH Web viewer application, EMH Android application, tablets, PC.

Technology adaptation 2: Adaptation of EMH backend system to meet the requirements of ICCP pathway.

Expectations	Testing methodology
All medical measurement data, and related medical notes, collected during the patient home visit must be accessible through the EMH backend web application viewer.	Protocol: Log in to EMH backend web application viewer with all relevant business roles and check if results of medical measurements with related medical notes can be accessed and reviewed. Staff: Field nurse, GP. ICT & equipment: EMH Web viewer application, PC.
All EMH questionnaires filled in using the EMH android application must be accessible through the EMH backend web application viewer.	Protocol: Log in to EMH backend web application viewer with all relevant business roles and check if submitted questionnaires can be accessed and reviewed. Staff: Field nurse, GP. ICT & equipment: EMH Web viewer application, PC.



Expectations	Testing methodology
Photographs submitted by field nurses using EMH android application, and related medical notes, must be accessible through the EMH backend web application viewer.	Protocol: Log in to EMH backend web application viewer with all relevant business roles and check if photos submitted and related medical notes can be accessed and reviewed. Staff: Field nurse, GP. ICT & equipment: EMH Web viewer application, PC.
App messages sent by field nurse (using EMH Android application) should be visible in backend system. Backend system should enable GP to reply to messages received.	Protocol: Log in to EMH backend web application viewer with all relevant business roles and check if messages sent by field nurse are visible and if reply functionality is working. Staff: Field nurse, GP. ICT & equipment: EMH Web viewer application, PC.

Technology adaptation 3: Integration of EMH with doctors' application to make the collected data accessible through the doctors' standard work activities support application.

Expectations	Testing methodology
All input (photographs, questionnaires and medical measurements) submitted to EMH backend system by field nurse during the patient visit should be accessible using the standard GP application used by GPs in everyday work.	Protocol: GP should log in to both his/her standard GP application and EMH backend web viewer application. All inputs should be accessible in both GP application and EMH backend web viewer application. Staff: GP. ICT & Equipment: EMH backend system integrated with doctors application, PC.

Technology adaptation 4: FER smart TV viewer

Expectations	Testing methodology
Developers can access all EMH MN API data using the FER Home Health Smart TV.	Protocol: Testing of all ENT MN API methods Staff: FER. ICT: FER Home Health Smart TV, EMH REST API Equipment: Android set-top box.
Test users can use all the functionalities of the FER Home Health Smart TV in controlled environment without exceptions.	Protocol: Users will test all the functionalities of the FER Home Health Smart TV application. Staff: FER, test users. Equipment: Android set-top box with FER Home Health Smart TV connected to EMH.
Users can use all the functionalities of the FER Home Health Smart TV in real environment without exceptions.	Protocol: Users will test all the functionalities of the FER Home Health Smart TV application in the real environment. Staff: FER, field nurses. ICT: FER Home Health Smart TV. Equipment: Android set-top box with FER Home Health Smart TV connected to EMH.

3.2.2 Service procedures

Service procedure 1: Intervention in patient's home, medical data collection and education of patients.



Expectations	Testing methodology
<p>During the patient in-house visit, field nurses should use the CareWell specific EMH Android application for tablets to perform standard or GP specifically required medical measurements, questionnaires and photo inputs. Additionally, patient education should be performed using the educational tool functionality. The implemented ICT should be easy to use after the nurse has passed the CareWell training. The nurse should also teach the patient how to use the educational tool.</p>	<p>Field nurse should select a 'test patient' for which all activities should be performed. In the test, GP should request specific inputs from nurse by using the EMH messaging system or by inputting a note using the EMH backend system. After checking for doctor's inputs, nurse should follow the standard in-house visit procedure. Nurse needs to check if the patient has learned how to use the educational tool.</p>

Service procedure 2: Regular data review meetings between GP and field nurse and feedback (from GP) with suggested next steps in treatment.

Expectations	Testing methodology
<p>GP and nurse will have regular and structured meetings for patient medical data analysis. During the meetings, nurse and GP will analyse the medical data trends and decide on next steps in patient treatment.</p> <p>All ICT to support the data analysis and feedback should work seamlessly, and enable healthcare staff to perform their activities.</p>	<p>This test can happen in two settings, either person meeting or remote phone based meeting. Field nurse will log in to the EMH backend system web viewer and GP will log in to his/her standard application. They will compare the data stored, analyse the trends, and decide on the treatment next steps. In case of specific requirements by GP, he/she will send the information to field nurse using the EMH in-app messaging system or by inputting the note on the EMH backend system; in this way the request will be visible to the nurse during the patient visit.</p>

Service procedure 3: Call centre for psychological and medical support, on-call, for patients and caregivers. Any technical issues will also be reported to this call centre.

Expectations	Testing methodology
<p>A specific phone contact will be available to patients and caregivers during the defined hours. A designated field nurse will answer the calls, and provide solutions to the problems or forward the request to the technical team if technical issues are reported. A specific procedure must be defined for tracking of all incoming calls.</p>	<p>A test incoming call will be made to test the phone line availability, interface towards the technical support, and if procedures for tracking of all incoming calls are working.</p>

Service procedure 4: Field nurse and social worker coordination.

Expectations	Testing methodology
<p>In case the field nurse identifies the need for social care intervention, a report should be sent to the social care worker with the request for intervention.</p>	<p>Test if ICT implemented is working properly for reporting social care intervention request. Field nurse will log in to the EMH backend web viewer application, and generate the note with information of the social situation that she has witnessed. She should generate the PDF file with the note, and send it via email to the social care worker.</p>

3.2.3 Service roll-out

Service will be rolled out to all patients within the first month of the operational pilot period, which is planned for March 2015. In the deployment of the Croatian pilot site, there is only one healthcare centre involved, providing patients from five GP practices, with five field nurses delivering the service in cooperation with selected GPs. Since each patient will be visited by field nurse at least once per month, during the pilot operational period, all patients will have been visited at least once during March 2015.

3.3 LSV

Integration platform – technology and architecture

There is in Poland Integration Platform for telemedicine. This platform may improve the quality of medical services and optimise time for diagnostics and patient treatment. An additional advantage for the implementation of projects such as Telemedicine Service Centre is of a financial nature, as it reduces costs related to the provision of medical services.

Telemedicine procedures offered by the Telemedicine Service Centre consist of the workflow involved in the performance of the procedures. Today's workflow applications are supported by packages such as Business Process Manager, which provide tools, methodologies and techniques enabling the control of the whole business process management cycle. Integration platform embeds a module supporting the design and performance of telemedicine business processes, coded in BPEL (Business Process Execution Language). The operation of tasks or processes controlling a given telemedicine procedure requires that the users of the system communicate through an ergonomic computer screen interface. In advanced workflow solutions for the processing of document forms which perform the role of a user's intelligent interface with the system, specialised document form management processes are used. The design concept of IT systems in SOA (Service Oriented Architecture) provides that the main focus is given to defining services satisfying user's requirements. The concept includes a set of organisational and technical methods purported to improve the business aspects of organisation with its resources. A service is defined as any software component with may work independently from others, and having a specific interface through which it gives access to functions performed by it. The mode of work of any service is determined in its entirety by its interface, hiding implementation details that are irrelevant to the user. Service interfaces are usually defined in an abstract manner, independently from the programming platform. The services are often implemented on the basis of various technologies, and made available by independent telecommunication protocols.

Social / information platform

The Social Platform has three groups of users. The first are the end-users (consumers), i.e. the elderly, patients who wish to use the selected service via the platform. The second group consists of service providers, who offer their services through the platform. The third group are integrators which, as its name implies, are designed to integrate the end users of the service providers. It plays the role of an intermediary which takes on the task of supporting elderly patients in the use of the platform and their initial training in its use. Integrator can also negotiate the price of services and make settlement.

Social portal will be integrated with the web site of Geriatric Hospital Centre, which is dedicated to the design of CareWell. It is equipped with a mechanism to manage users, permissions, and logging and authentication of people who want to use it.

Telemonitoring system

All HIS solutions enable four core processes of telemonitoring:

- Remote data collection and reporting about a person’s health and their environment.
- Data analysis to identify adverse conditions and risks.
- Generation of alerts and notifications to a citizen’s virtual care network.
- Triggering and escalation of health and care workflows to support diagnosis and treatment.

At the same time, HIS solutions support essential administrative, maintenance and support processes, key to organising and operating remote monitoring and assistance.

So every device which will be used to get any data about patient health will send that data to Vital Monitor using Bluetooth standard (wireless). Vital Monitor is a specialised device where patients can see data received from measurements devices. Data will be presented in an easy way for patient to understand. For Vital Monitor, in some cases we can use smart devices with appropriate software. Vital Monitor will send data to HIS Portal by HIS gateway using GPRS/UMTS communication standard. If a connection cannot be established, then the data will be store in internal memory of Vital Monitor, and wait to be sent when access to HIS gateway is possible.

The telemonitoring service involves the following: patients, diagnostic devices, medical terminals, telemedicine platform and medical systems, such as HIS, EMR or EHR. The patient is outside a static treatment medical unit. Diagnostic devices may be devices for home or mobile examination to perform tests at home. A medical terminal records patient’s vital parameters, and sends them to a telemedicine platform. The telemedicine platform is an IT infrastructure in which a workflow system of telemedicine services has been implemented. An important task of the telemedicine platform is the integration of diagnostic device subsystems to transmit and process electronic medical documentation in a safe way. A schematic diagram of the technical telemedicine services for the area of cardiology is presented in Figure 2.

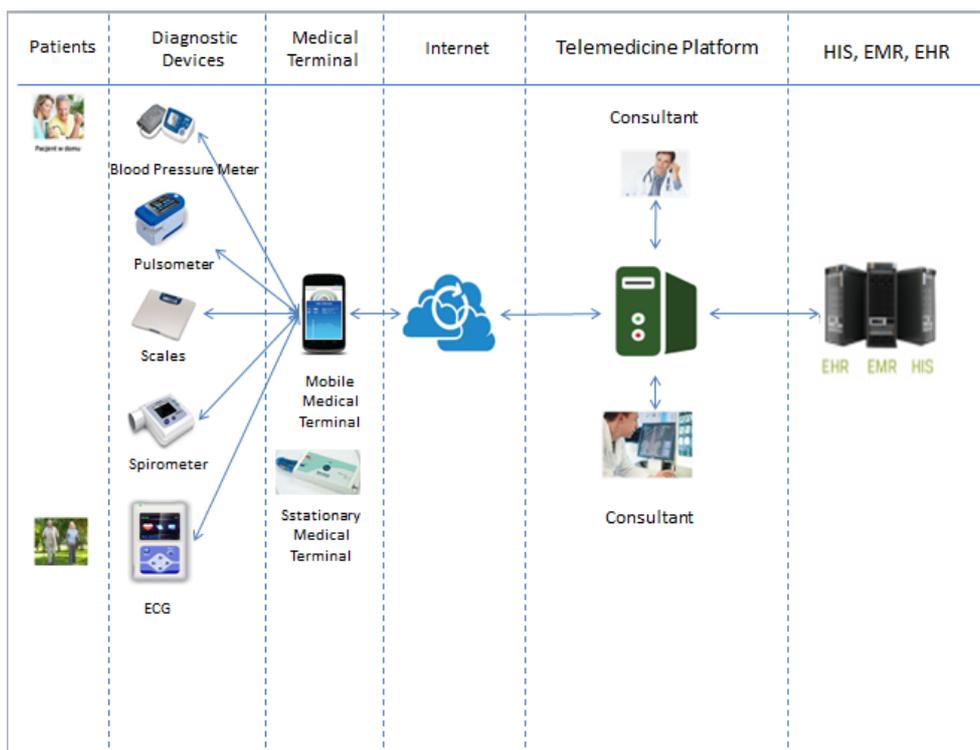


Figure 2: The infrastructure of a telemedicine solution

The patient receives the measuring equipment, manuals and direct contacts, i.e. telephone number of the nurse coordinating the CareWell project, the Contact Centre, and the patient's doctor. Training of the patient is carried out in an outpatient setting (before allowing home telemonitoring) in the telecare service procedure using telemedicine equipment provided. When the patient is a dependent person, i.e. has a guardian, the guardian also receives training.

The first thing should be to register patient's health condition according to Barthel scale using nurse questionnaire. The value recorded from this questionnaire will be the baseline for comparison with the next values recorded in subsequent surveys during telemonitoring at home.

The patient's vital parameters to be monitored, such as the cardiac rhythm, blood pressure, saturation, etc., depend on the medical requirements.

Diagnostic facilities applied in telemedicine procedures should be supplied with mobile communication features, such as Wi-Fi, Bluetooth and NFC.

A scenario of telemedicine services for the monitoring of patient's vital parameters consists of an iterative performance of the following tasks:

1. The patient, supplied with a diagnostic device, performs a test at home by themselves.
2. The test result is transmitted to a telemedicine centre in an automatic and safe way.
3. The telemedicine centre stores the received test results, and produces a test consultation task which is notified to a consulting doctor.
4. The consulting doctor reviews the received test results and sends recommendations to the patient.
5. The patient receives the consultation results.

Before and after a long-term monitoring process, tasks for the development of electronic medical documentation (EMD) of the patient are often performed. In the course of the monitoring process, communication messages may be sent via SMS or email, or alarms in order to call the ambulance. An example of the procedure for cardiology monitoring process is presented in Figure 3.

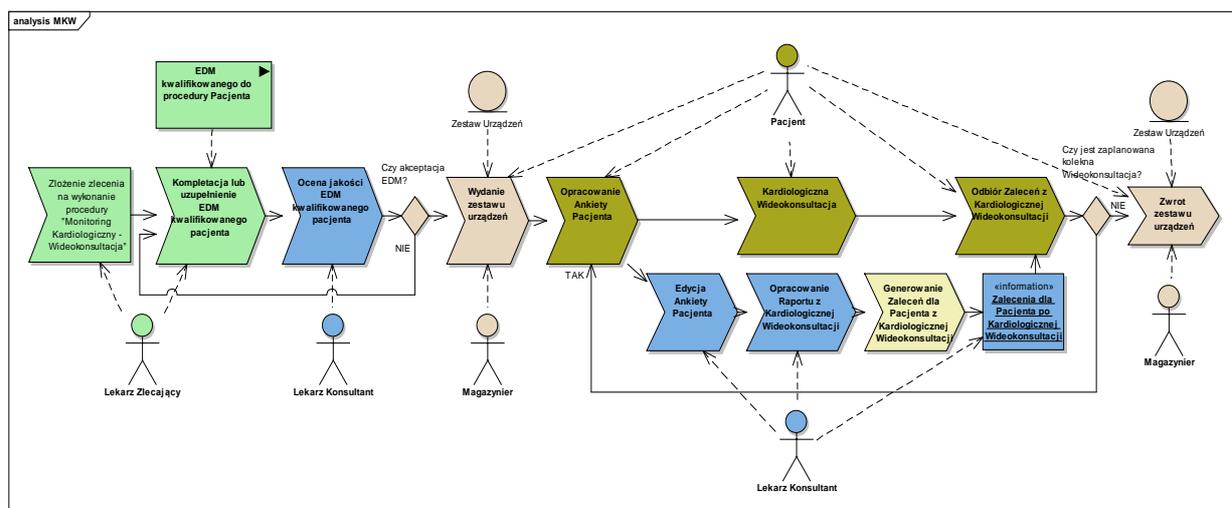


Figure 3: Example of the procedure for cardiology monitoring process

Telemedicine procedures may be classified into the following classes characteristic of the same organisational system of workflow, for instance, telemonitoring, telerehabilitation, teleconsultation, etc. Any of these classes is served by a dedicate telemedicine business process that coordinates the actions of the actors involved in its performance. Various types of telemonitoring may occur within the framework of a given class, depending on



assumed medical diagnostic tasks. Diagnostic tasks define the type of monitored vital parameters, collected medical documents, and analytic tools supporting the decision making process by the consulting doctor.

The proposed solution consists of the implementation of currently applied procedures and telemedicine services into the telemedicine platform with their optimisation. The process involves users (medical units) and developed medical procedure models which are applied in the medical unit. Next, a team of IT specialists implements the models on the platform and puts them into operation. A period for consultations is also required in order to examine diagnostic devices used by the medical unit. Where modern equipment with data transmission is used, its application in the telemedicine system is not a problem. In the event that older devices without data transmission modules are used, it is necessary to supply such devices with additional modules / equipment. Where additional equipment or diagnostic devices need to be purchased, we offer our advice and cost optimisation in the selection of proper telemedicine equipment. For this purpose we perform the following:

1. Consultations with users (the development of the list of procedures, equipment, specialists and personnel).
2. Developing the models of currently applied medical procedures.
3. Developing the models of new medical procedures.
4. Adjusting the equipment to the requirements of the telemedicine platform.
5. Implementation of procedure models on IntegraTIS platform.
6. Development of relevant documentation.
7. Putting the system into operation.

3.3.1 Technology adaptations

Technology adaptation 1: Adapt CareWell telemonitoring system to cooperate with Integration Platform.

Expectations	Testing methodology
All measurement data should be available on Vital Monitor. Supported devices: blood pressure meter, weight scale, pulse oxymeter, ECG, glucometer.	Protocol: Install measurement devices with patient and run Vital Monitor. Then connect with installed devices and get sample of data. Staff: Environmental nurse. ICT & equipment: Vital Monitor, supported medical devices.
Data received from devices should correspond with real state of patient. Supported devices: blood pressure meter, weight scale, pulse oxymeter, ECG, glucometer.	Protocol: Receive all types of measurable data, and compare with the data obtained in the normal way. Result of comparison should be acceptable by medical expert. Staff: Environmental nurse & GP. ICT & equipment: Vital monitor, supported medical devices, standard medical devices which correspond with supported devices.
Data from Vital Monitor should be successfully sent to HIS portal v3.0.	Protocol: Make a few attempts to collect data from measurement devices, and then make sure that all data are available on HIS Portal v3.0. Protocol for this communication should be GPRS/UMTS, so no problem with access to internet should be happen. Staff: Environmental nurse. ICT & equipment: Vital Monitor, laptop / tablet with access to HIS Portal v3.0.



Technology adaptation 2: Adapt Integration Platform to support two defined CareWell health care processes.

Expectations	Testing methodology
<p>Telemonitoring for ambulatory hospital care procedure should be supported by this platform</p>	<p>Protocol: Make a test run where all tasks will be visited and validated. All rules should also be verified during test run. Algorithm to detect health threats by analysis of collected data should work and be tested. Staff: Environmental nurse. ICT & equipment: laptop / tablet with access to Integration Platform.</p>
<p>LSV telemonitoring for home care procedure should be supported by this platform. This procedure should provide functionality to support incident actions.</p>	<p>Protocol: Make a test run where all tasks will be visited and validated. All rules should also be verified during test run. Verify support for incident actions, by running many times in different way. Algorithm to detect health threat by analysis of collected data should work and be tested. When threats are detected, then proper medical support should be inform. Staff: Environmental nurse. ICT & equipment: laptop/tablet with access to Integration Platform.</p>
<p>System should allow access to defined task only. Users should only see needed information after login. Patient should have access to his account where he can see current status of his health.</p>	<p>Protocol: All user' roles are correctly protected by authentication and authorisation. Data from HIS can be imported to this system. Staff: Environmental nurse. ICT & equipment: laptop / tablet with access to Integration Platform.</p>

Technology adaptation 3: Adapt CareWell Information Portal to cooperate with Integration Platform.

Expectations	Testing methodology
<p>Information portal has needed information for first contact with new healthcare system, and user has easy access to all healthcare services</p>	<p>Protocol: Content and navigation on the portal should be intuitive for typical patient; make a test where 10 patients after first contact with portal submit a proper survey. Access to all new healthcare services should be available. Staff: Environmental nurse & testers (sample of 10 persons in patient role). ICT & equipment: laptop / tablet with access to Information Platform.</p>
<p>Portal should be available on many different types of devices.</p>	<p>Protocol: Test this portal on PC, laptop, mobile phone, tablet. Each test should be run in some kind of environment, e.g. different operation system. Staff: Testers. ICT & equipment: different type of devices where we can get access to information portal.</p>

3.3.2 Service procedures

Service procedure 1: LSV telemonitoring for ambulatory hospital care.

Expectations	Testing methodology
Procedure can provide services to support medical care in hospital, where patient will be under system care by automatic analysis of data entered by medical personnel	All defined steps, data, forms, users should work during test run by testers.
GP and nurse have easy access to all patient history, including all data collected from medical devices.	Checking if during test run GP and nurse have access to patient's data and its analysis.

Service procedure 2: LSV telemonitoring for home care.

Expectations	Testing methodology
Procedure can provide services for home care telemonitoring, where patient in home will be under hospital care. All biometric data will be collect in an easy way, and sent to hospital, where data will be analysed to detect any health threat.	All defined steps, data, forms, users should work during test run by testers. Nurses and medical support can run process where they can import data from local HIS.
From patient perspective, information portal, medical devices and Vital Monitor are easy to use.	Patient after short training should be able to use procedure in the correct way.

3.3.3 Service roll-out

LSV CareWell platform services are dedicated to the newly created Geriatric Centre. LSV pilot site will respond to the final opinion survey regarding the effectiveness of each of the interventions in the Platform. Depending on the survey results, we will recommend roll-out of each of the actions across regional hospital sites. Overall, if the evaluation is positive, and no intervention is felt to be "not effective", the majority of respondents would recommend roll-out of the Platform to all hospitals, with the proviso that it should be tailored to meet the needs of patients.

3.4 Veneto

In the Veneto pilot site, CareWell will enable the activation of several innovative services:

- 1. Interconsultations via electronic health record:** Healthcare professionals will be able to make consultations via the electronic care record.

This change will include consultants, specialists and GPs. Healthcare professionals are able to inform themselves more quickly about the patient, and increases their confidence when making decisions.

- 2. Medical consultation via videoconference:** Consultations could be made via videoconference. This change will affect consultants and specialists, patients, primary care professionals and home care nurses. This will improve communication between healthcare professionals, avoiding the need for a referral. Patients will be able to reduce travel for appointments.

- 3. Monitoring undertaken by a nurse:** Monitoring of the patient, done by nurses at the patient's home, will be introduced. The results of monitoring will then be directly shared via the Territorial ICT system so all relevant healthcare professionals will be able to access measurements of the patient's clinical parameters. This change will



affect specialist and consultants, home care nurses, and primary care professionals. Amongst the benefits, the patient and informal carer will feel supported. Healthcare professionals will be kept informed of the patient’s status and progress.

- 4. Education by nurses in conjunction with monitoring:** When a care plan is assigned to a patient, the homecare nurse’s tasks will be comprehensive and include delivery of educational and training on disease management in conjunction with monitoring activities. This change will include patients, homecare nurses, GPs. The patients will have a clearer vision of their own health status; in fact they will be able to recognise risk conditions. The patient will feel secure in managing their condition.
- 5. Web-based educational material:** A specific part of the ULSS 2 authority website will be created for educational materials to aid patients' self-management. Inclusion on ULSS 2 authority website means that patients will trust the information, as it comes from an authority. Patients will be more confident about self-management of their conditions.
- 6. My Health Portal:** Patients entering health information. Patients will be able to enter a dedicated portal on the ULSS 2 website called My Health Portal, where they will be able to insert information, find information, download results of tests, and book appointments. Patients will be actively involved in the healthcare process.
- 7. Territorial ICT system:** Sharing of action plan for developing self-management in patients. The Territorial ICT system will allow healthcare professionals to share plans developed to monitor parameters and self-management education. Thus efforts to empower patients will be reinforced and supported by various health professionals in a patient’s care plan. This change will affect GPs, homecare nurses, specialists and consultants, social workers, and ward assistants. This functionality will avoid contradictory messages, and reinforce support to encourage patient self-management and empowerment.

3.4.1 Technology adaptations

Technology adaptation 1: Telemonitoring will be provided through the nurse at patient's home. A PC and some specific medical devices will be provided to the nurse. The medical devices will be used to measure the clinical data of the patient, and send the results to the PC. The data monitored will be shared via EHR with all relevant professionals.

Expectations	Testing methodology
All medical devices must be able to connect with the PC, the PC must collect the data sent by the medical devices, and send them to the backend system.	Protocol: Perform the measurement with a “test user” using the medical devices. After the measurements have been performed, access the application for local storage and check if all measurements are stored. Staff: Homecare nurse. ICT & Equipment: PC, medical devices.
The backend system must be able to show all medical inputs performed for the selected patient.	Protocol: Perform the measurement with a “test user” using the medical devices. After the measurements have been performed, access the application for local storage and check if all measurements are stored. Staff: Homecare nurse. ICT & equipment: PC, medical devices.

Technology adaptation 2: Adapt EHR to meet the requirements of ICCP pathway and allow the interconsultation between different professionals.



Expectations	Testing methodology
All input submitted to EHR from all actors involved in the care of the patients should be accessible using the standard GP application.	Protocol: All input should be accessible in EHR by GP, nurse and specialists. Staff: all professionals involved in the care of the patients. ICT & equipment: EHR.

3.4.2 Service procedures

Service procedure 1: Telemonitoring undertaken by nurse and education by nurses in conjunction with monitoring.

Expectations	Testing methodology
During the patient’s home visit, nurses should use medical devices and send clinical data to PC. Home nurses have to register their activities on backend system; in addition, they should provide education to improve the empowerment of patients about their conditions.	Home nurse should select a ‘test patient’ to performed all activities. In the test, nurse should consult the clinical plan of the patient provide by the referent clinicians. After checking for doctor's input, nurse should perform the request measurements, and send the data collected to EHR.

Service procedure 2: Access to EHR for GPs, specialists, nurses, social assistant and data interconsultation via EHR.

Expectations	Testing methodology
All professionals involved in the patients’ care should have access to EHR and consult clinical and social data of patients. All professionals should view all the activities being performed by other health and social care professionals for their patients.	A test for the log in to the EHR will be performed using a “test user” with different profiles (GP, home nurse, social worker, etc.). Once logged in, it will be checked if different actors see the correct information.
All users that will access EHR should have the possibility to make interconsultations via EHR with other professions.	Two different “test users” with different profiles (GP, home nurse, social worker, etc.) will be used to access EHR. Once logged in, it will be checked if the “test user A” can make a consultation with a “test user B”, and vice versa.

Service procedure 3: Medical consultation via videoconference.

Expectations	Testing methodology
During the home visit, the nurse could need to have a videoconference with a specialists using their personal PC and internet connection.	A test with the PCs of nurses and specialists will be made to check the operation of the internet connection, microphone and webcam. The videoconference will be done using Skype, so the following steps will be verified: <ul style="list-style-type: none"> • if the download of Skype app can be done for all PCs; • if all the nurses and specialists have their own credentials to enter Skype.

Service procedure 4: Consultation of educational and personal material via web site.



Expectations	Testing methodology
The patient has the possibility to access the LHA2 web portal, download the educational material, and upload personal information	With a "test user", a log in to the web portal will be done, and the procedure of download and upload will be checked.

3.4.3 Service roll-out

At ULSS N.2, there is only one healthcare centre, which is the hospital located in Feltre. The territory is divided into three main areas (called AFT – Territorial and Functional aggregation) that group municipalities, GPs and the home nursing services. The roll-out will start with one of these three areas, in which the pathway and all the services related to it will be tested. Once validated in one of the three AFTs, the services and system will be tested in the others within a month.

3.5 Puglia

Patients in Puglia are currently cared for by their GP in collaboration with nurses and specialists; information is shared by phone. Patients with complex needs are case managed in Care Puglia Programme by a primary care specialist nurse (CM) who uses the Integrated EHR to record and share information with other relevant members of the care team. Telemonitoring of patients with heart disease is available, and emergency or specialist services can be activated by the GP through the CM and/or telemonitoring.

During CareWell deployment, several innovations will be introduced from an organisational point of view, supported by technological adaptations. Telemonitoring will be extended to measure blood pressure, weight, oxygen and blood glucose, using devices at patient's home related to already existing "Nardino" platform. This implies that technological adaptations need to create an interface between the devices hub software and EHR. EHR will be enriched with more clinical information, and a warning system for out-of-range variables will be put in place to alert CM and, if necessary, GP and specialist, or A&E department. Thanks to the project, integrated pathways will be enhanced with more active specialist participation (primary care specialist and hospital specialist). Each professional (also specialists) will be able to consult and update patient's information, upload reports, etc. by accessing EHR with their weak or strong authentication. Members of the care plan could also join a community on the EHR platform to discuss specific patients and work in a more integrated manner. Each professional engaged in the patient clinical management will participate in periodic and planned briefings via videoconference to assess the general clinical status of patients, according to a specific protocol agreed with the quality team. Automatic recall procedures (e.g. therapeutic reminder) managed by the platform according to a specific care plan, will flow towards the hub sited at patient's home as an addition service that will be rolled out to support patient empowerment. In addition, patients could contact CM by phone or, as a new service, by SMS, at defined times of the day, to ask for explanations on therapy, communicate symptoms, etc., according to a protocol. They can also send photos (to monitor for example diabetic wounds) to CM; images will be uploaded later by CM so that they can be shared with all the care team through EHR. All these services need to be tested as reported below with support of quality and installation team.

3.5.1 Technology adaptations

Technology adaptation 1: platform adaptation to receive clinical parameters from home monitoring; interface creation between device hub software and EHR.



Expectations	Testing methodology
No problems during the clinical data transmission from devices to the platform.	The care manager selects a "test patient" to plan an installation team visit (maximum two members of the team); the installation team checks on site devices connectivity with the hub and the platform, testing 3G/LTE (where available) mobile network and land-line phone connection. Afterwards, device functioning explanation follows and a transmission of the patient clinic parameters takes place with nurse / care manager support. At the end, a check on the clinical data registration in EHR is done.

Technology adaptation 2: creation of specific access profiles for Care Managers, GPs, specialists in outpatients clinics / in hospital.

Expectations	Testing methodology
Each health professional will be able to consult and update patient's information, each according to their profile and specific competences, by accessing EHR with their weak or strong authentication. Depending on access login information, they can join the community of health professional users of the platform to discuss specific clinical problems.	Installation team can plan a test procedure to simulate the inter consultation on EHR through different working stations using temporary log in information. Test will include check on transmission of clinic parameters from devices at patient's home and on the community functionality of information exchange.

Technology adaptation 3: medical consultation via videoconference.

Expectations	Testing methodology
Additional Skype videoconference consultations on patients' clinical status can be performed.	Installation team can support a test procedure to simulate a medical consultation via videoconference involving care manager, GP and the related specialist. Check on the broadcast quality.

Technology adaptation 4: therapeutic recall procedure and messaging between patients and health professionals.

Expectations	Testing methodology
Automatic recall procedures (e.g. therapeutic reminder) managed from the platform according to a specific care plan will flow towards the hub sited at patient's home. SMS from patients to health professionals would be used to ask for explanations on therapy, communicate symptoms, etc., according to a protocol.	Installation team can plan a test procedure to assess the therapeutic reminder functionality during the installation visit at patient's home, and to verify the availability of a mobile telephone with messaging service to support communication towards CM.

3.5.2 Service procedures

Service procedure 1: patients' home monitoring.



Expectations	Testing methodology
<p>During the installation team's visit to patient home, the CM, trained by the installation team, supports patient in performing the required medical measurements using the devices. The procedure should be very simple thanks to a very user friendly device interface, a clear protocol to support use, and a simulation with the help of the nurse. The presence of an additional person (a relative / care giver) is also recommended.</p>	<p>The care manager selects a "test patient" to plan the installation team visit (maximum two member of the team); after the connectivity check, explanation of device functioning follows, and a real transmission of the patient clinical parameters takes place with nurse / CM support. At the end, a check on the clinical data registration on EHR is done.</p>

Service procedure 2: inter consultation through EHR.

Expectations	Testing methodology
<p>Thanks to EHR and a system of warnings related to "out-of-range", CM will be able to monitor specific patients' conditions, having access to parameters sent from home, to alert GP if necessary.</p> <p>It is responsibility of GP to ask for the related specialist intervention, or vice versa (the specialist asks for GP intervention). Each professional will be able to consult and update patient's information by access EHR with their weak or strong authentication.</p>	<p>Installation team can plan a test procedure and simulate an inter consultation on EHR involving CM, GP and the related specialist. Check on possibility to read and update clinical information, and on the procedure duration and quality assessment.</p>

Service procedure 3: medical consultation via videoconference.

Expectations	Testing methodology
<p>Each professional engaged in the patient clinical management will join periodic and planned briefings via videoconference to assess the general clinical status of patients, according to a specific protocol agreed with the quality team. Procedures to activate medical consultation via videoconference any time they are necessary will be defined.</p>	<p>Quality team can plan a test procedure to assess the medical consultation via videoconference procedure, according to the protocol agreed with CM, GP and the related specialist. A member of the quality team could also join the periodic briefing on the general clinical status of patients.</p>

Service procedure 4: therapeutic recall procedure and messaging between patients and health professionals.

Expectations	Testing methodology
<p>Additional recall procedures and messaging between patients and health professionals will be defined, agreed with the quality team and outlined in a protocol. Automatic procedures managed from the platform will support patients to self-manage their pathology. Patients will be educated by CM to respect a specific protocol in messaging activity.</p>	<p>Quality team will assess the automatic therapeutic recall procedure, asking patients to monitor the therapeutic adherence through CMs. The quality team will verify that patient has real knowledge of messaging protocol, interviewing patient and CMs on the matter.</p>

3.5.3 Service roll-out

At the end of January, creation of interface between device hub software and EHR is almost completed, procurement procedures are finished, the first set of devices is already available, and next shipment (30 kits) is planned for 10th February. We are going to test, first in AReS, then on site, adaptation of platform to receive clinical parameters from home monitoring. Service procedures in Campi Salentina Health district will be developed first in Carmiano's chronic outpatient clinic, where test procedures will be completed on 15th February 2015. On 23rd January, three members of the quality team visited Carmiano outpatients clinic and two chronic outpatients clinics in Veglie ("Veglie1", "Veglie2"). There they met care managers, primary care specialists, and GPs, explained the proposed pilot site operations, including enrolment criteria and telemonitoring procedures, and introduced the possibility to link up, if necessary, with hospital specialists in Panico general hospital in the health districts of Lecce. On 13th January, CareWell scientific committee, together with members of the quality and the installation team, met tertiary hospitals (Miulli and Casa Sollievo della Sofferenza) and general hospital (Panico) top management to share CareWell goals, explain the need to involve hospital specialists in EHR management, describe new services to develop, and received their consensus. All test procedures will be completed by the end of February, including additional training of CMs on devices usage, so that, at the beginning of March, enrolment phase can start (procedures to select eligible patients according to the protocol are still in place). Test procedures in Veglie1 and Veglie2 outpatients clinics will be completed by 28th February. Timing for service roll out will come from enrolment phase, managed by the 12 GPs in Campi Health district. Quality team will manage training sessions for CMs, and the shipping procedures from devices company to A.Re.S, and from A.Re.S to pilot site (next shipments on 1st April and 15th May); they will also monitor enrolment trend in order to plan installation team visits to patient's home, etc.

3.6 Powys

All improvements carried out by Powys have been focused on the technology used by CareWell services in Integrated Care and Coordination pathway and Patient Empowerment and Home Support Pathway. Not only has coordination between practitioners been enhanced, but also the services for patient's follow-up and empowerment.

3.6.1 Technology adaptations

There are six local GP pilot sites; each pilot site is undertaking a readiness assessment using a Self-Assessment Framework tool, from which practices will develop local actions plans according to the maturity of system implementation by pilot site. This approach has been taken as the technology currently available to practices and the new adaptations are not mandatory, and pilot sites are each working from a different baseline.

Technology adaptation 1:

CareWell patients will be highlighted through the Individual Health Record (IHR) to the out-of-hours GP service on a view-only basis, thus improving communications with the out-of-hours service. Access to the IHR will be extended during the lifetime of the project.



Expectations	Testing methodology
Widen access to the IHR within community nursing / therapist services (ICCP). Flag high risk patients via IHR: CareWell patients will be flagged within the existing out-of-hours GP service.	Protocol: GP practice to create a special instruction / flag to allow the out-of-hours team to be aware that the patients are CareWell patients. OOH service to log into IHR system to confirm that the flagging system has worked appropriately. Staff: OOH, GP practices. ICT & equipment: Access to IHR.

Technology adaptation 2:

Microsoft Lync (MS Lync) is planned for delivery by NWIS across Powys from April 2015. Powys will also procure access to MS Lync for GP practices to enable its use across the MDT in CareWell.

Expectations	Testing methodology
Videoconferencing to be available from April 2015 for use within the community nursing teams. (ICCP) To improve mobile productivity, voice, video and messaging will enable the HCP to collaborate with colleagues in real time around their patients/caseloads.	Protocol: Log in to the MS Lync client. Test use of voice, video and messaging functionality between test clients. Testing will be undertaken on both desktop computers or mobile devices. Staff: Community, specialist nurses, GPs and patients. ICT & equipment: MS Lync client and licence. Mobile device / desktop computer. Headsets and web camera.

Technology adaptation 3:

The up-scaled use of the Welsh Clinical Communication Gateway (WCCG) will increase referral activity from primary care to secondary care to enable improved and consistent communication with reduced delays in referrals. In some areas, the gateway will also be the vehicle for discharge information back to the practice. Cross border issues are a particular area of concern in Powys, and referrals from primary care in Wales to secondary care in England need to be considered alongside the WCCG.

Expectations	Testing methodology
Referrals from primary care to secondary care via WCCG to enable improved and consistent communication (ICCP). Increased use of WCCG for e-referrals with expanded scope of WCCG functionality.	Protocol: Test patient referral from submission at GP end to receipt at Hospital end. Staff: GP practice, hospital administration staff. ICT & equipment: WCCG installed at GP practice and at hospital sites. Practice migrated to new web based GP systems.

Technology adaptation 4:

Patient led monitoring in EHR: A key part of the CareWell programme; devices and vital signs to be monitored will be defined with the engagement of practices and patients.



Expectations	Testing methodology
Establishing a mechanism for electronic submission of patient-generated monitoring information to feed into his/her electronic health record (PEHP). The messaging service for self monitoring may or may not require being fed back into the patient record manually by admin staff.	Protocol: Test quality of data within APP, compare against existing BP / pulse oximetry / blood sugar recording tools. Staff: Patient, community & specialist nurses, GP practices. ICT & equipment: TBC – APP.

Technology adaptation 5:

All CareWell patients will register with My Health Online (MHOL). Electronic registration to MHOL will be introduced together with a help-desk.

Expectations	Testing methodology
MHOL will enable the patient to update their details, book on-line appointments, and order repeat prescriptions (PEHP). Increased use of MHOL with expanded scope of functionality to include free text reminders & messaging to GPs.	Protocol: Test each of the individual functions from the patient and GP practice perspective. Staff: Patients, GP practices. ICT & equipment: MHOL installed on GP practice ICT equipment. Practice migrated to new web based GP systems.

Technology adaptation 6:

The approach that has been adopted is to promote mobile working as a more generic process, rather than selecting one product line. Powys will invest in portable hardware technology to promote mobile working for use by community nurses and GPs to access the patient EHR and other systems away from base.

Expectations	Testing methodology
Mobile working for use by community nurses to access the patient record in patient's home on home visits (PEHP).	Protocol: Testing that required applications are installed, accessible and workable from various settings. Test VPN token and WiFi access / security with assistance of IT Department. Staff: GP practices, community & specialist nurses. ICT & equipment: Procure ICT devices as per GP specification via primary care, out of the National Framework. ICT device configuration with installation of appropriate applications. VPN token. ICT skills training through Workforce Development team if required.

Technology adaptation 7:

Practice websites will be expanded to include standard Patient self-help information with regard to the patient's chronic conditions. Some areas of good practice have already been identified at individual practice level; these will be shared and profiled within a wider review and update of patient education web-based tools to standardise the approach within the pathway.

Expectations	Testing methodology
Web based education material for patient and care givers (PEHP).	Protocol: Test to ensure that the web links are fully accessible to patient. Staff: Patient, specialist nurses, community nurses. ICT & equipment: N/A



3.6.2 Service roll-out

There are six local GP pilot sites, each pilot site is undertaking a readiness assessment using a Self-Assessment Framework tool, from which practices will develop local actions plans according to the maturity of system implementation by pilot site. This approach has been taken as the technology currently available to practices and the new adaptations are not mandatory, and pilot sites are each working from a different baseline.



4. Next steps

The testing of CareWell service procedures and the adapted technology are the next step before the pilot operation phase. Once the testing results reach expected results, irrespective of the corrective actions required, the implementation of the services will be carried out. This service deployment is a staggered process, meaning that services are introduced into the routine practice one by one, in order to ensure a successful process completion. Once the healthcare professionals are trained according to the protocols defined by each pilot site, patient recruitment will start and the CareWell integrated care pathways will be considered fully active.