



# C3-Cloud

## “A Federated Collaborative Care Cure Cloud Architecture for Addressing the Needs of Multi-morbidity and Managing Poly-pharmacy”

**PRIORITY Objective H2020-PHC-25-2015 - Advanced ICT systems and services for integrated care**

### D8.1 Use Cases and Requirements Specifications of the Pilot Application

*Work Package:* WP8 C3-Cloud Pilot Application Development & Deployment

*Due Date:* 31 August 2016

*Actual Submission Date:* 29 August 2016

*Project Dates:* Project Start Date: 01 May 2016  
Project End Date: 30 April 2020  
Project Duration: 48 months

*Deliverable Leader:* RJH

Project funded by the European Commission within the Horizon 2020 Programme (2014-2020)		
Dissemination Level		
PU	Public	X
CO	Confidential, only for members of the consortium (including the Commission Services)	
EU-RES	Classified Information: RESTREINT UE (Commission Decision 2005/444/EC)	
EU-CON	Classified Information: CONFIDENTIEL UE (Commission Decision 2005/444/EC)	
EU-SEC	Classified Information: SECRET UE (Commission Decision 2005/444/EC)	

**Document History:**

Version	Date	Changes	From	Review
V0.1	2016-05-11	Initial Document	ORU	All Consortium
V0.2	2016-06-29	4.1.2, 5.1 and 5.2 added	RJH/KG/ OSAKIDETZA	All Consortium
V0.3	2016-07-01	Restructuring of the overall document with introduction of new sections and update of existing ones.	SRDC	All Consortium
V0.4	2016-08-26	Merging input from different partners and answers to raised questions, minor structural changes. Adding list of definitions, abbreviations and executive summary and PAR-57 to PAR-60 (section 5) and moved PDFs etc. to the addendum (section 7)	RJH	All Consortium
V0.5	2016-08-26	SRDC Review	SRDC	All Consortium
V0.6	2016-08-28	Quality review of all the document and extensive revisions to the descriptions of the ICT landscape in RJH.	ORU	RJH and Warwick
V0.7	2016-08-28	Merging input from SWFT, and finalising deliverable	WARWICK	RJH
V1.0	2016-08-29	Final deliverable	RJH	

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## **EXECUTIVE SUMMARY**

The aim of the deliverable D8.1 was to identify the clinical and personal needs for patients, their families and their care givers to improve the care of multi-morbid patients. The work has been performed at the three pilot sites in Spain, Sweden and the U.K. via the collaboration of local multi-disciplinary team members and patients and with the use of patient scenarios. The work has also been performed in close collaboration with all C3-Cloud consortium, especially with Task 3.2 members.

From the scenarios, 60 different Pilot Application user Requirements (PAR) have been identified that have been mapped to different required high level components; Patient Empowerment Platform (PEP), Personalized Care Plan Development Platform (PCPDP), Coordinated Care and Cure Delivery Platform (C3DP), Technical Interoperability Suite, Semantic Interoperability Suite, Clinical Decision Support Modules, Security and Privacy Suite, and in some cases to already existing local care systems.

To this, the actual IT landscape at each pilot site has also been mapped and described, thus enabling the development of use cases and requirements for the pilot site application in the different regions.

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# 1 DOCUMENT OVERVIEW

## 1.1 Purpose of task from Description of Action

The purpose of Task 8.1 is to develop Requirements and Use Cases of C3-Cloud Pilot Application.

Leader: RJH, Strongly involved: SWFT, OSAKI

This task bridges the conceptual and operational details, with the technical requirements and further specification of C3-Cloud. This establishes a link between implementation and the clinical needs, which will be monitored throughout the duration of the project. The current application landscape of the end-users describing the as-is situation for predictive risk assessment, multi-morbid chronic disease management, case management by multidisciplinary teams, patient empowerment approaches will be documented. Then the detailed use case scenarios of C3-Cloud for coordinated patient-centred care will be developed with involvement of 30 MDT members and 15 patients as a part of layer 1 evaluation; i.e. user-centred design.

## 1.2 Methodology

The methodology of this task has been to use scenarios capturing the intended use of C3-Cloud, as the basis to extract and elicit requirements. The scenarios have been developed by multidisciplinary team members' and patients together in a series of workshops, and through patient interviews (see Section 7.1) at the three pilot sites separately, reflecting local characteristics of care. The concurrent work of Task 3.2 and of Task 8.1 have had a 2-way relationship with Task 3.2 adding specificity to the scenarios if there has been ambiguity on operation, and Task 8.1 evaluating completeness of the use cases in Task 3.2, but also identifying new scenarios if necessary. The scenarios presented in the Description of Action (DoA) formed the basis of the development of scenarios, and these were complemented with further descriptions and diagrams. An attempt to catch flows of information and flows of responsibility was then made.

For the deliverable, the use case scenarios in local languages was translated into English and harmonized into common requirements. From the scenario descriptions, formal pilot user requirements were extracted which will be a basis for the finalisation of the more elaborated use case descriptions of Task 3.2 to be finalised after Task 8.1.

An additional task was to document the current application landscape of the end-users describing the as-is situation for predictive risk assessment, multi-morbid chronic disease management, case management by multidisciplinary teams, patient empowerment approaches at each pilot site. This was done by IT staff at pilot sites.

## 1.3 Reference documents

The following documents were used or referenced in the development of this document:

- C3-Cloud Description of Action (DOA)
- Mary Beth Rosson and John M. Carroll. Scenario based design. Chapter 53 in J. Jacko & A. Sears (Eds.), *The Human-Computer Interaction Handbook: Fundamentals, Evolving Technologies and Emerging Applications*. Lawrence Erlbaum Associates, 2002, pp. 1032-1050.

## 1.4 Definitions and Acronyms

### 1.4.1 Definitions

**Care Plan:** Dynamic, personalized plan including identified needed healthcare activity, health objectives and healthcare goals, relating to one or more specified health issues in a healthcare process.

**Clinical Decision Support Modules (CDSM):** Reusable Clinical Decision Support Modules that are necessary for personalised care plan development and execution. Different types of CDSMs are targeted to be built in C3-Cloud including:

- Patient risk stratification
- Suggest the set of risk factors, based on the current conditions of the patient
- Reconcile multiple treatment plans to create an integrated care plan, personalise care plans according to patient data
- Manage poly-pharmacy
  - like Beer's list, FORTA, Drug Burden Index, START and STOPP criteria
  - indicate contraindications across multiple treatment plans due to drug-drug, drug-disease and drug-body part interactions
  - measure the burden of exposure to multiple drugs, by exploiting the principles of pharmacokinetics (e.g., dose) and pharmacodynamics (e.g., dose response, maximal effect)
- Indicate contraindications across multiple treatment plans
- Identify disease stage
- Monitoring care plan results
- Detect deviations from the outcome goals
- Monitor treatment continuously to realize benefit-risk assessment of drugs to ensure the drugs are producing the intended effects, remain appropriate and to detect any medicine-related problems as soon as possible

**Clinical Guideline:** Set of systematically developed statements to assist the decisions made by healthcare actors about healthcare activities to be performed with regard to specified health issues.

**Coordinated Care and Cure Delivery Platform (C3DP):** A platform to support collaborative execution of care plans for chronic conditions over a prolonged period of time in the scope of predefined care pathways. Platform supports the management and update of care plans during the transition of care among care providers; management of care team (adding, removing care team members); collecting the most recent context of the patient from EHRs, and PHRs and sharing them along with the updated care plan; act as a workflow engine to guide the execution of care pathway guiding about the previous and subsequent steps in the care pathway; promotes the coordination, collaboration and communication among care team members to discuss and share goals of care, interventions and monitoring the outcomes (via care team messaging, negotiation and virtual care plan review meetings).

**Patient Empowerment Platform (PEP):** Process that helps people gain control over their own lives and increases their capacity to act on issues that they themselves define as important.”

**Scenario:** A narrative of foreseeable interactions of user roles (known in the Unified Modeling Language, UML, as 'actors') and the technical system, which usually includes computer hardware and software. It describes one way that a system is or is envisaged to be used in the context of activity in a defined time-frame.

**Storyboard:** Type of scenario. A drawing, or a sequence of drawings, used to describe a user interface or to tell a story. This meaning is common in Human–computer interaction to define what a user will see on a screen. It is common in Human–computer interaction.

**Use case:** Use case is a list of actions or event steps, typically defining the interactions between a role (known in the Unified Modeling Language as an actor) and a system, to achieve a goal.

## 1.4.2 Abbreviations and Acronyms

**Table 1. List of Abbreviations and Acronyms**

Abbreviation/ Acronym	DEFINITION
AD	Active Directory
ADT	Admission, Discharge, Transmission
A&E	Adverse Event
ATC	Anatomical Therapeutic Chemical Classification System
BNF	British National Formulary
CDA	Clinical Document Architecture
CDM/CDSM	Clinical Decision (Support) Module
CKD	Chronic Kidney Disease
C3DP	Coordinated Care and Cure Delivery Platform
CMSP	Clinical Management Software Platform
CPG	Clinical Practice Guidelines
CWPT	Coventry and Warwickshire Partnership Trust
DICOM	Digital Imaging and Communications in Medicine
DoA	Description of Action
HER	Electronic Health Record
EPR	Electronic Patient Record
EPSR2	Electronic Prescription Service Release 2
FHIR	Fast Healthcare Interoperability Resources
GP	General Practitioner
HF	Heart Failure
HISA	Health Informatics Society of Australia
HL7	Health Level 7
ICC	Integration Competence Centre in Inera
ICD	International Classification of Diseases
ICF	International Classification of Functioning, Disability and Health
ICT	Information Communication Technologies
IHE	Integrating Healthcare Enterprise
IVR	Interactive Voice Response
KVÄ	Koder ur Klassifikation av vårdåtgärder
KSI	Classification of activities in social service
LDAP	Lightweight Directory Access Protocol
LOINC	Logical Observation Identifiers Names and Codes
MDT	Multidisciplinary team
LOPD	Agencia Española de Protección de Datos
NCPDP	National Council for Prescription Drug Programs
NDR	National Diabetes Register
NPÖ	National Patient Overview (“Nationella PatientÖversikten”)
NSAID	Non-steroidal anti-inflammatory drugs
OG	Osabide Global
PAPs	Plan Of Planned Activities



Abbreviation/ Acronym	DEFINITION
PAR	Pilot Application Requirement
PCC	Patient Care Coordination
PCP	Personalized Care Plan
PCPDP	Personalized Care Plan Development Platform
PEP	Patient Empowerment Platform
PHF	Personal Health Folder
PHR	Personal Health Record
PKI	Public key infrastructure
PROMs	Patient Related Outcome Measures
RDBMS	Relational database management system
RGS	Web based national decision support in (Rådgivningsstödet”)
RJH	Region Jämtland Härjedalen
SAML	Security Assertion Markup Language
SCR	Summary Care Record
SIL	Svenska Informationstjänster för Läkemedel
SOAP	Simple Object Access Protocol
SSL	Secure Sockets Layer
SWFT	South Warwickshire Foundation Trust
TLS	Transport Layer Security
TTO	To Take Out
UHCW	University Hospitals of Coventry & Warwickshire
XML	EXtensible Markup Language
WS	Web Service

## 2 OVERVIEW OF REQUIREMENTS FROM THE PERSPECTIVE OF THE OVERALL C3-CLOUD SYSTEM

C3-Cloud will establish an ICT infrastructure enabling a collaborative care and cure cloud to enable continuous coordination of patient-centered care activities by a multidisciplinary care team and patients/informal care givers. A **Personalized Care Plan Development Platform** will enable the development of personalized care plans for multi-morbid conditions through systematic and semi-automatic reconciliation of digitally represented clinical guidelines for individual chronic conditions, by a group of collaborating health and social care givers, and with the informed participation of the patients and their informal care givers. Moreover, the project aims to provide an innovative online platform through which multidisciplinary team members can collaboratively manage (execute, monitor and update when necessary) the integrated personalized care plans for patients with multi-morbid conditions, through a **Coordinated Care and Cure Delivery Platform**. Both platforms will be supported by the help of **Clinical Decision Support Modules** for risk prediction and stratification, recommendation reconciliation, poly-pharmacy management and goal setting. Fusion of multimodal patient and provider data will be achieved via C3-Cloud **Interoperability Middleware** for seamless integration with existing information systems. An Integrated Terminology Server with advanced semantic functions will enable meaningful analysis of multimodal data and clinical rules. The active participation of patients and their informal care givers will be achieved through a **Patient Empowerment Platform** ensuring patient needs are respected in decision making and taking into account preferences and psychosocial aspects.

Co-design and 4-layered multi-method multi-stakeholder evaluation will lead to a user friendly solution. The project will demonstrate the applicability of its integrated care approach and supporting set of innovative ICT components in varying clinical, technological and organizational settings by piloting for 15 months in three European regions with quite different health and social care systems and ICT landscapes, which will allow for strengthening the evidence base on health outcomes and efficiency gains. As the focus is multi-morbidity, the target population for C3-Cloud pilot applications is elderly (65+) patients, having at least two among these four chronic diseases (diabetes, heart failure, renal failure and depression).

The high level interaction of these components with each other and their distribution to work packages are depicted in Figure 1 as envisioned in our DoA.

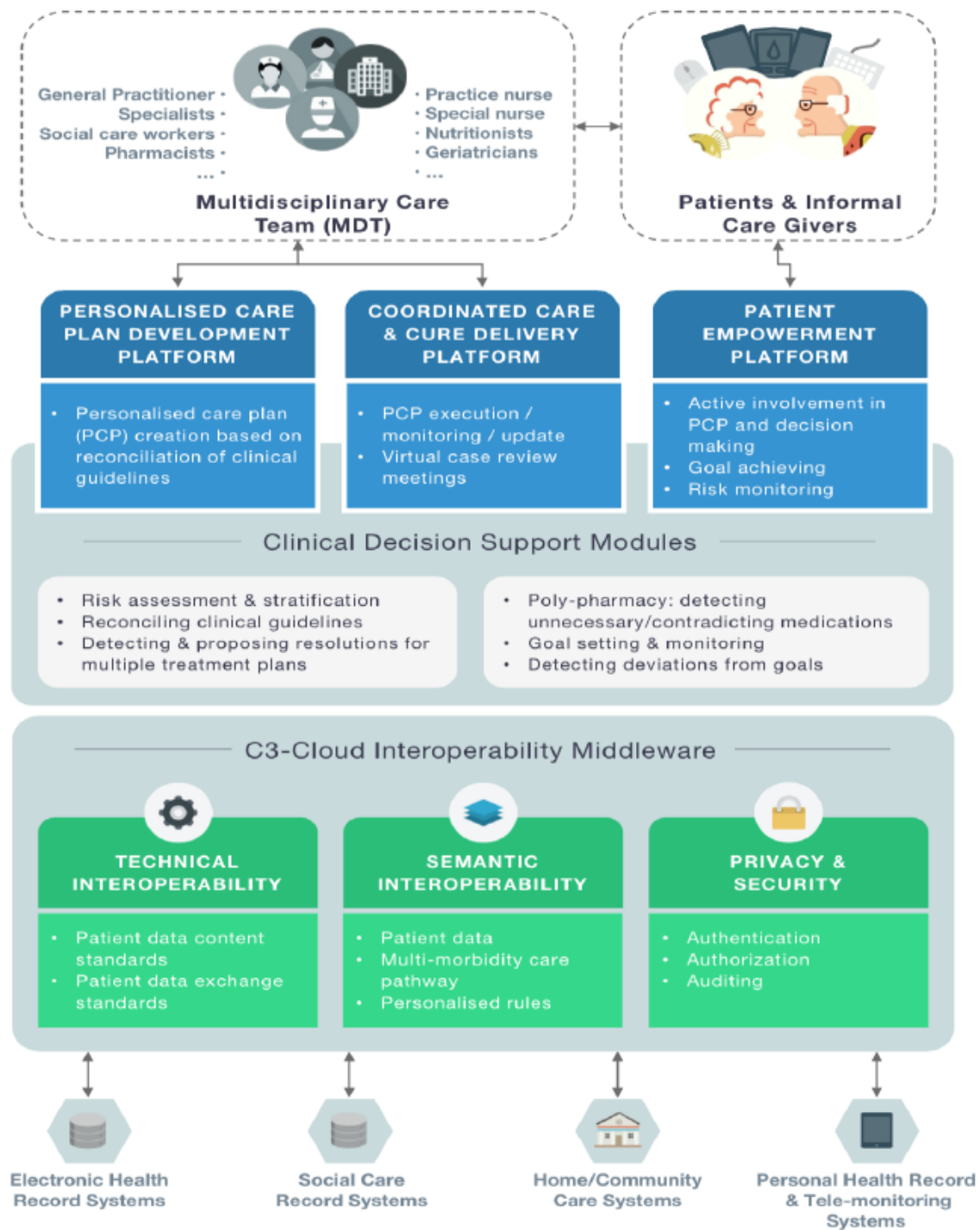


Figure 1. A draft C3-Cloud Architecture (from Description of Action)

## **3 THE PROCESS FOR TASK 8.1**

### **3.1 Overview and relation to Task 3.2**

In our Description of Action, high level components and their envisioned functionalities have already been described in some sense but not defined in a strict way. The objective of Task 3.2 is to analyse the detailed technical requirements for each of these high level components to guide the succeeding conceptual design phase, and document them in a Requirements Specification Document. Although the Description of Action provides a high level description of objectives for each of these components, the detailed specifications of each of them need to be collaboratively agreed upon by examining the end user requirements and the opportunities and constraints introduced by the current applications landscapes at end user sites. Because of the time constraints, Task 3.2 has been initiated in parallel with Task 8.1 although logically the output of the user oriented requirements shall guide the detailed technical descriptions of Task 3.2.

In Task 8.1, in the first four months of the project, the requirements of pilot applications has been described in working with potential users from the healthcare domain the multidisciplinary team members (MDT) and some patients. This development of scenarios has been influenced by the services proposed in the DoA and described in initial Use Case Descriptions from the early draft D3.2. Another basis for the report and the reflections by the user groups is the existing ICT services and processes as relates:

- predictive risk assessment
- multi-morbid chronic disease management
- case management by multidisciplinary teams
- patient empowerment

This existing situation has also been documented separately.

The plan followed through the life time of D8.1 were as follows:

#### **Step 1 - Initial Draft of a work plan and framework for the deliverable**

**Time Period (May 9, 2016-May 20, 2016):**

Action RJH and ORU. To be reviewed by other partners.

#### **Step 2. Initial Workshops with clinicians (and patients) in the three regions**

**Time Period (May 12 – June 10)**

Until our next meeting in Bilbao, where the pilot requirements will be discussed, each regional partner shall provide a first draft of the local scenarios in English. High level use case descriptions or other material supporting the scenarios will be appreciated.

In addition, each site shall in collaboration with their technical partners provide a description of the current ICT systems that are relevant for the project.

#### **Deadlines:**

- **2016-06-10**

#### **Step 3 – Continued workshops with clinicians and patients**

**Time Period (June 15 – June 30):**

After the initiation of discussions with our end users during the Bilbao meeting, the partners responsible for the requirements will have additional workshops to validate the common understanding of scenarios. If patient groups have not been held they will be conducted in this period. A number of iterations might be necessary to have an agreed understanding.

**Deadlines:**

- **2016-07-10** Partners provide final scenario and use case descriptions
- **2016-06-30** Partners provide final descriptions of current ICT systems

**Step 4 – Initial drafting of deliverable D8.1**

**Time Period (July 11 – July 31):**

**Deadlines:**

- **2016-07-31** A first draft is available to all participants of the task for review

**Step 5 - Review and Finalization of the Deliverable**

**Time Period (August 1 – August 31):**

In this time period, the partners will before August 15 provide comments and suggested amendments. The task leader, RJH, will in cooperation with the WP8 leader consolidate all partners' input and provide a near final draft for final internal quality review by both WP 8 members and all of the Technical and Scientific Board.

**Deadlines:**

- **2016-08-24** RJH provides consolidated document for consortium review
- **2016-08-28** Deadline for review comments
- **2016-08-31** RJH provides final deliverable for submission to the Commission by the co-ordinator

## **4 PILOT APPLICATION SCENARIOS**

### **4.1 Reporting of patient scenarios**

The use-case scenarios demonstrate interaction between the C3-Cloud approach, patients and the wider multidisciplinary care team (MDT). The stories intend to present an overview of the present as-is care at each site and ways that a C3-Cloud integrated care could do to improve care coordination even in these advanced regions. The scenarios are based on input from MDT members and patients at each of the three sites in accordance with the given instructions;

*The storyboards describing the to-be scenarios of each pilot sites should include all high level components of C3-Cloud, as they appear in DoA:*

- *Patient Empowerment Platform*
- *Technical Interoperability Suite*
- *Semantic Interoperability Suite*
- *Security and Privacy Suite*
- *Clinical Decision Support Modules*
- *Personalized Care Plan Development Platform*
- *Coordinated Care and Cure Delivery Platform*

*For that, it is recommended to use the format “storyboard structured in encounters” for the description of the to-be scenarios of each pilot site. The structure will be:*

1. **Short Description:** typically a brief statement that conveys the role and purpose of the specific use case.
2. **Actors and Roles:** individuals who initiate an action that requires the system to respond
3. **Encounters:**

*Each encounter:*

- a. **Pre-Conditions:** document the business or system states that are necessary prior to the storyboard encounter
- b. **Encounter:** the primary path and tasks performed between the actors or the system. It includes information about timing and highlights in the story what parts are regular events/flow and what are exceptional things.
- c. **Post-conditions:** describe the potential states after the encounter
- d. **Applications/Functionalities** of high level components

*The storyboards will be developed with the aim that the encounters contain information and details as much as possible, related to the elements involved, in order to be helpful for both 3.2 and 8.1 Deliverables partners.*

## 4.2 Basque Country

### 4.2.1 Patient scenario Mrs. Brenda Jones-Aguirre, as-is and with C3-cloud.

Mrs. Jones-Aguirre is a 67 year old lady, married to Mr. Martin-Ruiz and living in Vitoria, a small town located in the Southern part of the Basque Country. Mrs. Jones-Aguirre has been the house wife for her entire life while Mr. Martin-Ruiz has worked at an important car tire manufacturing company in town. Mr. Martin Ruiz is now retired and is entitled for a relatively high economic allowance from the Public Pension System. They both hold basic degrees of education and are located at a middle class socio-economic level.

Mrs. Jones-Aguirre and Mr. Martin-Ruiz have two siblings. Their son, Ander, is married, has two young kids and lives down South in the Canary Islands. Their daughter, Emma, is single and lives also in Vitoria, just a few minutes away from her parents' place.

Vitoria is quite a comfortable place to live in for both Mrs. Jones-Aguirre and Mr. Martin-Ruiz as they are close to all services and can access them either by foot (Primary Care Center/Community Health Care Center or Public Civic and Sports Center: 5' walk) or public transportation (Acute Care Hospital: 7' tram). Feeling close to their daughter, who visits them twice a week and attends medical appointments with them, is of key importance for their comfort and safe, thus for their quality of life as they would define it.

Both Mrs. Jones-Aguirre and Mr. Martin-Ruiz have always been physically active and have been out for long walks around town but, since Mr. Martin-Ruiz's knee replacement 13 months ago, their level of activity has decreased significantly. Their level of social interaction has also diminished over the past few months but they still keep in touch with long-time friends and sporadically meet with them for a dinner out.

Mrs. Brenda Jones-Aguirre has been living with type 2 diabetes for over 10 years. For the first 9 years following her diagnosis, she had difficulty understanding how the new diabetes medications she was prescribed worked, but usually took them on the advice of her GP, Dr. Zabaleta.

**AS-IS:** Dr. Zabaleta has recently introduced Mrs. Jones-Aguirre to the **Personal Health Folder (PHF)/ Osasun Eskola/Active Patient Program**, which easily explains how each drug works along with its benefits. Since then, Mrs. Jones-Aguirre never misses a dose.

**C3-Cloud:** Her GP had introduced her to the C3-Cloud Patient Empowerment Platform, which explained in simple language how each drug works and explains the benefits; she now never misses a dose.

\*

Dr. Zabaleta has known Mrs. Jones-Aguirre and Mr. Martin-Ruiz for over 18 years and has been caring for her diabetes in the community since she was diagnosed. Last time Mrs. Jones-Aguirre came in for a visit,

**AS-IS:** Brenda and her husband use her PHF for get information. As she is empowered, when she feels some fluid on her ankles, she **books for IVR appointment through Osarean**. They use Osarean to communicate directly with her doctor and/or nurse. The appointment can be **face to face or by phone**.

**C3-Cloud:** Brenda and her husband use her Patient Empowerment Platform, named Personal Health Folder (PHF) to get information. As she is empowered, when she feels some fluid on her ankles, she books for IVR appointment through Osarean.

\*

Dr. Zabaleta noted some fluid on her ankles and updated her treatment. Mrs. Jones-Aguirre was diagnosed with Heart Failure (HF).

**AS-IS:** Through **Osabide Global (OG)** Dr. Zabaleta can access to the EHR patient and review all her data. With that information, he makes a decision about treatment, considering management of polypharmacy. Then he modifies and updates the treatment through **PRESBIDE**, the platform for electronic prescription that is inside of OG.

For the patients, treatment and treatment guidelines are accessible through **PHF**, while drug interaction information from **Osasun eskola** and **ibotika** websites. **Mrs. BJA can find information in those web pages**.

**C3-Cloud:** Using the **Personalized Care Plan development platform (PCPDP)** Dr. Zabaleta **updated her Personalised Care Plan** which helped **reconciliation of clinical guidelines** for diabetes and her new diagnosis of heart failure.

**Clinical Decision Support Modules of the Platform** (Reviewed Clinical Guideline on Heart Failure and diabetes) advised switching some medications including stopping her thiazolidinedione and goal-orientated lifestyle and activity modifications.

The **updated plan** is then available to all multidisciplinary team (MDT) members involved in the care of Brenda. By now: the GP, the nurse, Brenda and her husband. And it is going to be **executed through Coordinated Care and Cure Delivery Platform (C3DP)**.

In C3 Cloud, Mrs. BJA can find her personally adopted care plan through her PHF. This plan has been generated automatically based on best knowledge and guidelines, but also based on BJA's medical data from her medical records, age and as well as on her preferences regarding what type of physical activity that interests her. One the care plan is reviewed, approved and signed by Dr. Zabaleta, who has been assigned as Plan Manager; it is also presented, and accepted by BJA.

\*

The heart failure has remained stable. Mrs. Jones-Aguirre is worried because after reading that diabetes could cause loss of sensation to the feet.

**AS-IS:** Mrs. Jones-Aguirre read on her Health Folder on tablet that diabetes could cause loss of sensation to the feet. She and Mr. Martin-Ruiz had previously set up an **appointment with the social worker** at the Community Civic and Sports Center, since a friend of theirs had talked to them about some public financing for safer homes for the elderly. The social worker provides Mrs. Jones-Aguirre with access to **easily affordable feet-care services** at the Socio-Cultural Center for the Elderly in the area. The social worker does not know Dr. Zabaleta and has no access to Mrs. Jones-Aguirre EHR, nor does the podiatrist who now takes care of her feet regularly.

**C3-Cloud:** She **remotely got in touch with social services**. The social worker applies to be a member of the MDT (multidisciplinary) team responsible for the Care of Mrs. Brenda Jones-Aguirre. He is admitted as member and become part of MDT. Then he can access the data of EHR, according to her/his privileges. The podiatrist who now takes care of her feet regularly acts in the same way.

\*

Since her last admission following an episode of severe dyspnea, Mrs. Jones-Aguirre has been provided with an easy-access emergency-service call system to help her gain confidence that she can access help if needed. She has also been admitted for the Heart Failure Clinic which offers her a closer at-home remote monitoring system and provides her and her husband with further training on HF: signs and symptoms of oncoming episodes and ways of better taking care of her new condition. Besides other home-adaptations, wireless medical sensors including a glucometer and O<sub>2</sub> saturation monitor have been installed in her home to help Mrs. Jones-Aguirre feel that she is being looked after a bit more closely.

**AS-IS:** Tele monitoring Information and alarms are sent to Brenda's **EHR**. Dr. Zabaleta can monitor the **readings, available through Osabide Global**. The readings become available to Brenda and her husband through her **PHF**, from her EHR.

**C3-Cloud:** Tele monitoring Information and alarms are sent to Brenda's **EHR**. Dr. Zabaleta can monitor the **readings, available through Osabide Global**. The readings become available to Brenda and her husband through her **PHF**, from her EHR. As the **readings** are immediately uploaded to her EHR, then **become available to her multidisciplinary care team (MDT)** through the **C3DP**. All these data are sent to C3-Cloud where special algorithms take care of the information. The data are available for all MDT members, the **patient and their caregiver**.

\*

Readings from monitored O<sub>2</sub> saturations are deviated from the goals

**AS-IS:** Dr. Zabaleta monitors the readings and refers Brenda to one of the cardiologists on the HF unit. **Cardiologist has full access** to sensor measurements as well as to every GP's and other secondary level teams' records through the **Osabide Global**. Through the tool **eBook** of Osabide Global, he reads the concerns of Dr. Zabaleta and **messaging** allows communication **between primary and specialist care**. The cardiologist and Dr. Zabaleta (remote) **modifies her treatment and medication dosages, according to best evidence managing diabetes and heart failure in harmony**.

**C3-Cloud:** The **C3DP** identified Mrs. Jones-Aguirre breathlessness and remotely monitored O<sub>2</sub> saturations, deviating from the goals in the Personalized Care Plan, and **alerted all the MDT**. Mrs.



*Jones-Aguirre is referred to the cardiologist. Using the PCPDP, the cardiologist, Mrs. Jones and her GP (remote) modifies Brenda's treatment and medication dosages, supported by Clinical Decision Modules (CDM).*

\*

Not much improvement has since seen Mr. Martin-Ruiz on Mrs. Jones and he is now, 2 weeks later, concerned she is getting more breathless.

*AS-IS: Searching for more information on what to do next, Mr. Martin-Ruiz logs onto Mrs. Jones-Aguirre's **Health Folder, as a caregiver**. By reading the information provided at the site, Mr. Martin-Ruiz quickly understands Mrs. Jones-Aguirre's her heart failure might have worsened. He immediately **contacts Dr. Zabaleta by phone** after setting up a phone-appointment through the website.*

*Through **Osabide Global**, Dr. Zabaleta gains access to the cardiologist's records and proceeds to set up messaging between them. Both **Dr. Zabaleta and team at the HF Clinic communicate by messaging (Osabide Global)** and offer Mrs. Jones-Aguirre's the possibility of coming into the Acute Care Hospital in town for a scan and check-up, coordinated by the HF team in order to make it a High Resolution process for Mrs. Jones-Aguirre.*

***C3-Cloud:** Mrs. Jones' husband is concerned she is getting more breathless, he logged onto **Patient Empowerment Platform, as an informal care giver**, and read that her heart failure might have worsened, he contacted Dr. Zabaleta, her GP, online.*

*Dr. Zabaleta through **C3DP** could read the cardiology input and organized a virtual case review meeting. The medical teams remotely communicating with each other and Mr. and Mrs. Jones, who agreed to come to hospital for a scan and check-up.*

\*

After a short 4-hour stay at the hospital, Mrs. Jones-Aguirre is discharged home with an outpatient cardiac resynchronization pacemaker insertion program scheduled for the following week. Hospital blood tests noted her renal function had deteriorated further

***AS-IS:** Dr. Zabaleta and the cardiologist **communicate again through the messaging** tools and both **decide to stop the metformin treatment**. This change is recorded in Brenda's EHR.*

***C3-Cloud:** As suggested by **Decision Support Modules**, the treatment is modified (metformin was stopped) in **C3DP**, and this information is available for all MDT members.*

\*

Nowadays, 6 months after Mrs. Jones-Aguirre was put the pacemaker, she is enjoying life again. She is regularly being checked up by the cardiac nurse specialists at the HF Unit. Both, Mrs. Jones-Aguirre and her husband remain at home and hold quite a high level of autonomy in the performance of their Everyday Living Activities. They both keep accessing their Health Folder for acquiring further confidence on their ability to manage and live with Mrs. Jones-Aguirre's conditions, which helps her better manage her own treatment, achieving the goals set by the MDT and sharing her story with other diabetes patients.

## 4.2.2 Storyboard describing the to-be scenario

<b>TITLE</b>	The journey of Mrs. Brenda Jones-Aguirre (multi-morbid patient) across Osakidetza, in a C3-Cloud landscape	
<b>Brief description of patient</b>	<p>Mrs. Jones-Aguirre is a 67 year old lady, married to Mr. Martin-Ruiz and living in Vitoria, a small town located in the Southern part of the Basque Country.</p> <p>Mrs. Jones-Aguirre has been the house wife for her entire life. Mr. Martin Ruiz is now retired and is entitled for a relatively high economic allowance from the Public Pension System. They both hold basic degrees of education and are located at a middle class socio-economic level. Mrs. Jones-Aguirre and Mr. Martin-Ruiz have two siblings.</p> <p>Both Mrs. Jones-Aguirre and Mr. Martin-Ruiz have always been physically active and have been out for long walks around town. But, since Mr. Martin-Ruiz's knee replacement 13 months ago their levels of activity and social interaction have decreased significantly.</p> <p>Mrs. Brenda Jones-Aguirre has been living with type 2 diabetes for over 10 years. For the first 9 years following her diagnosis, she had difficulty understanding how the new diabetes medications she was prescribed worked, but usually took them on the advice of her GP, Dr. Zabaleta.</p>	
<b>Short Description of the storyboard, including all the encounters that the storyboard is consisted of and describing the total length/running time of the story.</b>	<p>This storyboard illustrates the communication flow and documentation of a care plan between a patient, Mrs. Brenda Jones-Aguirre, her primary care provider and the home health specialists involved in the discovery and treatment of Heart Failure in the patient who has been suffering Type 2 Diabetes for 10 years.</p> <p>This health issue thread (simplified) covers a period of time of 5 months and it consists of six encounters:</p> <ol style="list-style-type: none"> <li>Primary Care Physician Initial Visit</li> <li>Social worker consult</li> <li>Primary Care Physician Second Visit</li> <li>Home Tele monitoring</li> <li>Hospital: scan and check-up</li> <li>Primary Care Follow-up Visits</li> </ol> <p>Care coordination should occur throughout the health issue thread, across several care settings and several care providers/givers.</p>	
<b>ENCOUNTER A: Primary Care Physician Initial Visit</b>	<b>Actors and Roles</b>	<ul style="list-style-type: none"> <li>• Patient: Mrs. Brenda Jones Aguirre</li> <li>• Patient's husband: Mr. Martín Ruiz</li> <li>• Primary Care Physician (GP): Dr. Zabaleta</li> <li>• Plan Manager: Dr. Zabaleta</li> </ul>
	<b>Pre-condition</b>	<p>Mrs. Brenda Jones-Aguirre has been living with type 2 diabetes for over 10 years. Dr. Zabaleta has known Mrs. Jones-Aguirre and Mr. Martin-Ruiz for over 18 years and has been caring for her diabetes in the community since she was diagnosed.</p> <p>Dr. Zabaleta has recently introduced Mrs. Jones-Aguirre to the Personal Health Folder (PHF)/ Osasun Eskola, which easily</p>

		<p>explains how each drug works along with its benefits. Since then, Mrs. Jones-Aguirre never misses a dose.</p> <p>Brenda and her husband use her PHF for get information. As they are empowered, when she feels some fluid on her ankles, she books for an IVR appointment with Dr. Zabaleta through Osarean.</p>
	<b>Encounter</b>	<p>Dr. Zabaleta examines Mrs. Brenda Jones-Aguirre, reviews her clinical record and concludes the patient suffers from <b>Heart Failure</b>. He accesses <b>Brenda's EHR (Electronic Health Record) (named Osabide Global in Osakidetza, Basque Country)</b>, and records the clinical assessment findings and the diagnosis.</p> <p>Using the <b>Personalized Care Plan development platform</b> (from now on named as <b>PCPDP</b>) Dr. Zabaleta <b>updates her Personalized Care Plan</b> which helped reconciliation of clinical guidelines for diabetes and her new diagnosis of heart failure.</p> <p><b>Clinical Decision Support Modules of the Platform</b> (Reviewed Clinical Guideline on Heart Failure) advised switching some medications including stopping her thiazolidinedione and goal-orientated lifestyle and activity modifications.</p> <p>Dr. Zabaleta discusses with Brenda the identified problems, potential risks, goals, management strategies and intended outcomes. Then, it is accepted by Brenda. Finally, the care plan is reviewed, approved and signed by Dr. Zabaleta, who has been assigned as <b>Plan Manager</b>. The updated plan is going to be <b>executed through Coordinated Care and Cure Delivery Platform</b> (from now on named as <b>C3DP</b>).</p> <p>Dr, Zabaleta informs Brenda that other care givers in the Multidisciplinary Team (MDT) have access to the same information through C3DP. The final care plan is available to all involved in the care of Brenda. By now the <b>multidisciplinary team (MDT)</b> members are the GP, the nurse, Brenda and her husband</p> <p>Brenda can find her updated Plan in her PHF, along with information about her diseases and their treatment as well as treatment guidelines.</p>
	<b>Post-condition</b>	<p>Once the care plan is completed, it is committed to the patient's medical record. The patient is offered a copy of the plan. The care plan is also accessible through Brenda's PHF.</p> <p>The care plan is available to all <b>multidisciplinary team (MDT)</b> members involved in the care of Brenda. By now: the GP, the nurse, Brenda and her husband.</p> <p>The treatment is modified. A new prescription is sent to the patient information in the community pharmacies.</p> <p>The patient is advised to follow the protocol specific to the local health care system.</p> <p>For the patients, treatment and treatment guidelines are accessible through <b>PHF</b>, while drug interaction information from <b>Osasun eskola and ibotika websites</b>. Mrs. BJA can find information in those web pages.</p>

		For the next appointment, the patient has to schedule his own appointment using booking systems of the primary care. They use Osarean for that. The appointment can be face to face or by phone.
	<b>Applications / Functionalities</b>	<ul style="list-style-type: none"> <li>• <b>Personalized Care Plan development platform (PCPDP)</b></li> <li>• <b>Clinical Decision Support Modules (CDSM)</b></li> <li>• <b>Coordinated Care and Cure Delivery Platform (C3DP)</b></li> <li>• <b>Patient Empowerment: Personal Health Folder (PHF), Osasun eskola and i-Botika web pages.</b></li> </ul>
<b>ENCOUNTER B: Social worker consult</b>	<b>Actors and Roles</b>	<ul style="list-style-type: none"> <li>• Patient: Mrs. Brenda Jones Aguirre</li> <li>• Patient's husband: Mr. Martín Ruiz</li> <li>• Social worker</li> <li>• Podiatrist</li> <li>• Plan Manager: Dr. Zabaleta</li> </ul>
	<b>Pre-condition</b>	Brenda and her husband use her <b>PHF</b> for get information. Although the heart failure has remained stable, Brenda is worried after reading in her tablet that diabetes could cause loss of sensation to the feet. She <b>remotely got in touch with social services</b> .
	<b>Encounter</b>	<p>The <b>social worker</b> applies to be a member of the MDT (multidisciplinary) team responsible for the Care of Mrs. Brenda Jones-Aguirre. He is admitted by the Plan Manager as member and become part of MDT. Then he can access the data of EHR, according to her/his privileges.</p> <p>The social worker generates a referral to the <b>podiatrist</b>. The referrals contain information about the patient's medical history, reasons for referral and requested services. The podiatrist acts in the same way as the social worker: first he/she applies as member of the MDT responsible of the care of Mrs. Jones-Aguirre, then he/she is admitted. Then Brenda is provided with access to <b>easily affordable feet-care services</b> at the Socio-Cultural Center for the Elderly in the area.</p> <p>During the first consultation, the podiatrist reviews the referral. At each consultation, the podiatrist reviews the patient's health record, assesses the patient, checks the progress and any risks of non-adherence (compliance) and complications, and discusses the outcomes of the management strategies and/or risks supported by CDSMs. Any difficulties in following the management strategies or activities by the patient are discussed. Any new/revised goals and timing, new intervention and self-care activities are discussed and agreed to by the patient. The new/changed activities are scheduled and target dates agreed upon.</p> <p>The podiatrist updates the clinical notes and the care plan with the assessment details, and any changes to the management plan including new advice to the patient. The date of next visit is also determined.</p> <p>The podiatrist introduces the specific plan for Brenda in the <b>PCPDP</b>. This plan is then available to all MDT members involved in the care of Brenda. And it will be executed through <b>C3DP</b>.</p>

	<b>Post-condition</b>	<p>An updated specific podiatrist care plan complete with action items and target dates is completed with patient agreement.</p> <p>The patient is given a copy of the new/updated care plan at the end of each podiatrist consultation.</p> <p>The care plan is available to all MDT members.</p> <p>At the end of each consultation a progress note is written by the podiatrist which documents the outcomes of the assessment, any new risks identified and changes to or new management strategies that have been included in the updated care plan.</p>
	<b>Applications / Functionalities</b>	<ul style="list-style-type: none"> <li>• <b>Patient Empowerment: Personal Health Folder (PHF)</b></li> <li>• <b>Personalized Care Plan development platform (PCPDP)</b></li> <li>• <b>Clinical Decision Support Modules (CDSM)</b></li> <li>• <b>Coordinated Care and Cure Delivery Platform (C3DP)</b></li> </ul>
<b>ENCOUNTER C: Primary Care Physician Second Visit</b>	<b>Actors and Roles</b>	<ul style="list-style-type: none"> <li>• Patient: Mrs. Brenda Jones-Aguirre</li> <li>• Patient's husband: Mr. Martín Ruiz</li> <li>• Primary Care Physician: Dr. Zabaleta</li> <li>• Plan Manager: Dr. Zabaleta</li> </ul>
	<b>Pre-condition</b>	Brenda suffers an episode of severe dyspnea. Her husband books for an Interactive Voice Response (IVR) appointment through Osarean.
	<b>Encounter</b>	<p>Dr. Zabaleta confirms the severe dyspnea and provides to Brenda with an easy-access emergency-service call system to help her gain confidence that she can access help if needed and ask for her admission in the Heart Failure Clinic. For that, Dr. Zabaleta generates a set of referrals which contain information about the patient's medical history including the recent diagnosis of severe dyspnea, reasons for referral and requested services.</p> <p>Mrs. Jones-Aguirre is admitted in the Heart Failure (HF) Clinic which offers her a closer at-home remote monitoring system and provides her and her husband with further training on HF: signs and symptoms of oncoming episodes and ways of better taking care of her new condition.</p> <p>Besides other home-adaptations, wireless medical sensors including a glucometer and O<sub>2</sub> saturation monitor have been installed in her home to help Mrs. Jones-Aguirre feel that she is being looked after a bit more closely. All MDT members can monitor the readings, available through Brenda's EHR, Osabide Global.</p>
	<b>Post-condition</b>	<p>All these data are sent to C3-Cloud where special algorithms take care of the information.</p> <p>Tele monitoring Information and alarms are sent to Brenda's EHR. The readings become available to Brenda (patient) and her husband (informal care giver) through her PHF, from her EHR (Osabide Global).</p>

		<p>As the readings are immediately uploaded to her EHR, then become available to her multidisciplinary care team (MDT) through the C3DP.</p> <p>On the Personal Health Folder, the information given is personalized based on answers given on questionnaires and on data from the EHR (diagnoses, medication, lab) but also based on data from devices, if there are.</p>
	<b>Applications / Functionalities</b>	<ul style="list-style-type: none"> <li>• <b>Patient Empowerment: Personal Health Folder (PHF)</b></li> <li>• <b>Personalized Care Plan Development Platform (PCPDP)</b></li> <li>• <b>Coordinated Care and Cure Delivery Platform (C3DP)</b></li> </ul>
<b>ENCOUNTER D: Home Tele monitoring</b>	<b>Actors and Roles</b>	<ul style="list-style-type: none"> <li>• Patient: Mrs. Brenda Jones-Aguirre</li> <li>• Patient's husband: Mr. Martín Ruiz</li> <li>• Primary Care Physician: Dr. Zabaleta</li> <li>• Cardiologist</li> <li>• Plan Manager: Dr. Zabaleta</li> </ul>
	<b>Pre-condition</b>	Readings from monitored O <sub>2</sub> saturations are deviated from the goals
	<b>Encounter</b>	<p>The C3DP identifies Mrs. Jones-Aguirre breathlessness and remotely monitored O<sub>2</sub> saturations, deviating from the goals in the Personalized Care Plan, and alerted all the MDT.</p> <p>Mrs. Jones-Aguirre is referred to the cardiologist.</p> <p>Using the PCPDP, the cardiologist, Mrs. Jones and Dr. Zabaleta (remote) modified her treatment and medication dosages, supported by Clinical Decision Support Modules (CDSM).</p> <p>The updated plan is then executed by the C3DP.</p>
	<b>Post-condition</b>	<ul style="list-style-type: none"> <li>• Once the care plan is completed, it is committed to the patient's medical record. The patient is offered a copy of the plan.</li> <li>• The care plan is available to all <b>multidisciplinary team (MDT)</b> members involved in the care of Brenda. By now: the GP, the nurse, the cardiologist, Brenda (patient) and her husband (informal care giver).</li> <li>• The treatment and medication doses are modified.</li> <li>• The patient is advised to follow the protocol specific to the local health care system.</li> <li>• For the patients, treatment and treatment guidelines are accessible through <b>PHF</b>.</li> </ul>
	<b>Applications / Functionalities</b>	<ul style="list-style-type: none"> <li>• <b>Personalized Care Plan development platform (PCPDP)</b></li> <li>• <b>Clinical Decision Support Modules (CDSM)</b></li> <li>• <b>Coordinated Care and Cure Delivery Platform (C3DP)</b></li> <li>• <b>Patient Empowerment: Personal Health Folder (PHF)</b></li> </ul>
<b>ENCOUNTER E: Hospital:</b>	<b>Actors and Roles</b>	<ul style="list-style-type: none"> <li>• Patient: Mrs. Brenda Jones-Aguirre</li> </ul>

scan and check-up		<ul style="list-style-type: none"> <li>• Patient's husband: Mr. Martín Ruiz</li> <li>• Primary Care Physician: Dr. Zabaleta</li> <li>• Cardiologist</li> <li>• Plan Manager: Dr. Zabaleta</li> </ul>
	<b>Pre-condition</b>	Not much improvement has since seen Mr. Martin-Ruiz on Mrs. Jones and he is now, 2 weeks later, concerned she is getting more breathless. Mrs. Jones' husband logs onto <b>Personal Health Folder of his wife, as an informal care giver</b> , and read that her heart failure might have worsened, so <b>he contacts Dr. Zabaleta, her GP, online.</b>
	<b>Encounter</b>	<p>Dr. Zabaleta through C3DP, reads the cardiology input and organizes a virtual case review meeting. The medical teams remotely communicating with each other and Mrs. Jones-Aguirre and her husband, who agree to go to hospital for a scan and check-up.</p> <p>After a short 4-hour stay at the hospital, Mrs. Jones-Aguirre is discharged home with an outpatient cardiac resynchronization pacemaker insertion program scheduled for the following week.</p> <p>Hospital blood tests noted her renal function had deteriorated further</p> <p>As suggested by <b>Decision Support Modules</b>, the <b>treatment is modified</b> (metformin was stopped) <b>in C3DP, and this information is available for all MDT members.</b></p>
	<b>Post-condition</b>	<p>The patient's discharge care plan is completed. The plan may include information on changes to medications, management recommendations to the patient's primary care provider and the patient, and any health care services that are requested or scheduled.</p> <p>The new plan is updated in the PCCDP and executed through the C3DP</p> <p>The patient is given a copy of the discharge summary that includes the discharge care plan.</p> <p>The discharge plan is available to all MDT.</p>
	<b>Applications/Functionalities</b>	<ul style="list-style-type: none"> <li>• <b>Personalized Care Plan development platform (PCPDP)</b></li> <li>• <b>Clinical Decision Support Modules (CDSM)</b></li> <li>• <b>Coordinated Care and Cure Delivery Platform (C3DP)</b></li> </ul>
<b>ENCOUNTER F: Primary Care Follow-up Visits</b>	<b>Actors and Roles</b>	<ul style="list-style-type: none"> <li>• Patient: Mrs. Brenda Jones-Aguirre</li> <li>• Patient's husband: Mr. Martín Ruiz</li> <li>• Cardiac nurse</li> <li>• Primary Care Physician: Dr. Zabaleta</li> <li>• Plan Manager: Dr. Zabaleta</li> </ul>
	<b>Pre-condition</b>	After Brenda was put the pacemaker, she is regularly checked by the cardiac nurse specialist at HF Unit.

		Brenda is scheduled for a regulate consultation with Dr. Zabaleta. Her clinical record information is available in Brenda's EHR and all MDT reviews at the consultation.
	<b>Encounter</b>	Dr. Zabaleta notices that Brenda has gained extra weight and the blood sugar level has not quite stabilized. Dr. Zabaleta reviews the care plan and discusses with patient the plan to change the diet and medication. Patient agrees. The care plan is updated.  Dr. Zabaleta generates progress notes with nutrition management and exercise change recommendations.  Dr. Zabaleta changes patient's follow-up visits from four monthly to two monthly for the next two appointments with the aim to review the follow-up frequency after that.
	<b>Post-condition</b>	<ul style="list-style-type: none"> <li>Once the care plan is completed, it is committed to the patient's medical record. The patient is offered a copy of the plan.</li> <li>The care plan is available to all <b>multidisciplinary team (MDT)</b> members involved in the care of Brenda.</li> <li>The treatment is modified. A new prescription is sent to the patient information in the community pharmacies.</li> <li>The patient is advised to follow the protocol specific to the local health care system.</li> <li>For the patients, treatment, treatment guidelines, and the care plan are accessible through <b>PHF</b>.</li> <li>For the next appointment, the patient has to schedule his own appointment using booking systems of the primary care. They use Osarean for that. The appointment can be face to face or by phone.</li> </ul>
	<b>Applications / Functionalities</b>	<ul style="list-style-type: none"> <li><b>Personalized Care Plan development platform (PCPDP)</b></li> <li><b>Clinical Decision Support Modules (CDSM)</b></li> <li><b>Coordinated Care and Cure Delivery Platform (C3DP)</b></li> <li><b>Patient Empowerment: Personal Health Folder (PHF)</b></li> </ul>

## 4.3 Region Jämtland Härjedalen

### 4.3.1 Patient scenario Sven Karlsson, as is and with C3-cloud.

Sven is a **67-year old** man, married with two sons living in Stockholm 600 km away. The couple lives in a small village with no public transports 20 km from the health center and from shops and 100 km from the town where the county hospital is. His wife Lisa handles the cooking and other household chores inside while Sven takes more responsibility for the garden. Sven's newly retired and feels like Lisa fit. He has been on medication for high blood pressure for 10 years and he uses to control his blood pressure once a year at the health center.

At the annual visit at the health care center Dr. Anna Svensson noted that Sven had diabetes type 2. Renal function was mildly impaired but that did not prevent the addition of oral medication with metformin for his blood sugar and atorvastatin for the blood lipids. Sven decided to be more physically



active when he heard that it would be valuable. In addition, he buys a blood pressure monitor to check his blood pressure regularly. He met the diabetes nurse Erik Larsson at the health center and received counseling and a blood glucose meter. He was followed up a bit tighter initially by the nurse but then had a check with the doctor and one with the nurse annually. To that he could contact them if necessary. When Sven received nutrition information from the diabetes nurse, he brought Lisa with him, but even after that visit, she felt a little unsure about how the diabetes diet should be. Sven was also referred to the hospital's eye clinic to carry out a check of his eyes fundus. Photos showed light fundus changes and Sven will therefore have photo checks annually. The health center doctor and diabetes nurse record various quality parameters in the National Diabetes Register (NDR) and at each visit.

***AS IS:** Medical records, appointment planning and referral and communication with the specialist care and prescriptions are made in Cosmic. Cosmic receives information about prescribable drugs and prescription information from the national Swedish information services for drug treatment (SIL). Cosmic delivers prescription information to a national database used by all pharmacies. From the pharmacies information about retrieved medication is sent to a national register. This latter information can be seen (only by medical professionals) using the national platform "1177". Cosmic also delivers most of the information in the EHR to the national patient overview ("NPÖ") also displayed at "1177". Here care givers throughout Sweden can see most parts of the EHR for most care givers in the country. From 2017 Sven can read his EHR at "My health care contacts" at 1177.se.*

*Registration in the National Diabetes quality Register quality register (NDR) are semi automatically done using Cosmic. Pharmaceutical (FASS.se) and drug interaction information and treatment guidelines are outside Cosmic at different web-pages. From the beginning of 2017 approximately 250 different treatment guidelines for primary care will be nationally provided and displayed at one web page.*

*Sven could find general information about diabetes at 1177.se. He could also anonymously put a question and receive an answer from a nurse. Using the telephone, he could also receive personal medical counselling from a nurse. The nurse can then see his EHR at NPÖ. The nurses at 1177 have separate medical records, also displayed at NPÖ for others to read. In parts of Sweden the patients can read their own medical records at 1177 using a safe login (BankID). This will be so also in RJH from 2017. Nurses at 1177 and often also in primary care use a web based national decision support ("Rådgivningsstödet (RGS)) displayed at 1177. Sven can see general information about drugs, drug interaction and from the quality register but nothing personalized and he has no access to RGS.*

*In some parts of RJH there is a (somewhat premature) possibility for a videoconference appointment with your doctor.*

***C3-Cloud:** Sven's wish, as well as his wife's wish, is to have one place where they find relevant information about all sorts of medical conditions. They use C3-Cloud for that as it has pages with the best knowledge together with an option that makes it possible for the reader to go deeper into a specific topic if he/she wants that. Sven also uses C3-Cloud to communicate with his doctor and the diabetes nurse. He can phone them, send text messages, SMS, and arrange a video appointment with them if needed on C3-Cloud.*

*Of special interest for Sven is that he can find his personally adopted care plan. This plan has been generated automatically based on best knowledge and guidelines, but also based on Sven's medical data from his medical records, and based on his age as well as on his preferences regarding what type of physical activity that interests him. The care plan has, after it was accepted by Dr. Svensson also been presented, and accepted by Sven.*

*Sven choses the option to have automatic coaching from C3-Cloud regarding his physical activity and diet and to have SMS-reminders when he has an appointment or a need for a new prescription.*

*Sven checks his blood glucose semi-automatically by scanning his arm sensor, and controls his blood pressure weekly and these data are simultaneously sent to C3-Cloud where special algorithms take care of the information. Either the values are accepted and stored or they potentially modify the coaching given. If needed an information is sent to Dr. Svensson that a modification of the medication might be needed. Rarely, if a pre-emergency situation is at hand, a warning is sent to Sven and Dr. Svensson. In all instances the personal care plan potentially is modified based on the registered blood glucose and blood pressure measurements. When the care plan is changed Sven gets a SMS-reminder and changes are highlighted. Sven also accept the changed plan.*

\*

**At 72 years of age**, renal function deteriorated to the point that Dr. Svensson replaced Sven's oral medications for blood sugar into insulin. Sven had to see the diabetes nurse tighter from the beginning, but then he managed his medication himself. Dr. Svensson found, after a minor investigation that a reasonable cause of the deteriorating renal function a combination of blood pressure and diabetes. In the years to come, the renal function deteriorated gradually and Sven became more tired.

**AS IS:** *Treatment guidelines are outside Cosmic.*

**C3-Cloud:** *Dr. Svensson and the diabetes nurse not only uses C-3 Cloud to communicate with, and to inform patients. It is also their preferred gateway to all medical information.*

*Now a more profound modification of the care plan is generated based on both best knowledge for diabetes as well as for kidney dysfunction. The new care plan is revised by Dr. Svensson and accepted by her and Sven as before.*

\*

**At 74 years of age**, Sven's kidney function has deteriorated so much that Dr. Svensson referred him to the hospital's renal department where he meets Dr. Anders Blom. Sven got some adjustments in medication and he now has eight different drugs. Dialysis is not yet required but Sven is monitored annually by Dr. Blom and additionally to that, every 3<sup>rd</sup> month blood samples are drawn at the health center to monitor the kidney function.

**AS IS:** *Referrals to the specialist care and information exchange back to the GP is possible in Cosmic. Specialist care has access to the same facilities as primary care. Different treatment guidelines are not found at the same web page and the same goes for different quality registers. Most quality registers are not integrated with Cosmic. Sven could find some additional information at 1177.se about kidney dysfunction.*

**C3-Cloud:** *Dr. Blom has access to all information in the medical records and to the actual, and previous care plans as well as to all communication possibilities that C3-Cloud offers with the patient. The updated care plan is also accepted by Dr. Svensson as she is Sven's personal doctor.*

*Sven opens up for his wife to have full access to his care plan and to help him in the contacts with his care givers. Sven and his wife now choses to get a SMS-reminder every time Sven has to take his medication.*

*Sven has to change his diet due to the failing kidneys. He and Lisa are presented an interactive information programme at C3-Cloud and also have a couple of web-appointments with a nutritionist. All information given is easily accessible in the care plan if they feel uncertain about the information given.*

\*

When Sven is **75 years old** he has trouble with aching knees when he was working in the garden. He is seeking information on the [www.1177.se](http://www.1177.se) and finds the advice to test naproxen tablets which he can buy without a prescription. On the second day on naproxen Sven feels sick, he vomits and is very tired. He contacts Dr. Svensson by phone and she fears that the renal function deteriorated further caused by naproxen and Sven was admitted to the hospital. Sven's kidney function had deteriorated significantly and he also had signs of heart failure. He received hemo-dialysis treatment at the hospital and the hospital's cardiologist is consulted. A cardiac ultrasound was also performed and his medication was adjusted. After two weeks he can leave the hospital and a care planning meeting is held, where in addition to Sven and his relatives also a nurse at the renal department, municipal district nurse and municipal assistance officer attended. At home Sven will continue with intra-peritoneal dialysis at home. This will be performed with the help of the municipality's nurse and nurse assistants and he now has so many drugs that he receives his medication pre-packed and distributed four times per day by the municipality nurse assistant. Dr. Svensson continues to manage Sven's diabetes as well as his cardiac failure and he visits her 2-3 times a year and additionally he has visit with Dr. Bloom as often as well as with the diabetes nurse. Further he has four daily visits by the municipality nurse assistants and with the municipality nurse every second month. At Sven's first appointment with Dr. Svensson after starting dialysis, she perceived him to be depressed, starting up a treatment with sertraline.

*AS IS: Meddix is used for the communication from the hospital to the home care (delivered by the municipality) at discharge. The prescription of drugs is no longer made in Cosmic but instead in Pascal. The home care in the municipality have their own medical records, neither communicating with the municipality social records nor with Cosmic.*

*C3-Cloud: In C3-Cloud all information and medical advices have been personalized, i.e. Sven gets the information that he should avoid NSAID medication.*

*The home care/home service has full access to C3-Cloud and they add on to the care plans and their medical/social records are fully integrated with the primary care and specialist care records. All communication and information at discharge and all prescriptions takes place on the same platform.*

\*

When Sven is **76 years old**, Lisa got diagnosed with breast cancer with metastases to the bone. Sven's depression had not responded well to treatment and now actually was becoming worse. While Lisa was treated for her cancer, their sons had a vacation and they moved home to live with, and care for their father. To that the help with every day care from the municipality was extended. Dr. Svensson wrote a letter to the psychiatrist Dr. Vikander regarding Sven's depression. Dr. Vikander recommended some medication adjustments and that Sven would receive more support and supervision at home.

*AS IS: As above, no special web-sites for Sven or his next of kin.*

*C3-Cloud: With an updated care plan follows an update of useful and supportive information for the patient, next of kin and care givers.*

\*

Lisa is recovering quite well after treatment but gradually she becomes more and more tired, and so also Sven. When Sven's is about to turn **78 years old**, the sons contacts the municipality nurse as they find the situation impossible for their parents. The municipality nurse made a home visit and then contacted the municipality's assistance officer who decide to offer Sven a place at a special housing.

In the special housing Dr. Allan Pettersson was the consulting GP and the responsible nurse was Anna Grahn. All medication and follow-up was now made by these two, except for the kidney problems and the dialysis were Dr. Blom was responsible.

**AS IS:** As above.

**C3-Cloud:** With C-3 Cloud Dr. Svensson and the diabetes nurse can continue to be responsible for the care of Sven as the nurse at the special housing, Anna Grahn, easily can communicate with them and together they can, if needed modify the care plans.

Sven no longer has the ability to fully understand, review and accept changes in his care plan so he has appointed his sons to help him with that. They therefore get an SMS when the plan is changed and they now can see the plan and accept it or give comments.

#### 4.3.2 Storyboard describing the to-be scenario

<b>TITLE</b>	The journey of Sven Karlsson (multi-morbid patient) across Region Jämtland Härjedalen in a C3-Cloud landscape.	
<b>Brief description of patient</b>	Sven Karlsson, <b>67 years old</b> , living in a small village, nearest shop and doctor 20 km away and 100 km to the nearest city and hospital. Sven is married to Lisa, both recently retired without major health problems. They are socially and physically active. Two sons in Stockholm 600 km away. Sven has had hypertension for 10 years with annual check-ups at the health centre where he meets Dr. Svensson.	
<b>Short Description of the storyboard, including all the encounters that the storyboard is consisted of and describing the total length/running time of the story.</b>	<p>This storyboard illustrates a multi-morbid patient with over time increasing medical problems and involvement of different hospital specialists and the municipality care and care at a special housing. The time span for the scenario is eleven years and consists of twelve encounters.</p> <ul style="list-style-type: none"> <li>A. Primary care physician visit</li> <li>B. Diabetes nurse visit</li> <li>C. Primary care physician visit</li> <li>D. Diabetes nurse visit</li> <li>E. Primary care physician visit</li> <li>F. Hospital specialist visit (nephrology)</li> <li>G. Nutritionist visit</li> <li>H. Hospital admittance</li> <li>I. Hospital specialist visit (cardiology)</li> <li>J. Social home service added</li> <li>K. Hospital specialist consultant (psychiatry)</li> <li>L. Special housing</li> </ul>	
<b>Encounter A</b> Primary care physician visit	<b>Actors and Roles</b>	Sven Karlsson, patient Dr. Anna Svensson
	<b>Pre-condition</b>	Sven has hypertension since 10 years and has known Dr. Svensson for many ears.
	<b>Encounter</b>	At the annual check-up for the hypertension Dr. Svensson notices that Sven has diabetes type 2 plus a mild renal impairment.

		<p>The <b>CLINICAL DECISION SUPPORT MODULE (CDSM)</b> alerts Dr. Svensson that Sven seem to have diabetes and some renal impairment, both alarms based on the laboratory testing registered in the patients EHR; Cosmic.</p> <p>Dr. Svensson confirms both diagnosis to the patients EHR and using the <b>PERSONALISED CARE PLAN (PCP) DEVELOPMENT PLATFORM (PCPDP)</b> updates the <b>PCP</b>.</p> <p>The <b>PCP</b> is based on clinical guidelines and the <b>CDSM</b> and suggests amongst other things treatment with metformin, a tighter blood pressure goal, life style intervention, and examination of urinary bladder and prostatic function.</p> <p>Dr. Svensson review and approve the <b>PCP</b> and discusses it with Sven who also approves the plan. The updated plan is executed and distributed through the <b>Coordinated Care and Cure Delivery Platform (C3DP)</b>. Dr Svensson also informs Sven that other care givers in the <b>Multidisciplinary Team (MDT)</b> have access to the same information through <b>C3DP</b> and he can find his <b>PCP</b> at 1177.se where he also linked to the <b>PCP</b> can find personalized information about his diseases and their treatment as well as treatment guidelines.</p>
	<b>Post-condition</b>	<p>The updated <b>PCP</b> is integrated into the EHR and through 1177.se accessible for Sven in a safe way using “Bank.ID” and for Sven’s next of kin if he gives them access. All <b>MDT</b> members (by now Dr. Svensson, the diabetes nurse, Sven and his wife) have access to the <b>PCP</b>.</p>
	<b>Applications / Functionalities</b>	<p><b>PCPDP</b> derives/updates a new <b>PCP</b> based on previous PCP, guidelines, EHR including medication and lab tests.</p> <p>The <b>PCP</b> is reviewed by the responsible care giver(s) and the patient and exported to the patients EHR, team members on the <b>C3DP</b> and to the patients “my pages” at 1177.se.</p> <p>The <b>CDSM</b> scans the EHR, including for laboratory trends, and actual guidelines to produce a personalized decision support. This is done automatically when new information or new guidelines are added and the results are presented to the responsible care giver when the patients EHR is opened. The system also produces reports of all patients at request and SMS-alarms at pre-set cut-off levels.</p> <p><b>Patient empowerment</b> giving personalized information at 1177.se</p>
<b>Encounter B</b>	<b>Actors and Roles</b>	<p>Sven Karlsson, patient</p> <p>Lisa Karlsson, wife</p>

Diabetes nurse visit		Diabetes nurse Erik Larsson
	<b>Pre-condition</b>	Sven has a newly diagnosed diabetes type 2 and comes with Lisa for diet and life style counselling.
	<b>Encounter</b>	<p>Prior to the encounter Sven together with Lisa has filled a questionnaire regarding life style including eating habits and preferred type of food and physical activities. Together with photos of Sven's meals the last week they have been uploaded to the patient's personal health folder in the <b>C3DP</b> were also nurse Larsson can see the questionnaires and photos (thus estimating caloric content of the meals).</p> <p>Nurse Larsson updated the <b>PCP</b> including nutritional and life style advices.</p> <p>He also informed Sven and Lisa how they via 1177.se on the <b>PATIENT EMPOWERMENT PLATFORM (PEP)</b> could find general and personalized information about diabetes and other diseases and how they in a safe way can send questions to him or Dr. Svensson.</p> <p>Sven gets an automatic blood glucose meter and decides to buy an automatic blood pressure meter and an accelerometer to follow vital measurements and physical activity.</p> <p>Sven wishes to have automatic coaching regarding life style, blood pressure and blood glucose measurements. The support given on <b>PEP</b> is based on, and modified by support from <b>CDSM</b>.</p>
	<b>Post-condition</b>	<p>The <b>PCP</b> is automatically updated and changes are approved by nurse Larsson.</p> <p>Data from <b>devices</b> are now automatically transferred to the patient's <b>personal health folder</b> and to EHR.</p> <p>Sven gets SMS <b>coaching</b> regarding his actual physical activity and regarding blood pressure and blood glucose if increased physical activity or medication could be needed. This coaching is based on information from the <b>CDSM</b>. The care giver is also notified if a changed medication/ altered <b>PCP</b> would be to recommend.</p> <p>On the <b>PEP</b> the information given is personalized based on answers given on questionnaires and on data from the EHR (diagnoses, medication, lab) but also based on data from devices.</p> <p>On the <b>PEP</b> a safe communication (mail, video) between patient and care giver(s) is established.</p>
	<b>Applications / Functionalities</b>	<p>All <b>devices</b> are linked to an automatic safety guard alarming the patient and/or the care giver if measurements indicate a potentially risky situation.</p> <p>The measurements from devices also influence the updating of the <b>PCP</b>.</p>

		<p>The <b>CDSM at least daily (more frequently if requested by the care giver)</b> scans measurements from devices or when new measurements are added to the EHR or when new guidelines are implemented, and if needed, alert for an updated <b>PCP</b>. See also encounter A.</p> <p>On the <b>PEP</b> information and responses from interactive pages are modified in accordance with the actual <b>PCP</b>.</p>
<b>Encounter C</b> Primary care physician visit	<b>Actors and Roles</b>	<p>Sven Karlsson, patient</p> <p>Dr. Anna Svensson</p>
	<b>Pre-condition</b>	Sven has had hypertension for 15 years and diabetes for 5 years and due to decreased kidney function in need of medication change.
	<b>Encounter</b>	<p>The <b>CDSM</b> alerts Dr. Svensson that Sven's kidney function is more deteriorated, which she confirms.</p> <p>Metformin treatment is changed to insulin.</p>
	<b>Post-condition</b>	An updated <b>PCP</b> is created and distributed at <b>C3DP</b> .
	<b>Applications / Functionalities</b>	<p>An updated <b>PCP</b> integrating kidney dysfunction to the underlying algorithm's, is made and distributed.</p> <p>Sven is alerted via SMS that his <b>PCP</b> is updated and the updates are highlighted. Sven is requested to accept/confirm the changes.</p> <p>The diabetes nurse is alerted through <b>C3DP</b> that the patient needs an appointment. Time for appointment sent to the patient via <b>C3DP</b> and SMS.</p> <p>The alerts from <b>CDSM</b> are based on guidelines and rules to check EHR data against. Changing health condition of patient will be reflected in the alerts.</p>
<b>Encounter D</b> Diabetes nurse visit	<b>Actors and Roles</b>	<p>Sven Karlsson, patient</p> <p>Diabetes nurse Erik Larsson</p>
	<b>Pre-condition</b>	Due to renal impairment medication for diabetes need to be changed from tablets (metformin) to insulin.
	<b>Encounter</b>	Nurse Larsson practically demonstrates how insulin should be given and demonstrates interactive information material and videos regarding insulin treatment.
	<b>Post-condition</b>	The <b>PCP</b> is updated at <b>C3DP</b> and distributed to <b>MDT</b> members. To <b>PEP</b> new and personalized information regarding insulin treatment is added.
	<b>Applications / Functionalities</b>	<p>Interactive and personalized educational material on the <b>PEP</b>.</p> <p>The <b>safety guard for devices</b> (blood glucose meter) has its main function in reacting on glucose measurement trends rather than in the value <i>per se</i>.</p> <p>Continuous updates of <b>PCP</b> at <b>C3DP</b>.</p>

<b>Encounter E</b> Primary care physician visit	<b>Actors and Roles</b>	Sven Karlsson, patient Dr. Anna Svensson
	<b>Pre-condition</b>	Sven has hypertension since 17 years and diabetes for 7 years and now more deteriorated kidney function
	<b>Encounter</b>	Dr. Svensson refers Sven to a nephrologist, Dr. Blom at the hospital.
	<b>Post-condition</b>	Dr. Blom can read actual and previous <b>PCP</b> at the <b>C3DP</b> and make changes to the <b>PCP</b> .
	<b>Applications / Functionalities</b>	With the referral the <b>C3DP</b> is fully opened up for the new member of the <b>MDT</b> .
<b>Encounter F</b> Hospital specialist visit (nephrology)	<b>Actors and Roles</b>	Sven Karlsson, patient Dr. Anders Blom, nephrologist
	<b>Pre-condition</b>	Sven is referred for impaired kidney function.
	<b>Encounter</b>	Dr. Blom changes the medication and treatment goals based on suggestions from <b>CDSM</b> and he makes an updating of the <b>PCP</b> to be accepted by dr. Svensson (as she is the plan responsible care giver) and the patient. Dr. Blom also refers Sven to a nutritionist.
	<b>Post-condition</b>	The <b>PCP</b> is updated.
	<b>Applications / Functionalities</b>	An updated <b>PCP</b> can be made partly or completely. A hierarchy within the <b>MDT</b> regarding responsibility for the entire document or parts of it as well as the right to open up for new <b>MDT</b> members has to be clear.
<b>Encounter G</b> Nutritionist visit	<b>Actors and Roles</b>	Sven Karlsson, patient Lisa Karlsson, wife Stina Ek, nutritionist
	<b>Pre-condition</b>	Sven is referred because of a need for a protein reduced diet.
	<b>Encounter</b>	Nutritionist Ek has a series of video consultations with Sven and Lisa on <b>C3DP</b> and she also demonstrates extra educational material on the <b>PEP</b> .
	<b>Post-condition</b>	An updated <b>PCP</b> . Video consultations at <b>C3DP</b> .
	<b>Applications / Functionalities</b>	Updates of <b>PCP</b> . Integrated video consultation opportunities at <b>C3DP</b> , encounters that are at request recorded and stored as part of the <b>PEP</b> .
<b>Encounter H</b> Hospital admittance	<b>Actors and Roles</b>	Sven Karlsson, patient Dr. Anders Blom, nephrologist Nurses and nurse assistants at the hospital and in the municipality.
	<b>Pre-condition</b>	Acute need for dialysis after that he has taken NSAIDs for knee problems.



	<b>Encounter</b>	<p><b>CDSM</b> suggests hemo-dialysis followed by peritoneal dialysis and the electrolytes and fluids used at the treatment. Dr. Blom approves and treatment starts in hospital.</p> <p>Continued peritoneal dialysis at home. Municipality nurses and nurse assistants are included in the <b>MDT</b>.</p> <p>Communication with municipality care givers via <b>C3DP</b> and linked to that is a web based education regarding peritoneal dialysis for municipality nurses/nurse assistants at <b>C3DP</b>.</p> <p>The EHR and social records for the municipality care givers is integrated at <b>C3DP</b>.</p>
	<b>Post-condition</b>	Updated <b>PCP</b> , personalized information and education also for care givers.
	<b>Applications / Functionalities</b>	<p>Personalized information and education also for care givers.</p> <p>Medical and social records integrated in the <b>PCP</b>.</p>
<b>Encounter I</b> Hospital specialist visit (cardiology)	<b>Actors and Roles</b>	<p>Sven Karlsson, patient</p> <p>Dr. X cardiologist</p>
	<b>Pre-condition</b>	Acute cardiac failure when Sven is referred to the hospital for kidney dysfunction.
	<b>Encounter</b>	<b>CDSM</b> suggests treatment changes and follow up. A plan for the follow up is displayed at <b>C3DP</b> in the <b>PCP</b> (potentially after MDT agreement) and automatically scheduled for appointments and blood sampling.
	<b>Post-condition</b>	Updated <b>PCP</b>
	<b>Applications / Functionalities</b>	Via <b>C3DP</b> is an alert sent to both Sven and to the municipality nurse when it's time for blood sampling and an alarm function also when procedures are outside the scheduled.
<b>Encounter J</b> Social home service added	<b>Actors and Roles</b>	<p>Sven Karlsson, patient</p> <p>Municipality nurse, nurse assistants and municipality assistance officer.</p>
	<b>Pre-condition</b>	Sven has a need for home service
	<b>Encounter</b>	The <b>PCP</b> is updated with the social services needed.
	<b>Post-condition</b>	An updated <b>PCP</b> also including social services
	<b>Applications / Functionalities</b>	An integration of parts of the social records with <b>C3DP</b> is needed.
<b>Encounter K</b> Hospital specialist	<b>Actors and Roles</b>	<p>Sven Karlsson, patient</p> <p>Dr. Vikander, psychiatrist</p>
	<b>Pre-condition</b>	Depression last year.

consultant (psychiatry)	<b>Encounter</b>	The <b>CDSM</b> analysis potential drug interactions and suggests thereafter changed treatment.
	<b>Post-condition</b>	Updated <b>PCP</b>
	<b>Applications / Functionalities</b>	A need for a personalized (age, sex, kidney and liver function) drug interaction module at <b>C3DP</b> .
<b>Encounter L</b> Special housing	<b>Actors and Roles</b>	Sven Karlsson, patient Lisa Karlsson, wife Two sons in Stockholm Dr. Anna Svensson Dr. Anders Blom, nephrologist Nurses and nurse assistants at the special housing
	<b>Pre-condition</b>	Sven now lives in a special housing. New <b>MDT</b> members added and some leave.
	<b>Encounter</b>	Daily social and medical care at the special housing. Devices deliver measurements daily and lab tests frequently.
	<b>Post-condition</b>	Sven's next of kin are updated of the care through the <b>PCP</b> and they also have help from the <b>PEP</b> .
	<b>Applications / Functionalities</b>	Next of kin/guardian can have access to <b>PCP/PEP</b> in a safe way.  If the patient makes many unsuccessful attempts to use <b>PCP/PEP</b> an alarm should be sent to care giver. This could be due to dementia, or at least indicate a problem that has to be solved.

Figures 2 and 3 show graphical representations of the patient scenario. Figure 2 shows the “as-is” situation at age 78 years old in RJH, while Figure 3 shows the ideal situation in RJH.

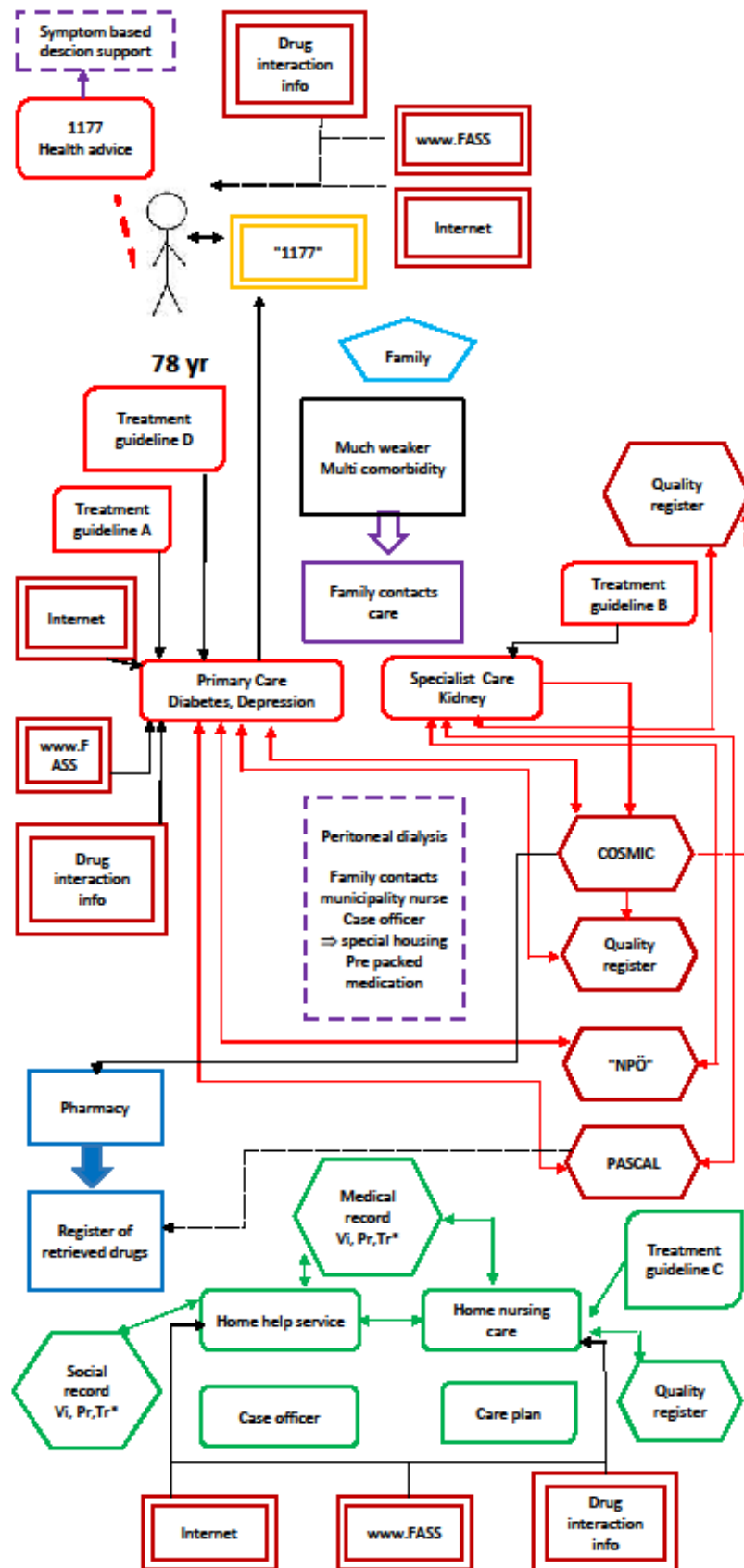


Figure 2. Graphical description of as-is situation in RJH for patient Sven Karlsson at age 78 years.

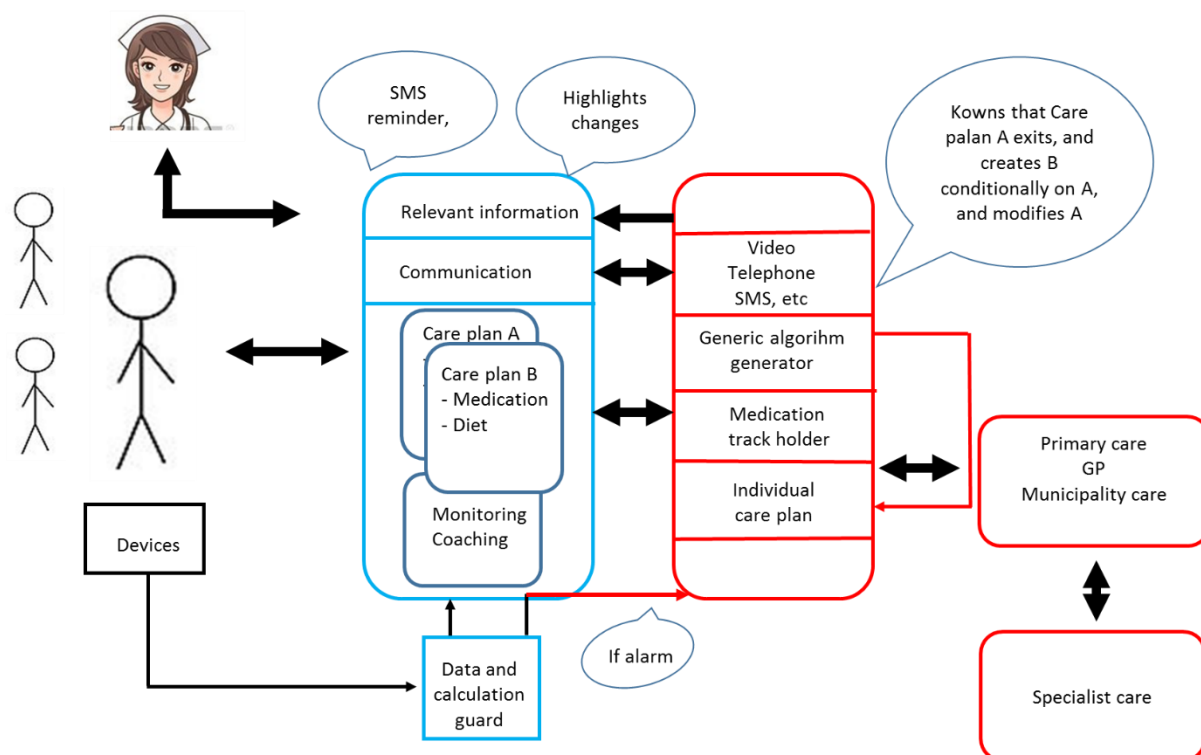


Figure 3. Ideal situation for patients, next of kin, and care givers

## 4.4 South Warwickshire NHS Foundation Trust, Warwickshire

### 4.4.1 Patient scenario Mrs. White, as-is and with C3-cloud.

Mrs White is an 86 year old woman who has been divorced for over 40 years. She lived with her daughter, son-in-law, and granddaughter. She retired when she was 70 years old and she was well known in the town as she owned and ran the local children's fairground rides in the park.

Her daughter works locally at the local council as does her husband and her granddaughter is completing her final year at school and hopes to go to university.

Their home is small and does not provide enough privacy for her daughter and son-in-law. For the last three years Mrs White has been housebound and has chosen to reside in her bedroom. She did not access the kitchen or the lounge. To help with meals and personal care whilst the family were working she had a care package, whereby carers visited three times every day. Her friends still visited her at home but she no longer attended family outings or holidays.

Mrs White has been diagnosed with type 2 diabetes since 2004 (12 years). She has limited ability to walk more than 10 metres due to lumbar spine degeneration. To assist mobility she walks with two sticks in the home but requires the use of a wheelchair for visits outside the home.

Her diabetes was managed by her GP and the practice nurse. Mrs White attended her follow-up visits every six months as per the national recommendations for Type 2 Diabetes up until she became housebound. After this her GP visited her at home but her health was not as good and she was not always compliant with her medication. This led to her developing Stage three Chronic Kidney Disease (CKD) which meant that her oral medication was changed to insulin. This took place at the surgery with the support of the practice nurse and she became independent with the technique of giving insulin.

***AS IS:** Education about diabetes takes place in the GP surgery with the practice nurse and she was introduced to education literature from diabetes UK. She does not always understand how her medication works and the importance of diet and exercise. She does not understand the implications of Chronic Kidney Disease (CKD).*

***C3-Cloud:** Mrs. White could be introduced to the patient empowerment platform and read suitable information about the benefits of her treatments and how her drugs work. This would improve compliance with medication as it would be accessible when she needed it.*

\*

Her GP was called to review Mrs. White in her home as she had red, hot, swollen legs. A diagnosis of cellulitis was confirmed and was treated with oral antibiotics; however, she did not respond to the treatment and was admitted to the acute care hospital. During this admission she was diagnosed with chronic heart failure she was stabilized and transferred back to the care of her GP. At this time she was also referred to a social worker who recommended that Mrs. White moved into a residential care home. She and her family were in agreement with this placement.

***AS IS:** The hospital sent a discharge summary to the GP but it does not contain the details of the admission; e.g. what form of education she has received to promote self-management. It does list her test results, drug changes and suggested management plan. The in-depth report of the admission is held in the acute hospital records which is not directly available to the GP.*

*The social worker also writes an independent report which is not shared with the health professionals and is held in an electronic format on their IT systems. The patient Mrs. White receives the recommendation from her social assessment as does the care home in paper format.*

*The hospital alerts the Community Matron and Community Nursing Team that she has been discharged to the care home. This occurs through the GAP Scheduling tool. They request education and monitoring of heart failure and diabetes to be given to the patient and the care staff. The Matron can then view the discharge prescription, summary of acute care and blood results using the IT systems as they are employed by South Warwickshire Foundation Trust (SWFT).*

***C3-Cloud:** C3-Cloud would enable a seamless flow from acute care to primary care through updating of the Personalized Care Plan Development Platform (PCPDP). The reconciliation of clinical guidelines for both heart failure and type 2 Diabetes would be updated and provide the health care professionals with clear guidelines on prescribing and non-medical treatments. Mrs White would be able to access update information from the Patient Empowerment Platform. The social care team would be able to update her social plan in accordance with her new and future needs via the PCPDP.*

\*

Mrs. White now resides in a residential home for the elderly and receives 24 hour care support. She has her own room and bathroom and is able to access the dining room and lounge. She participates in the group activities and has started to deliver her own art group. This has increased her confidence but she misses her family home. Her family visits at least twice a week. At a regular review from the Community Matron it was noted that Mrs. White was more breathless and her legs were becoming swollen. Appropriate blood tests were carried out and her medication was adjusted to improve her diuresis and monitor her renal function. This treatment was initiated by the Matron with consent from the GP. The Community Heart failure team were notified as she did not respond to the treatment and she was referred for ambulatory assessment and delivery of intravenous medication in the acute hospital. The admission was averted and her condition improved over a period of three weeks until once again she is now stable. However, her blood glucose levels became unstable and she has had to have weekly visits from the Matron to titrate her insulin so that she is once again stable and enjoying life in the care home.

**AS IS:** GP and Matron can access the blood results externally. Her health records at the surgery are updated electronically, the referral to ambulatory care was made electronically by the GP through the shared system. Patient and carers are given written and verbal information so that they understand Mrs. White's nursing care plan to promote stability in her care. Written information is downloaded from the SWFT website and given to Mrs. White to help her recognize changes that can occur in heart failure and what to do about these changes. All contacts from the community nursing team is recorded on the GAP system electronically, but this does not contain in-depth information about her care.

**C3-Cloud:** Her care plan would be updated via the PCPDP and the Clinical Decision Support Modules would provide the researched based gold standard information with which to develop the care plan. All members of the multidisciplinary team would be able to access this new information.

The Patient Empowerment Platform would update Mrs White about managing her medication and the importance of weighing daily to monitor fluid overload and maintain stability in her three chronic conditions.

#### 4.4.2 Storyboard describing the to-be scenario

TITLE	Complexity of Type 2 Diabetes, Chronic Kidney Disease and Chronic Heart Failure
<b>Brief description of patient</b>	<p>Mrs White is an 86 year old female. She lives in a residential care home that has care facilities 24 hours a day. Any nursing needs that the residents might have are managed by the community nursing team.</p> <p>She has a daughter who also lives in Warwick and a granddaughter. Up until eight months ago she lived with her daughter, son in law and her granddaughter. She had been housebound for three years. She managed her daily living activities and food preparation with the support of a domiciliary care team which was funded by social services. Her daughter ensured that she took her medication, liaised with health professionals and did the laundry.</p> <p>She is a well-known person in the local community as she owned and managed the fairground attractions in the local park until she retired at the age of 70. However, due to her medical condition she is not able to walk more than 10 metres on the flat and is unable to manage the stairs. She spends her time reading and watching wildlife documentaries.</p> <p>She has been divorced for over 40 years and has no contact with her ex-husband. She has a close friend who visits her regularly at home and now in the residential home.</p> <p>Mrs White has been living with type 2 diabetes for 12 years and also has a degenerative disorder of her lumbar spine which has meant that she has been unable to exercise as she would have liked. This was managed by her GP and the practice nurse. In 2008 she developed Stage three chronic Kidney Disease and her medication to manage her diabetes was changed to insulin. Again this was managed through regular follow-up appointments with her GP and practice nurse.</p>

<b>Short Description of the storyboard,</b> including all the encounters that the storyboard is consisted of and describing the total length/running time of the story.	<p>The story board starts when Mrs White begins to feel unwell with cellulitis which led onto an acute admission into hospital and the diagnosis of Chronic heart failure. The time span for the story board is eight months and includes Mrs White's encounters with various health and social care providers, as follows:</p> <ul style="list-style-type: none"> <li>• GP</li> <li>• Community Nursing Team/Community Matron</li> <li>• Acute Hospital Specialist</li> <li>• Social Worker</li> <li>• Cardiology Team</li> <li>• Heart Failure Team</li> </ul> <p>In C3-Cloud it would be necessary to ascertain who the lead clinician and care plan manager would be - most likely the GP.</p> <p>Access for other members would be on a need to know basis - determined by what is relevant for them to be able to manage the patient and work within the confidentiality framework.</p>	
<b>Encounter A</b>	<b>Actors and Roles</b>	<ul style="list-style-type: none"> <li>• Patient - Mrs White</li> <li>• Patient's Daughter - Mrs Brown</li> <li>• GP (medical doctor to whom the patient is assigned)</li> <li>• Community Nursing Team for the locality in which Mrs White lives</li> </ul>
	<b>Pre-condition</b>	<p>Mrs White had Type 2 diabetes for 12 years and her GP had known her for the last 15 years. Her care was managed and coordinated in the community; she received one to one education from the practice nurse about the management and promotion of wellbeing in diabetes. She was given verbal and written information about the drugs she needed to take to keep her healthy and reduce the disease progression. However, she went onto develop chronic Kidney Disease stage 3 and started to use insulin which she administered herself twice a day. She continued to have regular six monthly follow-up appointments with her GP and Nurse until she became housebound in 2013. The follow-up visits were then conducted by the GP in her home. She did not have access to a plan of care that she could read and add to.</p>

	<b>Encounter</b>	<p>In January 2015 she developed swollen legs which were diagnosed as being cellulitis and she was treated at home by her GP with diuretics and antibiotics. He also enlisted the community nursing team to visit Mrs White and manage her swollen legs. The nurse provided a written plan that stays in the home of Mrs White and contains information about her past medical problems, education materials to maintain skin integrity and manage her diabetes. She was given further education about diabetes management particularly when suffering an acute infection. Her daughter was also actively informed of her care and any changes to her medication, i.e. what it's for and how it should be stored and taken. However, her condition deteriorated and the GP admitted her into hospital for intravenous antibiotic therapy.</p> <p>Using the C3-Cloud Personalised Care Plan Development Platform (PCPDP) the GP could update the personal care plan (PCP). Using the information within the Decision Support Modules, the plan could be reconciled with the national clinical guidelines for Type 2 Diabetes, Chronic kidney Disease (CKD) when the patient is acutely unwell. This would support the clinicians in prescribing the correct drug treatment. This updated Care plan could be discussed with Mrs White and her daughter. Mrs White could be shown how to access the information and how to interact with the platform to utilise her self-management plan.</p> <p>The plan could then be accessed by the other care providers within the MDT. A video link with MDT members and the patient could assist in delivery and provide an environment for discussion.</p>
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	<b>Post-condition</b>	<p>This information about her condition &amp; treatment was entered on to the electronic health records held at the GP surgery (EMIS). This includes alerts when routine monitoring should take place, past and acute medication interactions. The community nursing team operate a paper care plan which is updated at each visit. Information about medical conditions and drugs were given to Mrs White in a paper format and there is the facility to access Websites outside of SWFT for diabetes management. The test results are accessed by the community nursing team from the ICE reporting system which is part of South Warwickshire Foundation Trust (SWFT).</p> <p>C3-Cloud, through the Patient Empowerment Platform (PEP), through the patient empowerment platform (PEP), would give Mrs White current up to date personalised information to enable her to learn more about her illness and how to manage her symptoms thus improving her health and wellbeing. This should be interactive so that she can evaluate her own learning and make informed choices about her future care.</p>
	<b>Applications / Functionalities</b>	<p>Currently, the patient's information is entered onto EMIS for all members of the GP Surgery to read &amp; add to but this is not available for the wider MDT.</p> <p>PCDP where new care plans can be added from the template or the existing care plans can be updated</p> <p>Reconcile care plan for multiple co morbidities</p> <p>Clinical Decision Support Modules would allow members of the MDT to have access to clinical guidelines and pharmaceutical information to improve prescribing.</p> <p>C3DP would allow MDT team collaboration</p> <p>PEP would allow patients to allow care plans and self-care management material</p> <p>All of the above would need to be accessible in the community as the MDT teams are mobile clinicians</p>
<b>Encounter B</b>	<b>Actors and Roles</b>	<p>Patient - Mrs White</p> <p>Patient's daughter - Mrs Brown</p> <p>Cardiologist in acute SWFT</p> <p>Social worker in Acute SWFT</p>
	<b>Pre-condition</b>	<p>Development of cellulitis and swollen legs that did not respond to oral therapies in her home environment which resulted in an admission to hospital.</p>

	<b>Encounter</b>	<p>Mrs White and her daughter are given a new diagnosis of Chronic heart failure after she had been investigated and underwent test during her hospital admission. Due to the effects of her recent illness a referral was made to the social worker to review her care plan with them. It was decided by all players that the best option would be for Mrs White to reside in a Care facility where she would have access to carers 24hrs a day. They would also monitor and dispense her medications. However, she could still be independent with her diabetes monitoring and insulin administration.</p>
	<b>Post-condition</b>	<p>Mrs White is discharged to the care home after receiving initial education from the heart failure Team on her new condition. This will be followed up by the community matron to complete the education and monitoring of her complex morbidities.</p> <p>The Community Nursing team support the staff in the care home with education around the management of diabetes and heart failure to determine any alteration in her condition early and thus initiate changes in her care plan. They will also be given support of the GP and Matron to prevent further admissions and optimise her well-being.</p> <p>Mrs White is followed-up within two weeks of discharge as per the NICE guidelines and local guidelines as developed by the heart failure team. A new care plan is issued from social services onto their system and the care home formulates a plan in agreement with Mrs White that is updated daily and is hand written. This is kept locked in an office and is not added to by Mrs White.</p> <p>Discharge plan is added to the hospital electronic records and the JAC prescribing system issues a paper copy for the summary of admission, medication changes and medications on discharge and finally follow-up and instructions for the GP to formulate a new plan.</p> <p>Electronic referral is made to the Community Matron/Community Nurses via the GAP scheduling tool. The team can access electronic copies of JAC report and any information that has been entered onto the electronic patient record.</p> <p>GP is also notified of change of address and patient discharge summary as above. Changes added to the EMIS electronic system</p>

	<b>Applications / Functionalities</b>	<p>PCPDP- To update the Care plan</p> <p>New care plan for heart failure and social care</p> <p>(Clinical Decision Support Modules to enable the reconciliation of her care plan for her multiple conditions.)</p> <p>Coordinated Cure and Care delivery Platform to facilitate MDT collaboration</p> <p>Patient Empowerment Platform with updated information on the management of her new condition</p>
<b>Encounter C</b>	<b>Actors and Roles</b>	<ul style="list-style-type: none"> <li>• Patient - Mrs White</li> <li>• Patient's daughter - Mrs Brown</li> <li>• Care home staff</li> <li>• Community Matron/Community Nursing Team</li> <li>• GP</li> </ul>
	<b>Pre-condition</b>	Matron notified of discharge through electronic GAP system and appointment scheduled for an assessment.

	<b>Encounter</b>	<p>One to one contact with the patient to provide education and advice around heart failure symptoms, the drug management of heart failure and diabetes and how this is related and managed with someone who has chronic Kidney Disease.</p> <p>The heart failure was stable and her drugs optimised for her condition. During routine follow-up it was noted that Mrs White blood glucose readings were extremely high. This led to a change in her nursing plan, further education around dietary intake as she had rather a sweet tooth and support from the home to provide the correct the diet.</p> <p>The Matron ascertained her knowledge about her management around diabetes and further education advice was given and she was reassessed in her ability to perform blood glucose monitoring and administration of insulin. This was verbally reported to the GP who was able to enter this onto the electronic EMIS system. It was then hand written into the nursing care plan which the patient and care team also have access to.</p> <p>The Matron was then able to titrate her insulin therapy over a period of several weeks until it stabilized. This was supported by the GP and was written into the care home plan so that everyone was aware of the decisions that had been made and her treatment. Information was available re blood results electronically through SWFT intranet and electronic access to the British National Formulary.</p> <p>In C3-Cloud, the Matron would be able to update the care plan via the PCPDP and the GP would have instant access to the new insulin doses. The system would alert them of the changes being made and by whom. Mrs White would be able to consolidate her learning through the PEP (Patient empowerment Platform).</p>
	<b>Post-condition</b>	<p>Patient and carers feel more competent with managing diabetes and heart failure as they are aware of acting upon early recognition of changes in her condition and symptoms.</p> <p>Once completed the written care plan is available for the patient and all involved in her care and this can be accessed with the permission of the patient.</p> <p>The GP is able to enter this information and changes onto the EMIS system.</p>

	<b>Applications / Functionalities</b>	<p>Schedule for nurses visits accessed through GAP.</p> <p>The GP is able to update electronic information and patient records into EMIS.</p> <p>Information about admission, discharge is available for nurses to access via patient electronic patient records at SFWT, ICE and JAC.</p> <p>GP electronic record of address and patient discharge summary as above. Changes added to the EMIS electronic system on EMIS</p> <p>C3-Cloud Tools used:</p> <p>Personalised Care Plan Development Platform Patient Empowerment Platform Clinical Decision Support Modules Coordinated Cure and Care Delivery Platform</p>
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## 5 PILOT APPLICATION USER REQUIREMENTS

The pilot application scenarios that are provided within Section 4, have been analysed and high-level user requirements have been extracted from them which are presented in this section. In D3.2 these user requirements will be mapped to detailed technical use cases for ensuring traceability of user requirements to technical system requirements.

Requirement ID	Pilot Application Scenario Requirements	Mapping to Pilot Scenarios	Mapping to High Level components
PAR-1	As a Patient/Informal Care Giver, I need to access Patient Empowerment Platform to learn about treatment options, about how drugs work along with their benefits	Basque Scenario-Encounter A, B  RJH Scenario – Encounter A, B, D  SWFT Scenario-Encounter A, B, C	Patient Empowerment Platform
PAR-2	As a Patient/Informal Care Giver, I need to access Patient Empowerment Platform to learn about my condition (when possible through interactive educational material)	Basque Scenario-Encounter A, B  RJH Scenario – Encounter A, B, C, G  SWFT Scenario-Encounter A, B, C	Patient Empowerment Platform
PAR-3	As a Health Professional and/or Social Worker in the MDT, I need to access the EHRs of the patient	Basque Scenario-Encounter A, C, D, E, F	Local EHR system (named Osabide Global in Osakidetza, Basque

Requirement ID	Pilot Application Scenario Requirements	Mapping to Pilot Scenarios	Mapping to High Level components
		RJH Scenario – Encounter A, B, C, D, E, F, G, H, K, L  SWFT Scenario-Encounter A, B, C	Country Cambio Cosmic in RJH)
PAR-4	As a Health Professional and/or Social Worker in the MDT, I need to access the EHRs of the patient to record clinical assessment findings and the diagnosis.	Basque Scenario-Encounter A, C, D, E, F  SWFT Scenario-Encounter C	Local EHR system (named Osabide Global in Osakidetza, Basque Country, EMIS in SWFT)
PAR-5	Personalised Care Plan Development Platform and Coordinated Care and Cure Delivery Platform needs to be updated about the recent context of the patient (i.e. new clinical assessment findings, diagnosis, lab results, referrals, consult notes, discharge notes), in order to share them with all MDT and also in order to be able to run Clinical Decision Support Modules with the most recent patient context while assisting MDT members	Basque Scenario-Encounter A, B, C, D, E, F  RJH Scenario – Encounter A, B, C, D, E, F, G, H, K, L  SWFT Scenario-Encounter A, B, C	Local EHR system (named Osabide Global in Osakidetza, Basque Country, Cambio Cosmic in RJH) Personalized Care Plan Development Platform Coordinated Care and Cure Delivery Platform Technical Interoperability Suite Semantic Interoperability Suite
PAR-6	As a Health Professional in the MDT, in each encounter I want to review patient's health record, check the progress and any risks of non-adherence (compliance) and complication, and define new or update existing goals and timing, intervention and self-care activities	Basque Scenario-Encounter A, B, C, D, E, F  RJH Scenario-Encounter A, B, C, D, F, G, H, J, K, L  SWFT Scenario-Encounter A, B, C	Local Care Systems Patient Empowerment Platform Coordinated Care and Cure Delivery Platform Personalised Care Plan Development Platform
PAR-7	As a Health Professional in MDT, I want the support of Personalised Care Plan Development Platform for reconciliation of clinical guidelines for multiple conditions (such as hypertension, diabetes, renal failure and heart failure)	Basque Scenario-Encounter A, B, E  RJH Scenario – Encounter A, C, F, H  SWFT Scenario-Encounter A,B, C	Personalised Care Plan Development Platform Clinical Decision Support Modules
PAR-8	As a Health Professional in MDT, I want the Clinical Decision Support Modules to continuously scan data from patient device measurements	Basque Scenario-Encounter D, F	Clinical Decision Support Modules Coordinated Care and Cure Delivery

Requirement ID	Pilot Application Scenario Requirements	Mapping to Pilot Scenarios	Mapping to High Level components
	and patient herself (e.g. questionnaires) as well as new clinical guidelines to alert me when there is a need to update the care plan of the patient	RJH Scenario-Encounter B	Platform Patient Empowerment Platform Technical Interoperability Suite
PAR-9	As a Health Professional in MDT, I want the support of Clinical Decision Support Modules to advise me medication updates based on the current conditions/medications of the patient by also considering drug interactions	Basque Scenario-Encounter A, B, D, E, F  RJH Scenario – Encounter A, C, D, F, H, K  SWFT Scenario-Encounter A, B, C	Clinical Decision Support Modules
PAR-10	As a Health Professional in MDT, I want the support of Clinical Decision Support Modules to advise me goals, interventions such as treatment options including medications, diagnostic procedures, goal-oriented lifestyle and activity modifications based on the current conditions of the patient	Basque Scenario-Encounter A, B, D, E, F  RJH Scenario – Encounter A, C, F, H  SWFT Scenario-Encounter A,B, C	Clinical Decision Support Modules
PAR-11	The tools supporting editing of care plans shall make clear the responsible editors of different sections of care plan	Basque Scenario-Encounter A, B, D, E  RJH Scenario – Encounter F  SWFT Scenario-Encounter C	Personalized Care Plan Development Platform
PAR-12	As a Patient, I want to see and accept/reject the care plan listing the identified problems, potential risks, goals, management strategies and intended outcomes	Basque Scenario-Encounter A, B, C, D, E, F  RJH Scenario – Encounter A, B, C, D, F, H, J, K  SWFT Scenario-Encounter A, B, C	Personalized Care Plan Development Platform & Patient Empowerment Platform
PAR-13	As an Informal Care Giver appointed on behalf of the patient, I want to see and accept/reject the care plans of my loved ones listing the identified problems, potential risks, goals, management strategies and intended outcomes	RJH Scenario – Encounter L  SWFT Scenario-Encounter A, C	Coordinated Care and Cure Delivery Platform & Patient Empowerment

<b>Requirement ID</b>	<b>Pilot Application Scenario Requirements</b>	<b>Mapping to Pilot Scenarios</b>	<b>Mapping to High Level components</b>
PAR-14	As a Health Professional in MDT, I want to share the updated care plan along with my clinical notes/progress notes/discharge summary with all MDT members	Basque Scenario- Encounter A, B, C, D, E, F  RJH Scenario – Encounter A, B, C, D, F, G, H, J, K, L  SWFT Scenario- Encounter A, B, C	Coordinated Care and Cure Delivery Platform
PAR-15	It should be possible to export the approved care plan from the Personalised Care Plan Development Platform to the patient's medical record	Basque Scenario- Encounter A, B, C, D, E, F  RJH Scenario – Encounter A, B, C, D, F, G, H, J, K, L	Local Care Systems Personalised Care Plan Development Platform Technical Interoperability Suite Semantic Interoperability Suite
PAR-16	As a Patient, I want to be notified if my existing care plan is updated, highlighting the changes	Basque Scenario- Encounter A, B, D, F  RJH Scenario – Encounter C, D, F, G, H, J, K  SWFT Scenario- Encounter A, B, C	Personalised Care Plan Development Platform & Patient Empowerment Platform Technical Interoperability Suite Semantic Interoperability Suite
PAR-17	As an Informal Care Giver appointed on behalf of the patient, I want to be notified if the existing care plans of my loved ones are updated, highlighting the changes	RJH Scenario – Encounter L  SWFT Scenario- Encounter A, C	Personalized Care Plan Development Platform & Patient Empowerment Platform
PAR-18	As a Patient I want to give access rights to my loved ones to view my care plan	Basque Scenario- Encounter E  RJH Scenario – Encounter E  SWFT Scenario- Encounter A, C	Patient Empowerment Platform
PAR-19	As an Informal Care Giver I want to see a copy of the care plan of my loved ones (if access is granted)	RJH Scenario – Encounter A  SWFT Scenario- Encounter A, C	Personalized Care Plan Development Platform & Patient Empowerment Platform



<b>Requirement ID</b>	<b>Pilot Application Scenario Requirements</b>	<b>Mapping to Pilot Scenarios</b>	<b>Mapping to High Level components</b>
PAR-20	As a Patient I want to be advised about how to follow the care plan	Basque Scenario-Encounter A, B, D, E, F  SWFT Scenario-Encounter A, B, C	Patient Empowerment Platform
PAR-21	As a Patient I want to get SMS notifications about my interventions planned in my care plan (such as medications)	RJH Scenario – Encounter E	Patient Empowerment Platform
PAR-22	As a Patient, I need to access drug interaction information	Basque Scenario-Encounter A	Patient Empowerment Platform & related local sites (Osasun eskola and i-Botika web pages)
PAR-23	As a Patient/Informal Care Giver, I want to be able to remotely get in touch with social care services	Basque Scenario-Encounter B	Patient Empowerment Platform
PAR-24	As a Patient I want to be able to schedule next appointment with my Primary Care Provider	Basque Scenario-Encounter A, C, F	Local Booking system of the primary care (Osarean for Basque Country)
PAR-25	As a Social Worker/Specialist, I want a mechanism to become a part of MDT	Basque Scenario-Encounter B  SWFT Scenario-Encounter B	Coordinated Care and Cure Delivery Platform
PAR-26	As a Social Worker/Specialist, I want to access the recent context (i.e. care plan) of the patient after my membership to MDT is approved by the Care (Plan) Manager	Basque Scenario-Encounter B  RJH Scenario-Encounter E  SWFT Scenario-Encounter B, C	Coordinated Care and Cure Delivery Platform
PAR-27	As a Health Professional in MDT, I want to specify the next Care Plan Review meeting	Basque Scenario-Encounter B, F	Personalized Care Plan Development Platform
PAR-28	As a Health Professional or Social Worker in MDT, I want to define new specialized care plans for the patient	Basque Scenario-Encounter B  RJH Scenario-Encounter E  SWFT Scenario-Encounter B, C	Personalized Care Plan Development Platform
PAR-29	As a Social Worker / Health Professional in MDT, I want to initiate referrals to another Specialist by sharing the information about the patient's	Basque Scenario-Encounter B, C, D, E	Local Care Systems Coordinated Care and Cure Delivery Platform Technical Interoperability Suite

Requirement ID	Pilot Application Scenario Requirements	Mapping to Pilot Scenarios	Mapping to High Level components
	medical history including the recent diagnosis, reasons for referral and requested services	RJH Scenario-Encounter E, F, G	
PAR-30	As a Health Professional in MDT, I want to invite another Specialist to MDT after referrals so that they can see the information about the patient's medical history including the recent diagnosis, reasons for referral and requested services, and also active and previous care plans	Basque Scenario-Encounter D, E  RJH Scenario-Encounter E, F, G	Local Care Systems Coordinated Care and Cure Delivery Platform
PAR-31	As a Health Professional in MDT, I want to invite Homecare social care providers such as Municipality nurses and nurse assistants to MDT so that they can see the information about the patient's medical history including the recent diagnosis, reasons for referral and requested services, and also active and previous care plans	RJH Scenario-Encounter H, J, L  SWFT Scenario-Encounter B	Local Care Systems Coordinated Care and Cure Delivery Platform
PAR-32	Coordinated Care and Cure Delivery Platform needs to be updated about the recent context of the patient from the social care services in order to share them with all MDT and also in order to be able to run Clinical Decision Support Modules with the most recent patient context while assisting MDT members	Basque Scenario-Encounter B  RJH Scenario – Encounter H, J, L  SWFT Scenario-Encounter B, C	Local Social Care Systems Coordinated Care and Cure Delivery Platform Technical Interoperability Suite Semantic Interoperability Suite
PAR-33	As a member of MDT, I want to be able to communicate with the other members of MDT via asynchronous messaging and video calls	Basque Scenario-Encounter D, E  RJH Scenario-Encounter H	Coordinated Care and Cure Delivery Platform
PAR-34	As a member of MDT, I want to access web based educational material related with the care of the patient	Basque Scenario-Encounter A  RJH Scenario-Encounter H	Coordinated Care and Cure Delivery Platform
PAR-35	As a MDT Member, I want to access the readings from remote monitoring systems such as wireless medical sensor devices	Basque Scenario-Encounter C, D, F  RJH Scenario-Encounter B	Local Care Systems (Including Remote monitoring systems and EHR systems) and/or Patient Empowerment Platforms Coordinated Care and Cure Delivery Platform Technical Interoperability Suite

<b>Requirement ID</b>	<b>Pilot Application Scenario Requirements</b>	<b>Mapping to Pilot Scenarios</b>	<b>Mapping to High Level components</b>
PAR-36	As a Patient/Informal Care Giver, I want to access the readings from remote monitoring systems such as wireless medical sensor devices from the Patient Empowerment Platform	Basque Scenario-Encounter C, D, F  RJH Scenario – Encounter B	Local Care Systems (Including Remote monitoring systems and EHR systems) Patient Empowerment Platform Technical Interoperability Suite
PAR-37	As a Health Professional in MDT, I want to be notified about the deviations of the remote monitoring systems readings from the set goals in the care plan and the abnormal results, which can trigger updates in the care plan	Basque Scenario-Encounter D  RJH Scenario – Encounter B	Remote monitoring systems and EHR systems) and/or Patient Empowerment Platform Coordinated Care and Cure Delivery Platform Clinical Decision Support Modules
PAR-38	As a Health Professional in MDT, I want to be notified about the selected pre-emergency situations detected through the abnormal results in remote monitoring results via SMS messages	RJH Scenario – Encounter B	Remote monitoring systems and EHR systems) and/or Patient Empowerment Platform Coordinated Care and Cure Delivery Platform Clinical Decision Support Modules
PAR-39	As a Patient I want to be notified about the selected pre-emergency situations detected through the abnormal results in remote monitoring results via SMS messages	RJH Scenario – Encounter B	Remote monitoring systems and EHR systems) and/or Patient Empowerment Platform Coordinated Care and Cure Delivery Platform Clinical Decision Support Modules
PAR-40	As a Health Professional in MDT, I want to be notified about the identified trends for the selected remote monitoring systems readings	Basque Scenario-Encounter C  RJH Scenario – Encounter C	Remote monitoring systems and EHR systems) and/or Patient Empowerment Platforms
PAR-41	As a Health Professional in MDT, I want to update the care plan when triggered by notifications about the deviation of readings of remote monitoring systems and abnormal results	Basque Scenario-Encounter D  RJH Scenario – Encounter B	Personalized Care Plan Development Platform Coordinated Care and Cure Delivery Platform
PAR-42	As an Informal Care Giver, I want the ability to get on online contact with MDT members of my loved ones	Basque Scenario-Encounter E	Patient Empowerment Platform

<b>Requirement ID</b>	<b>Pilot Application Scenario Requirements</b>	<b>Mapping to Pilot Scenarios</b>	<b>Mapping to High Level components</b>
PAR-43	As a Health Professional in MDT, I want to be able to review the recent patient context from C3DP and organize a virtual case review meeting	Basque Scenario-Encounter E	Coordinated Care and Cure Delivery Platform
PAR-44	As a Health Professional in MDT, I want to be advised by the Clinical Decision Support Modules employed by C3DP, about treatment options (such as starting/stopping drugs based on the most recent context of the patient including the changes in the recent remote monitoring results)	Basque Scenario-Encounter D, E  RJH Scenario – Encounter B	Coordinated Care and Cure Delivery Platform Clinical Decision Support Systems
PAR-45	As a Patient, I want to access a copy of my discharge summary along with discharge care plan	Basque Scenario-Encounter E	Local EHR system (named Osabide Global in Osakidetza, Basque Country) Coordinated Care and Cure Delivery Platform Patient Empowerment Platform
PAR-46	As a Health Professional, I want the support of Clinical Decision Support Modules for identification of diagnosis based on recent lab results based on clinical guidelines	Basque Scenario-Encounter E  RJH Scenario-Encounter A	Personalized Care Plan Development Platform Clinical Decision Support Modules
PAR-47	As a Health Professional in MDT, I want the Patient to have the ability to fill in questionnaires via the Patient Empowerment Platform	Basque Scenario-Encounter D  RJH Scenario-Encounter B	Patient Empowerment Platform
PAR-48	As a Patient, I need to upload photos of my meals to the Patient Empowerment Platform	RJH Scenario-Encounter B	Patient Empowerment Platform
PAR-49	As a Health Professional in MDT, I want to access patient specified information such as questionnaires filled, files uploaded via the Patient Empowerment Platform	Basque Scenario-Encounter D  RJH Scenario-Encounter B	Patient Empowerment Platform Coordinated Care and Cure Delivery Platform
PAR-50	As a Patient, I want to get in contact with the Health Professionals in MDT via messaging	RJH Scenario-Encounter B  SWFT Scenario-Encounter A	Patient Empowerment Platform
PAR-51	As a Patient, I want to get in contact with the Health Professionals in MDT via video conferencing	RJH Scenario-Encounter B, G  SWFT Scenario-Encounter A	Patient Empowerment Platform

<b>Requirement ID</b>	<b>Pilot Application Scenario Requirements</b>	<b>Mapping to Pilot Scenarios</b>	<b>Mapping to High Level components</b>
PAR-52	As a Patient, I want to have automatic coaching regarding life style, blood pressure and blood glucose measurements.	Basque Scenario- Encounter A  RJH Scenario- Encounter B	Patient Empowerment Platform
PAR-53	As a Patient I want to have personalized guidance/information from the Patient Empowerment Platform based on my most recent context (answers given on questionnaires and on data from the EHR (diagnoses, medication, lab) but also based on data from devices)	Basque Scenario- Encounter A, B, C  RJH Scenario- Encounter B, H	Patient Empowerment Platform Clinical Decision Support Modules Remote Monitoring Systems Local Care Systems Technical Interoperability Suite Semantic Interoperability Suite
PAR-54	As a Health Professional in MDT, I want to get timely notifications about the interventions in the care plan that need to be carried out by me	Basque Scenario- Encounter B  RJH Scenario- Encounter I	Coordinated Care and Cure Delivery Platform
PAR-55	As a Health Professional in MDT, I want to get notifications when the patient makes many unsuccessful attempts to use Patient Empowerment Platform s	RJH Scenario- Encounter L	Patient Empowerment Platform Coordinated Care and Cure Delivery Platform
PAR-56	The system shall enable to ascertain who the lead clinician and care plan manager would be	SWFT Scenarios  RJH Scenario- Encounter F	Coordinated Care and Cure Delivery Platform Personalized Care Plan Development Platform
PAR-57	The system shall ensure authentication of users, preferably with their existing business user accounts	Basque, RJH and SWFT scenarios – All encounters	Security and Privacy Suite
PAR-58	The system shall ensure that no unauthorised user is able to access sensitive data	Basque, RJH and SWFT scenarios – All encounters	Security and Privacy Suite
PAR-59	The system shall provide a mechanism for dynamic management of access control policies	Basque, RJH and SWFT scenarios – All encounters	Security and Privacy Suite
PAR-60	The system shall audit all data access and exchange transactions for non-repudiation	Basque, RJH and SWFT scenarios – All encounters	Security and Privacy Suite

## **6 DESCRIPTION OF CURRENT ICT APPLICATION LANDSCAPE**

The objective of this section is to describe the current ICT support in the three pilot regions that will form the basis for the C3-Cloud developments and pilot testing. This will guide the development of the architecture of the new system, and the development and integration of components in C3-Cloud and also to some extent be informative for the development of scenarios and use cases since some of the possible functionality is already available.

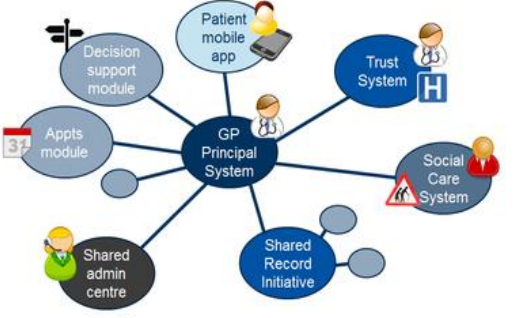
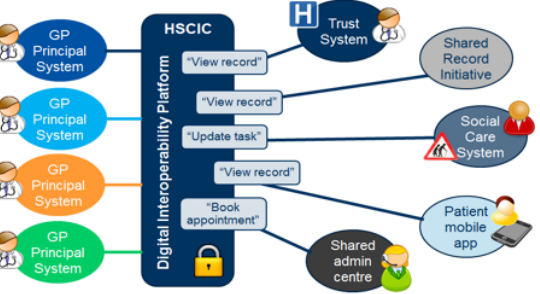
### **6.1 Healthcare and social care information systems**

C3-Cloud aims to enable integration with existing care systems in different care settings. An initial investigation of the ICT landscape in three pilot sites, are summarized in Table 2 as follows.

**Table 2 Summary of healthcare and social care information systems**

Pilot ICT Landscape	South Warwickshire, United Kingdom	Basque Country, Spain	Region Jämtland Härjedalen, Sweden
Primary Care System (Name, existing APIs available? One-way or two-way interactions)	<ul style="list-style-type: none"> <li>• EMIS (EMIS Health) – this is the GP Electronic Patient Record (EPR) in all South Warwickshire GP surgeries. Collects all data for patients &amp; sends prescriptions electronically to local pharmacies. Linked to national spine &amp; accessed with smartcard</li> <li>• Summary Care Record (HSCIC) – extract of key information from GP records, e.g. allergies, medications etc.</li> <li>• E-Referrals/Choose &amp; Book (HSCIC) – e-booking for patient appointments</li> <li>• Docman – Document transmission and management system used by SWFT to send and GPs to receive clinical letters</li> </ul> <p><b>Interoperability/Integration:-</b> Integration potential currently limited for EMIS &amp; other national systems such as E-Referrals &amp; SCR, and would need further discussion when specific requirements have been confirmed. However, integration potential should improve under GP Connect who are working with clinical system providers to open up FHIR based APIs to improve interoperability. To achieve this GP Connect will:</p> <ul style="list-style-type: none"> <li>• Adopt and drive forward interoperability standardization within the market</li> <li>• Build capabilities in systems to support interoperability</li> <li>• Define processes that provide confidence to suppliers, clinicians and patients.</li> </ul>	<p>Osabide Global integrated with Presbide. For both there are integration APIs WS SOAP; two-way interaction.</p>	<p>Cambio Cosmic®</p> <p><b>Information handled:</b> Electronic Health Records, excluding care plans. Practically no existing standardized EHR templates.</p> <p><b>Documents exchanged at point of transfer:</b> (For the secondary care in the county the EHR is fully integrated.) The Electronic Health Records are nationally available electronically at the National Patient Overview(NPÖ). The different information objects are; Medical records, Prescriptions, Lab results (chemistry), Radiology and demographics. Additional documents exchanged, when requested or needed, are printed and sent by mail or fax.</p> <p><b>Documents created point of referral</b> Between primary and secondary care, all information is available in the EHR. Only a Demand for care is created at referral and it is sent electronically, unless the referral is sent to an external care provider. Then it is a printed referral sent by mail or fax. Additional patient information is either requested or sent by mail or fax, if it is not accessed through NPÖ.</p> <p>To municipalities the referral sent by mail or fax. Additional patient information is either requested or sent by mail or fax, if it is not accessed through NPÖ or MEDDIX.</p> <p><b>Extract Patient Summary:</b> No.</p> <p><b>Decision support features:</b></p>



Pilot ICT Landscape	South Warwickshire, United Kingdom	Basque Country, Spain	Region Jämtland Härjedalen, Sweden
	 <p style="text-align: center;"><b>Digital Interoperability Platform</b></p> 		<p>Drug Interaction alerts, Hyper Sensitivity warnings (Cambio COSMIC R8.1).</p> <p><b>Information exchange standards:</b> CDA XML objects, HL7 messages, openEHR archetypes.</p> <p><b>APIs for external Systems (1-way/2-way):</b> A Web service API exists to retrieve different information objects from the system. It is also possible to consume events when information objects are created and updated. There are certain API for 2-way communication but is limited to certain information objects.</p> <p><b>Accept and execute a patient's care plan from external system:</b> No.</p> <p><b>Provide update on the progress of care plan execution:</b> No.</p> <p><b>Electronic prescriptions and drug information:</b> Cambio Cosmic® and for multi dose packaging using PASCAL (<a href="https://www.eordinationpascal.se/">https://www.eordinationpascal.se/</a>) for prescription. All prescriptions can be seen at NPO.</p> <p>Prescriptions and information are based on (freely accessible) national information on available drugs, side effects, interactions etc. at "Svenska informationstjänster för läkemedel (SIL) (Swedish pharmacological information services) <a href="http://www.inera.se/TJANSTER--PROJEKT/SIL/">http://www.inera.se/TJANSTER--PROJEKT/SIL/</a>. In SIL drug information from many sources is integrated, for more information see <a href="http://www.inera.se/TJANSTER--">http://www.inera.se/TJANSTER--</a></p>



Pilot ICT Landscape	South Warwickshire, United Kingdom	Basque Country, Spain	Region Jämtland Härjedalen, Sweden
			<p>PROJEKT/Sil/Forvaltning/Innehall-i-Sil-databasen/Befintliga-kallor/.</p> <p>A national system for e-prescription “Nationella e-recepttjänster” (National e-prescription services) <a href="https://www.ehalsomyndigheten.se/tjanster/nationella-e-recepttjanster/">https://www.ehalsomyndigheten.se/tjanster/nationella-e-recepttjanster/</a> receives all prescriptions and make them accessible to all pharmacies.</p>
<p>Secondary Care System (name, existing APIs available? One-way or two-way interactions)</p>	<ul style="list-style-type: none"> <li>• Lorenzo (CSC) – patient administration system – strategic EPR</li> <li>• E-Records (Kainos Evolve) – document scanning repository</li> <li>• ICE (Sunquest) – electronic result reporting (imaging &amp; pathology). Requesting still done on paper. ICE to be replaced by Lorenzo requesting &amp; reporting</li> <li>• JAC Pharmacy (JAC) – stock management, discharge letters &amp; ‘To Take Out’ (TTO) medications. Discharge letter &amp; TTO functionality to be replaced by Lorenzo</li> <li>• Winscribe (Winscribe) – digital letter dictation</li> <li>• DIGIT (in-house) – patient tracking system</li> <li>• ORMIS (CSC) – theatre management system</li> <li>• Docman – sends clinical letters to GP practices</li> <li>• Diamond &amp; Twinkle (HICOM) – diabetes specialty system</li> </ul> <p>Further investigation is required into other specialist systems used to manage the 4 key conditions, i.e. Cardiac/Diabetes Depression/Renal</p> <p><b>Interoperability/Integration:-</b></p>	<p>Osabide Global integrated with Presbide.</p> <p>For both there are integration APIs WS SOAP; two-way interaction.</p>	<p>Cambio Cosmic®</p> <p>Same and fully integrated with the Primary Care EHR System.</p> <p>At discharge a discharge summary is created and electronically distributed to primary care and by mail/fax sent to the municipality care. For them it is also accessible via NPÖ.</p>

Pilot ICT Landscape	South Warwickshire, United Kingdom	Basque Country, Spain	Region Jämtland Härjedalen, Sweden
	<p>All systems fed from Lorenzo PMI. No other integration of note. Potential for wider integration would need to be explored.</p> <p>All integration with secondary care systems would need to be done through the Orion Rhapsody integration engine using standard messaging, i.e. not direct to the source systems themselves. Rhapsody supports HL7 (v2 and v3), HL7® FHIR®, CCDA, NCPDP, X12, IHE, DICOM, XML, binary, delimited and legacy formats.</p>		
Social Care System (name, existing APIs available? One-way or two-way interactions)	<ul style="list-style-type: none"> <li>Currently replacing 'Care First' core case load system with 'Mosaic' (Servelec). <a href="http://www.servelec-group.com/health-social-care/social-care/social-care-technology-and-services/mosaic/">http://www.servelec-group.com/health-social-care/social-care/social-care-technology-and-services/mosaic/</a></li> <li>Still awaiting information from the social services team re: the systems that they use and their potential for integration so will be provided at a later point when it is received</li> </ul>	Interoperability social and health information systems tool (Inter-RAI)	<p>Three different systems are used; Viva, Procapita and Treserva.</p> <p>Each system have their own medical records and they are not integrated with other IT-systems. What APIs and opportunity for interactions is not known in detail at this point.</p>
Home/Community Care System (name, existing APIs available? One-way or two-way interactions)	<ul style="list-style-type: none"> <li>Lorenzo (CSC) – used minimally, e.g. children's services for recording visits/contacts</li> <li>GAP (in-house development) - tactical community scheduling tool. Moving to GAP2</li> <li>Summary Care Record (HSCIC) – planned pilot of access in care homes</li> <li>EMIS (EMIS Health) - looking at possibility of using EMIS in community for district nurses as part of a proof of concept</li> </ul> <p><b>Interoperability/Integration:-</b> Integration potential for Lorenzo/EMIS/SCR as above. GAP probably has more potential for integration as developed in-house.</p>	Osabide and Presbide in nursing homes. The confidentiality issues have been solved by requesting permission from the patient when he entered the nursing home. The goal is to reach coverage over 50% of nursing home places in December 2016.	<p>Three different systems are used; Viva, Procapita and Treserva.</p> <p>Same as Social Care System but not integrated with them.</p> <p><b>Electronic prescriptions:</b> Except for the platform Cambio Cosmic® exactly the same as for primary care (above).</p>

Pilot ICT Landscape	South Warwickshire, United Kingdom	Basque Country, Spain	Region Jämtland Härjedalen, Sweden
PHR/Tele-monitoring System (name, existing APIs available? One-way or two-way interactions)	<ul style="list-style-type: none"> <li>External funding bid submitted for Phillips tele-monitoring in patients homes</li> <li>Warwickshire County Council – some assistive technology in place, e.g. dementia monitoring</li> </ul> <p><b>Interoperability/Integration:-</b> This information is not currently available as minimal tele-monitoring in place</p>	<p>Personal Health Folder (PHF)/ Tele monitoring (Beti-on). For both there are integration APIs WS SOAP; two-way interaction. Information related to tele monitoring-transmitted constants, results of questionnaires, activated alarms and the activities triggered are sent from the CMSP to the EHR automatically.</p>	<p>Specialized systems used in certain units e.g. ICU. But limited or no integrations with them exists today.</p>
Interoperability (what standard/technology used for what)	See details above for each sector	See Table 2.1. Interoperability Basque Country	HISA, openEHR archetypes, HL7 v2/v3 messages

Table 3.1. Interoperability Basque Country

Application	Semantic standards	Syntactic Standards	Organizational Interoperability
e-Prescription	LOINC, ICD 9/10	HL7, CDA HL7	Basque Health services, Spanish health ministry
Osabide Global	LOINC, ICD 9/10, RIS	HL7, DICOM, CDA HL7	Basque Health services, Spanish health ministry
PHR	LOINC, ICD 9/10	HL7, CDA HL7	

In the following sections the details of the application landscape of pilot sites will be elaborated in detail by providing a standard set of questions addressed to IT staff of pilot sites.

### 6.1.1 Basque Country, Spain

*Which information systems are supported? (Primary care, secondary care, social care, personal health record, e-prescription, etc.)*

**Osabide Global** : The Unified Electronic Health record (EHR) (called Osabide Global) is a single electronic medical records' program providing comprehensive patient focused information. 100% of Osakidetza centers have deployed the Unified Electronic Health Record (including hospitals and primary care centers). The tool contains all health-related information on a patient, facilitating service delivery and enabling the provision of new forms of healthcare such as tele-consultation between primary and specialized healthcare. With its patient-centered approach, it has significantly contributed to the care continuum, and allowed to overcome the previously existing barriers between different areas and levels of care. Osabide Global, interoperates permanently and very intensively with hospital healthcare information systems (HIS) Osakidetza, e-Osabide, using the web services exposed by e-Osabide. For each patient, doctors can see all stored data, as next appointments, fact sheets and recommendations, informed consent forms, social history, pending tasks, reports etc. Different clinical data and diagnostics test or health records are also accessible in Osabide Global

- ✓ Electronic prescription (PRESBIDE): Primary and secondary care can access the same space where patient's pharmacological treatment is described, improving drug management. This system has been integrated as a module within the EHR systems
- ✓ eBook is used during consultations. Shared common space for primary and secondary professionals in EHR. It is included in Osabide.
- ✓ Messaging inter-consultation (between GPs and specialists): A standard part of healthcare professionals' workflow. It is included in Osabide.
- ✓ Videoconferencing system (Lync server) between healthcare professionals. It can be used in any equipment of Osakidetza.

**Clinical Management Software Platform (CMSP):** workflow for an assigned pathway.

- ✓ Beti-on is the Basque Public service for Telecare. Tele-monitoring and Telecare: Alarms for the call center and tele-monitoring information.
- ✓ It is extended to a wider spectrum of patients and professionals
- ✓ Integration: Information related to tele-monitoring-transmitted constants, results of questionnaires, activated alarms and the activities triggered are sent from the CMSP to the EHR automatically.
- ✓ Incorporation of the eHealth Centre, that coordinates the workflow and ensures all healthcare professionals are aware of the workflow.

**Personal Health Folder (PHF):** The Patient Empowerment Platform of Basque Country, currently it offers the following services to the citizen:

- ✓ Examine the EHR: This service allows the citizen to view or download an electronically signed copy (pdf) of the clinical reports available in electronic records. This copy has official recognition and is a legally valid document. The reports currently available are:
  - Hospital discharge reports
  - Radiology reports (no radiological image available)
  - Pathology reports (Anatomy Pathology samples and results; usually cytology and tissue samples for cancer test)
  - Primary care reports
  - Lab results reports (tests performed on blood, urine, feces and other human samples to detect, for example, deviations or abnormal levels of biometric parameters or drugs)
  - Surgical reports
- ✓ Online communication with medical doctors and nurses: the patient is given the possibility to write questions to health professionals. The service is fully available for both primary care providers and specialized care

- ✓ Print out drug and lab list: patients can see information on the medical doctor that issued the prescription, medication the patient is taking at the moment, and other health products prescribed to the patient (i.e. diapers, nutritional supplements) details include the product name, dosage and daily and weekly distribution, and the date of next review or end of the treatment. The format of the display is the active treatment report, a downloadable and printable pdf document.
- ✓ Patients' input into the PHR: Patients have the possibility to input data into the EHR in two different ways:
  - By means of Patient's Diary: this service gives patients the option to write notes about their disease, treatment, symptoms, etc. Patients have the ability to include as many entries as they want, and also to share them with their medical doctor.
  - By means of uploading clinical information from other providers: To upload a report, a user must provide the type of report, the date of completion, a brief description, and the report in pdf format. Doctors may accept or reject the document, and include comments on the report. The patient receives the response accepted or rejected; if it is accepted, it will become part of the clinical record; if it is not accepted, the document remains as information in the PHR of the patient.
- ✓ Integration of data relating to patient's self-monitoring: and allows monitoring of some parameters related to the health status of the patient. Programs currently offered are:
  - Auto-tracking of weight and blood pressure.
  - Control of the intake of cigarettes and alcohol.

This information is recorded for further evaluation by professionals.

- ✓ Other administrative services available within Personal Health Folder are: Change the reference GP, update personal contact details, view the history of appointments, and check next appointments.
- ✓ Shortly, third parties authorized by the patient are going to be allowed to access to medical records staff. As example, guardians of children, parents, dependents and non-relative adults, previous authorization and in some cases under administrative and legal proceedings.
- ✓ Access to "My Health Folder" is secured by mechanisms that guarantee the identity and confidentiality of patient information. Patients may access it using a card reader and a smart card with built-in digital signature, or by using a username, password and coordinates matrix.
- ✓ Besides the benefit that patients may find, the PERSONAL HEALTH FOLDER provides utilities also for HEALTH PROFESSIONALS:
  - Avoid delivering reports or active treatment sheets in face to face consultations, avoid issuing health reports.
  - Direct the patient to the information about their health problem and then discuss any questions they may have.
  - Recommend the completion of questionnaires on healthy habits and get recommendations.
  - Communicate with the patient in non-face to face methods.

**Osasun Eskola:** Educational web aiming to foster patient/caregiver empowerment (<http://www.osakidetza.euskadi.eus/osasuneskola/es/>)

- ✓ Active patient: educational program to acquire knowledge and skills.
- ✓ Kronik-on: to help frail elderly patients and their caregivers to become more active and more health-literate.

**i-botika:** website that collects materials to inform and educate the citizenship on issues such as efficacy, safety, dosage, etc. of drug therapies (<http://www.osakidetza.euskadi.eus/ibotika/>).

**OSANAIA:** Osanaia is the tool created for the management of nursing care, allowing to set and manage personalized nursing care plans, customized to each patient needs. It integrates information from primary, specialized care and mental health.

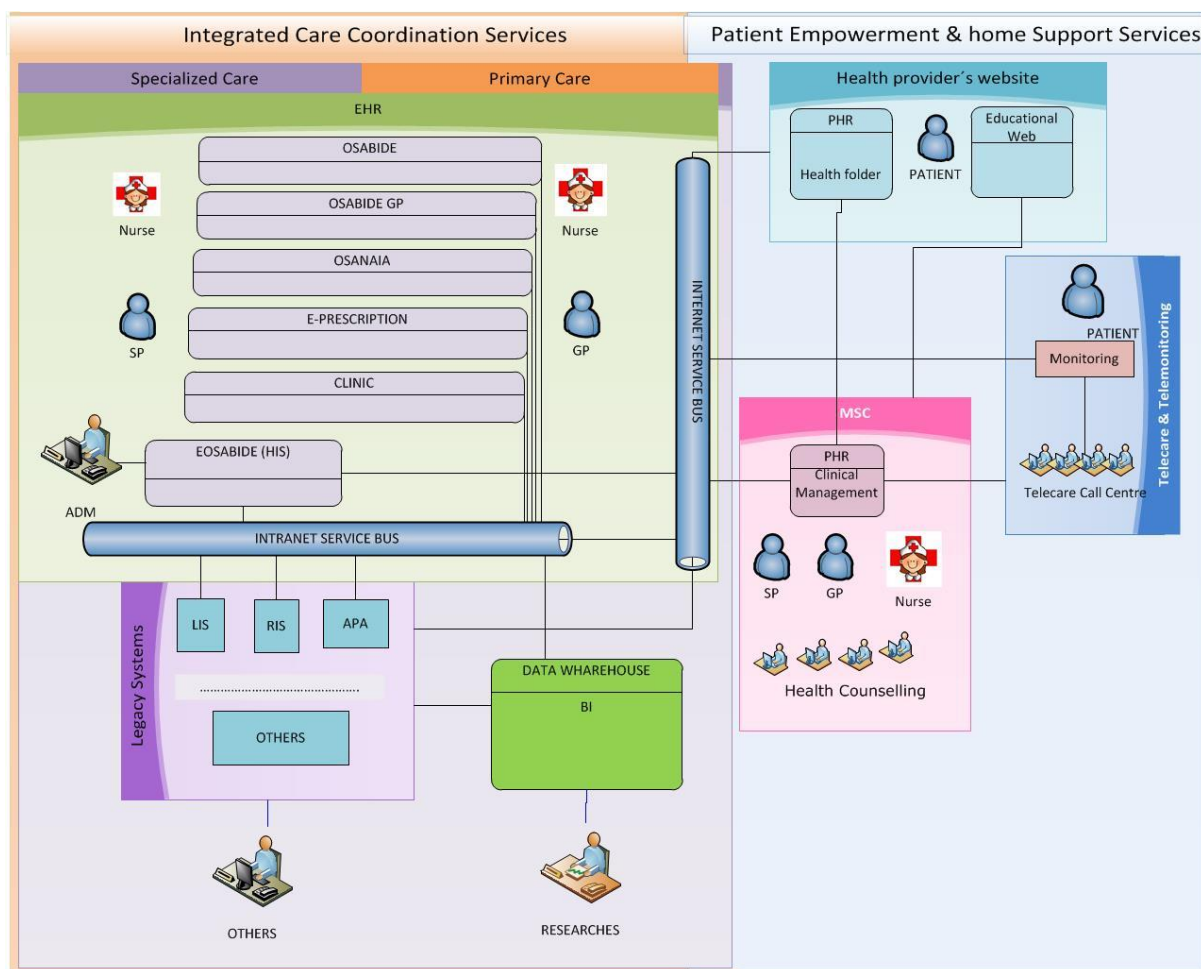
**Interoperability social and health information system (InterRAI-CA):** tool to establish a common language among health and social fields. It allows the interoperability of social and health information systems, enabling both professionals to make a common assessment of people with health needs (target groups). Currently it is not completely implemented. This year, 2016, the expected impact is to train 70 users, to implement and use 70 tools, to set up 140 coordinated Social-Health Care teams, to encourage the development of new protocols for coordinated Social-Health Care and to evaluate the experience of implementation of this tool.

*Major functional components and indicate the party that is behind the development when it is an organization within the C3-Cloud we can perhaps expect modifications for integration and when there is an external company which will not change their product during our project:*

Major functional components	Name	Development
Unified Electronic Health record (EHR)	Osabide Global	Osakidetza, by its own or in collaboration with other partners
Electronic Prescription	Presbide	Osakidetza, by its own or in collaboration with other partners
Patient Empowerment Platform	Personal Health Folder	Osakidetza, by its own or in collaboration with other partners
Educational Web	Osasun eskola, i-botika	Osakidetza, by its own or in collaboration with other partners
Nursing Care Plan	Osanaia	Osakidetza, by its own or in collaboration with other partners
Interoperability social and health information system	Inter-RAI	External company

*Major information flows and dependencies:*

The diagram illustrating the Basque Country architecture is shown in Figure 4.



**Figure 4. Diagram illustrating the Basque Country architecture**

***What types of data do they have or handle? (patient history, care plan)***

The Summary Clinical Record of the patient. The standards used are HL7, CDA Level 3.

***If so can you elaborate on the standards used, and if possible share the document template and an example document?***

The Summary Clinical Record of the patient, Document attached (see Section 7.2.1). In mid-term it will reach to nursing homes, state-subsidized centers and ER.

***What kind of documents are created and exchanged at the point of referral (example documents can be: referral note, care plan, consultation note)?***

*Are these documents electronic, if so can you elaborate on the standards used, and if possible share the document template and an example document? Is it possible to extract a Patient Summary in electronic format? If so can you elaborate on the standards used, and if possible share the document template and an example document?*

Same answer as above. The Summary Clinical Record of the patient, Document attached (see Section 7.2.1). The standards used are HL7, CDA Level 3. In mid-term it will reach to nursing homes, state-subsidized centers and ER.

***Do they currently use any decision support features? (Such as drug interaction alerts, alerts for conflicts of treatment, etc.)***

Currently it is in process, as it is explained below.

***What information exchange standards do they use? Are APIs available for external systems? If so, is information exchange one way or two-way from the existing systems?***

We have API-WS SOAP for integration of information between internal and external systems.

***Can the pilot site accept and execute a patient's care plan provided by an external system i.e. C3-Cloud? If yes, please provide a technical specification of the ICT system interface. If no, please give suggestions on workaround solutions.***

Currently it is not available.

***Elaborate on the electronic prescription systems used (standard and multi dose packaging)***

**Presbide:** The e-Prescription service, Presbide, is provided by a unique system. This system has been integrated as a module within the EHR systems (Osakidetza Global)

***Do you have drug information databases guiding Electronic prescription (information about drugs, contraindications side effects of a drug)?***

Yes, we do have:

- ✓ **INFORMATION ABOUT DRUGS:** In Presbide, the drugs list is loaded and updated monthly through the Official Nomenclature, in which the next information is included: both names, the brand name and the active ingredient, the national code and the ATC code. It can be prescribed by both names, although the prescription by active ingredient is favored (currently in Osakidetza, 65% of prescriptions are made by active ingredient). The uploads of current interactions have been performed by ATC code. In fact, most of the information fields in Presbide are uploaded by means of the ATC code.
- ✓ **DRUG-DRUG INTERACTION:** Currently the interactions included in Presbide are the contraindications of Technical Sheet and the last update was in 2013. However, the system is ready to upload the interactions according to different levels (active ingredient ATC, ATC therapeutic group, etc.).
- ✓ **GUIDELINES USED TO IDENTIFY POTENTIAL INTERACTIONS:** Regarding the guidelines used to identify potential interactions, the most common data bases to check interactions are Micromedex and Lexicom (the latter of Uptodate). These information sources are available to all Osakidetza professionals. In the hospital setting, professionals can also use specific databases, for example to validate interactions in HIV drugs (<http://www.hiv-druginteractions.org/>) or hepatitis C (<http://www.hep-druginteractions.org/>). The goal in the near future is to include in Presbide the “severe” interactions, linked to the ATC classification.
- ✓ **IDENTIFICATION OF DRUG-DISEASE INTERACTION:** The identification of drug-disease interactions is not developed systematically in Osakidetza, especially because it is a new aspect in reconciling Clinical Practice Guidelines (CPG) in multi-morbid patients. Nowadays there are two working groups in Presbide which are working on recommendations for use of drugs in renal failure (contraindications or dosage recommendations based on the glomerular filtration rate) and liver failure. Presbide is ready for it, although currently it is not incorporated.
- ✓ **DRUGS DUPLICITY:** Currently the duplicities are uploaded in Presbide. The source used is the Nomenclature of the Ministry, which is updated monthly since several months. When making a new prescription, Presbide warns of the existence of duplicity and asks whether you



want to continue the prescription. In addition, there is a "validation" button that checks: (i) the duplicities, (ii) the interactions that are contraindicated and (iii) the maximum doses (according to the current uploaded data). Of these three items, only the one about duplicities is updated constantly.

- ✓ **MAXIMUM DOSE:** The maximum doses are uploaded in Presbide but not updated (till 2013 approximately). In this case, the diary dose is compared with a table which is built at the level of the drug national code, as the maximum dosed can vary according to the route of administration (the ATC code of active ingredient is insufficient). For the associations, the table includes the maximum dose of the main ingredient. Like duplicities, when making a new prescription, Presbide warns the maximum dose has been exceeded and asks whether you want to continue the prescription and the "validation" button checks. The fields that are captured from the prescription are: "dose" (mg) and "number of the daily drug dose". The program multiplies dose per number of taking medications. Currently, the program is not configured for drugs out of guidelines patterns of medication taking or specific pharmaceutical items, as patches. In mid-term it will reach to nursing homes, state-subsidized centers and ER.

### 6.1.2 Region Jämtland Härjedalen, Sweden

*Which information systems are supported? (Primary care, secondary care, social care, personal health record, e-prescription, etc.)*

**Cambio Cosmic** is the medical record system for all patients in both primary and in secondary care in Region Jämtland Härjedalen (RJH). Doctors in home care and at special housings are supplied by the primary care. Over 99% of all primary and secondary care in the region uses Cosmic and all records are open and accessible for all these care givers. (If considered needed or if requested by the patient parts of the records could be closed for other clinics/other care givers). Within less than one year the patient also will have open and safe access to the medical records via 1177.se. The X-ray department and the different hospital laboratories have their own different IT-systems but they are fully integrated with Cosmic. Standard e-prescriptions to the national database for pharmacies is fully integrated (one-way information) in Cosmic.

Laboratory results, x-ray results and all medication/prescriptions respectively are presented in one view for all RJH irrespective of where the prescription/testing was made. For other parts of the records an "own clinic" or an entire care giver (or group of care giver) view can be chosen. Cosmic can be used for safe communication with groups or with specific individuals also using Cosmic.

**Special IT-systems** exist in RJH for quite many different patient groups, the exact number is unknown. To exemplify, for patients with dialysis "Diamant" is used for ordering of drugs and electrolytes and for the monitoring of the patients. For patients with atrial fibrillation "Auricula" is used in the same way. None of these systems are integrated with Cosmic.

The eight municipalities in RJH have in total three different IT-systems ("**Viva**", "**Procapita**" and "**Treserva**") for their respective medical and social records. In the social records, home service is documented and in the medical records, medical care and all care at special housings are registered. No integration exists between medical and social records at municipalities due to the legislation. For home care personnel both medical, and to a part social records are open. The medical records have integrated separate individualized care plans. E-prescriptions can be made in the same way as with Cosmic.

Swedish information services for drug treatment (**SIL**) (Svenska Informationstjänster för Läkemedel) is the national platform for drug information used by all EHR systems including Cosmic.

The **national e-prescription store** ("Receptdepån") is a system maintained by the state owned Swedish eHealth Agency (<https://www.ehalsomyndigheten.se/other-languages/english/>). It receives electronic prescriptions from EHR systems like Cosmic and any pharmacy in the country can retrieve information

when they serve an individual patient with filling a prescription. The system also receives and stores information from the pharmacies on all medicines they have provided for the individuals.

**Pascal** is a system for registering and executing multidose prescriptions provided by Inera. Prescribers usually access it through a web based interface also used by nurses in primary or community care. A set of special pharmacies get the information and at regular interval package the relevant doses for each time point in a small plastic bag which is delivered to especially elderly patients or others with a relevant functional impairment.

**Meddix** is a communication platform in particular between specialist care and the care provided by the municipality. Primary care also has access but are not so often involved. Meddix is used for the preparing and planning of a patient's discharge from the hospital and for the information about decisions taken at the discharge. It is planned for having a separate module, "unified individual care plan (Samordnad individuell plan (SIP)) integrated in Meddix shortly. In Meddix SIP individualized care plans can be (manually) produced not only at discharge from hospital.

The patient care givers can, using **the National Patient Overview (NPÖ)** ("Nationella PatientÖversikten") read parts of most medical records for the patient from some other parts of the country, both primary and secondary care and today, in some instances also for municipality care and private care givers. However, the coverage is far from 100 %. NPÖ was launched in 2008. Cosmic, and the IT-systems in the municipalities, delivers information to NPÖ but the design does not allow record systems to receive information originating from other sites.

**1177.se** is a national platform where the patient can seek information about diseases and treatments and also where anonymous health related questions can be put and have an answer from a nurse (mostly) or a doctor. Through phone personal medical counselling is also given. 1177 has separate medical records, also displayed in "NPÖ". The nurses at 1177 can read the patient's records in "NPÖ". There is also a safe option so that patient can send a question or a request to his/her personal doctor, nurse, or other care giver (though not integrated in Cosmic). The patient can also through NPÖ have access to medical certificates to the Swedish Social Insurance (Försäkringskassan) and have a list of all current prescriptions of drugs from all pharmacies. Within less than a year every Swede can have access to his/her (almost) entire medical record through "**Journalen**" (My Record) that is reachable through the 1177.se patient portal. Currently 16 of the 21 regions already have this facility connected and RJH will get it within the year.

Sweden has about 100 different **quality registries**, practically all used in specialist care, some in primary care and a few are also used by care givers in the municipality. No integration exists between the different quality registries. For one, the National Diabetes Register (NDR) there is a semi-automatic possibility to export information from Cosmic but the rule is that there is no integration with Cosmic. In NDR, quality results for each care giving organisation are open for everyone to see and each care giver can follow his/her own real-time results including to identify patients at extra high risk. Some patient groups e.g. rheumatics can today report PROMs (Patient Related Outcome Measures) which is frequently done before an appointment. Diabetic patient will within less than one year be able to follow his/her own results in NDR and to report PROMs. Most quality registers have fewer technical possibilities for patients and care givers than NDR. The registers are managed by the Swedish county councils organization (Swedish Association of Local Authorities and Regions).

For the **IT-security** all care givers in primary and secondary care in RJH have the medical records inside fire walls, one for the whole region. Each community has their own fire wall. **Authentication** of the users is done using a public key infrastructure (SITHS) using an electronic ID-card with RSA encryption and a personal PIN-code, this authentication is also used for access outside the fire walls e.g. to quality registers and to NPÖ. The patient/citizen authentication is made using a software stored PKI system, managed jointly by the Swedish banks called "BankID".

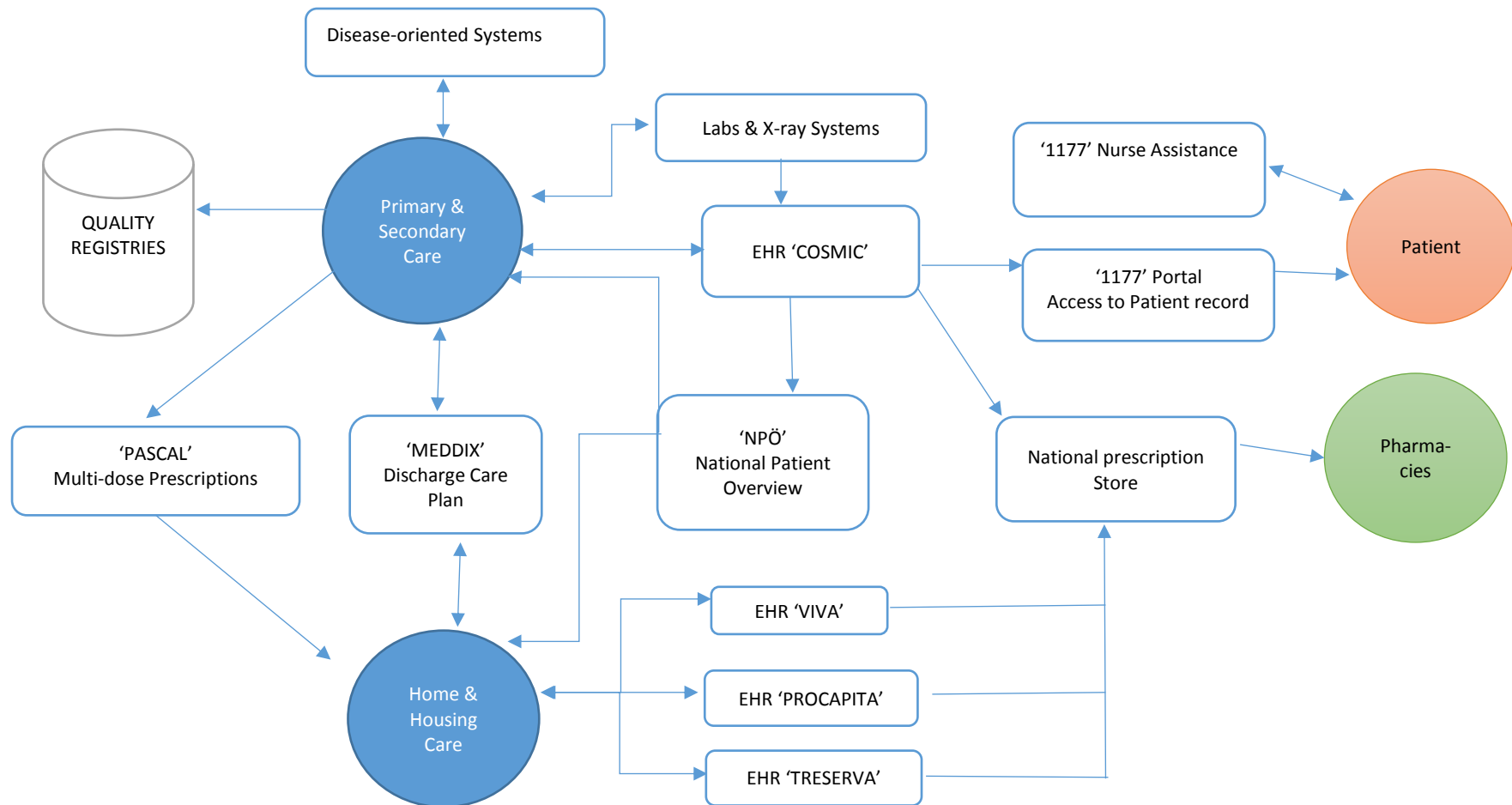
The **National Service Platform (Nationella tjänsteplattformen)** is the national platform for integration of IT-systems and services within medical and social services. It is organized by ICC, the Integration Competence Centre in Inera, owned by the Swedish county council organization (Swedish Association of Local Authorities and Regions).

*Major functional components and indicate the party that is behind the development when it is an organization within the C3-Cloud we can perhaps expect modifications for integration and when there is an external company which will not change their product during our project:*

Major Functional Components	Name	Development	Web address
EHR in RJH (Primary and Secondary Care)	Cosmic	Cambio Healthcare Systems	www.cambio.se
EHR in municipalities	Viva Treserva Procapita	ILAB CGI TietoEnator	www.ilab.se www.cgi.se www.tieto.se
Web EHR-National Patient Overview	NPÖ	Inera	www.inera.se
National Prescription Store	”Receptdepån”	Swedish eHealth Agency	<a href="https://www.ehalsomyndigheten.se/other-languages/english/">https://www.ehalsomyndigheten.se/other-languages/english/</a>
Multi dose prescriptions	Pascal	Inera	www.inera.se
Education web	1177	Inera	www.inera.se
Care planning	Meddix	TietoEnator	www.tieto
IT-integration	“National Service Platform”	Inera	www.inera.se

*Major information flows and dependencies:*

See Figure 5.



**Figure 5. Present IT-structure in Region Jämtland Härjedalen for the patient and for care givers.**

***What types of data do they have or handle? (patient history, care plan)***

*What kind of documents are created and exchanged at the point of transfer of care (for example between acute care centers and nursing homes) (example documents can be: discharge summary, care plan, transfer summary). Between which systems? Are these documents electronic, if so can you elaborate on the standards used, and if possible share the document template and an example document?*

Between primary and secondary care all documents are shared through the common EHR. Municipality care have no doctors, they come from the primary care but all other care givers are employed by the municipality.

At the transfer to municipality care (home care or at special housings) some information is accessible electronically for the municipality though most information is given on paper. Meddix is used for the planning of a discharge from hospital and partly is functioning as an individual care plan focusing on help/assistance needed. If multi-dose prescription (Pascal) is used the municipality nurse have the full electronic information. Using NPÖ the municipality nurse can read (most) parts of the primary/secondary care EHR and *vice versa*.

***Is it possible to extract a Patient Summary in electronic format? If so can you elaborate on the standards used, and if possible share the document template and an example document?***

The National Patient Overview System (NPÖ) was designed initially to be a Patient Summary and contains several important information objects including list of diagnoses but not an edited summary text. In the new national architecture, parts of EHRs can be accessed through the service platform and are exported to both NPÖ for professional use and to the Personal health record (“Journalen”).

***Do they currently use any decision support features? (Such as drug interaction alerts, alerts for conflicts of treatment, etc.)***

**Web based national decision support (RGS) (“Rådgivningsstödet”)** is a national web based decision support used by nurses in primary and secondary care and at the national telephone patient support (1177.se) for quality assured medical advices to patients, including for appointment planning. RGS is produced by Inera, cooperatively owned by the Swedish county councils organization (Swedish Association of Local Authorities and Regions). Each text is quality assured at least every second year by a quality reference group in order to verify correctness and being up to date. In surveys among users, RGS is considered helpful, though for poly symptomatic patients and/or in patients with multiple diseases it is not functioning so well.

Swedish information services for drug treatment (**SIL**) is produced and maintained by Inera and quality assured in a similar way as described for RGS (See above). Amongst other things it also provides the **“national list – avoid in elderly”** based on the national quality indicators from the National Board of Health and Welfare (Socialstyrelsen). SIL also provide information from the drug interaction database **“Sfinx”** from Stockholm county council. The drug interaction warnings, integrated in Cosmic, are non-personalized and are not only triggered by clinical relevance. Cosmic has no supportive warnings when prescribing drugs based on previous diagnosis or on estimated kidney function.

**“www.FASS.se”** gives pharmaceutical and medical information regarding all drugs possible to prescribe in Sweden with indication, side effects etc. “FASS” has both a public and a professional interface.

**“Janus info”** gives information about, amongst other things, drug interactions but also about recommended drugs in Stockholm County. It is open for everyone but not integrated with Cosmic.

Numerous **medical guidelines** exist, both local, regional and national without any integration, and to be found at many different web-pages. Within less than one year Sweden will have  $\approx 250$  treatment guidelines for primary care accessible from one open web-page. The production and maintenance of

these guidelines will be from the Swedish county councils organization (Swedish Association of Local Authorities and Regions), presumably through Inera. No integration with Cosmic will exist to begin with.

***What information exchange standards do they use?***

CDA XML objects, HL7 messages, openEHR archetypes and service specifications from the national service platform.

***Are APIs available for external systems? If so, is information exchange one way or two-way from the existing systems?***

A Webservice API exists to retrieve different information objects from the system. It is also possible to consume events when information objects are created and updated. There are certain API for 2-way communication but is limited to certain information objects.

***Can the pilot site accept and execute a patient's care plan provided by an external system i.e. C3-Cloud? If yes, please provide a technical specification of the ICT system interface. If no, please give suggestions on workaround solutions.***

Not possible today.

***Can the pilot site provide an update on the progress of care plan execution for a given patient on a regular basis? If yes, please provide a technical specification of the ICT system interface. If no, please give suggestions on workaround solutions.***

Not possible today.

***Elaborate on the electronic prescription systems used (standard and multi dose packaging):***

All prescriptions are based on information from **SIL** (see above) which among other things contains identification of products and their characteristics (strength, packages etc). Cosmic delivers standard prescriptions to for the **National Prescription Store** (see above) maintained by the Swedish eHealth Agency. When the patient visit any pharmacy, the currently active prescriptions are retrieved from the National Prescription Store and his/her drugs can be delivered. For multi dose packed medication a separate national system; **Pascal** (see above) is used. Pascal also is a link to inform other car givers, e.g. the municipality nurse responsible for a patients care, about the actual medication. The information from **Pascal** is not integrated with Cosmic. The patients have access to prescribed medication through "1177.se", medication services or through the access to "My Record" and also through their delivery pharmacy for prescriptions in **Pascal**.

All delivered medication from pharmacies, i.e. prescribed either using Cosmic or Pascal, are registered in the **National Prescribed Medicines Register ("Läkedemedelsförteckningen")**. Patients and Medical professionals (with patient consent) have access to this information for any patient via "1177.se".

***Do you have drug information databases guiding Electronic prescription (information about drugs, contraindications side effects of a drug), is it possible to use these databases in C3-Cloud?***

**SIL** (see above) that could be used in C3-Cloud.

### 6.1.3 South Warwickshire, United Kingdom

#### System Overview/Scope

The SWFT ICT landscape has evolved in line with the structure and development of its services. The major systems are presented in Figure 6.

There is no 'one' system across SWT. Instead, there is a range of commercially purchased or bespoke/in-house systems owned and managed by different stakeholders, in different care environments, as outlined below. The low level of integration between these systems makes data sharing challenging.

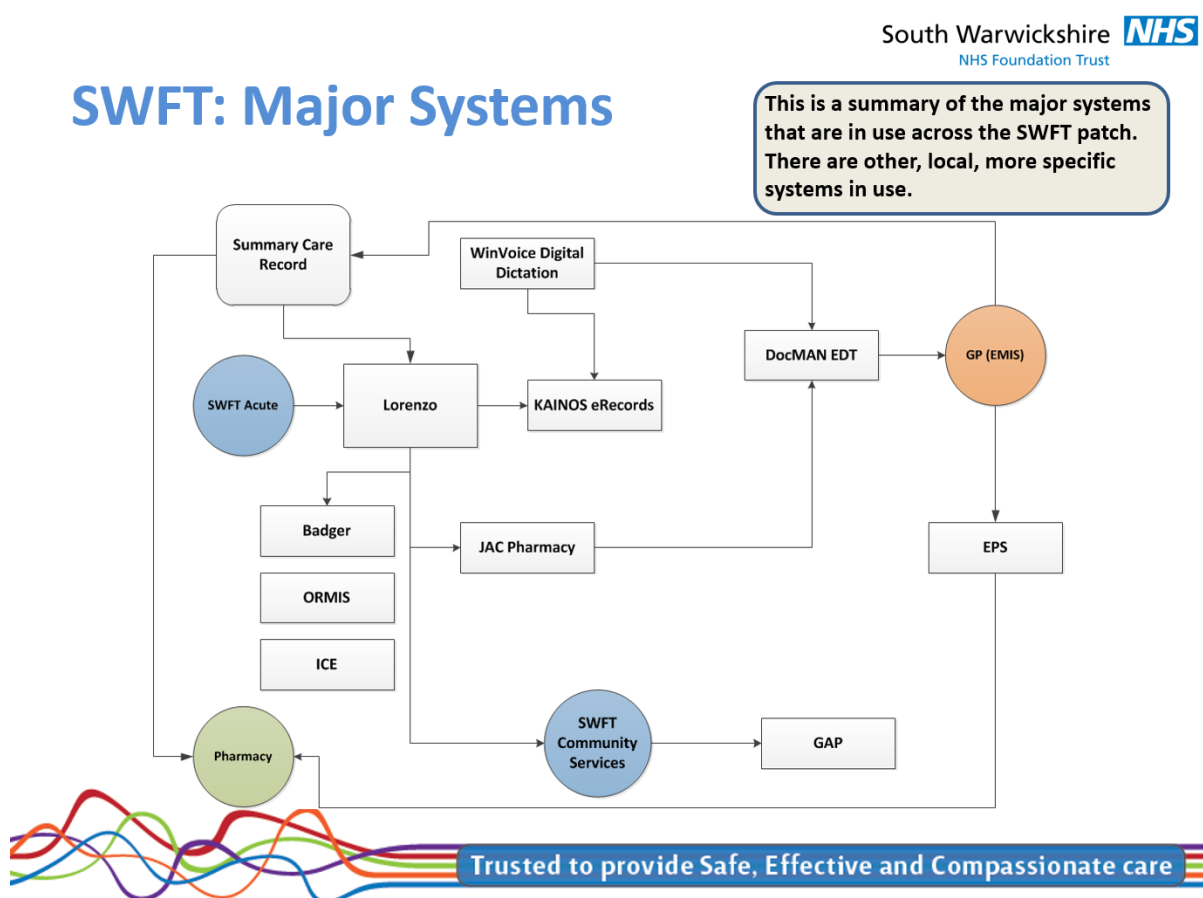


Figure 6. Major IT systems in SWFT.

There are a very large number of systems in operation within SWFT, and in use by other relevant care providers targeted by the scope of this project (see below), which makes it impossible to name them all for the purpose of this exercise. A more detailed analysis would be required. This document will therefore cover the main core and specialty/departmental systems.

It should be noted that:

- some systems, or functionality within them, may be replaced or upgraded before or during the design/development of the C3 Cloud as part of the SWFT ICT Programme

- Project 2020 has been set up locally to move the Trust to paperless working and to ensure an Electronic Patient Record (EPR) designed around the patient's needs that can be accessed across all care settings within a local health economy

### SWFT Sectors Covered

The table below lists the various sectors which provide care to patients within SWFT and the wider Warwickshire community in the context of the C3-Cloud project. Please note that the organizations and staff groups listed are not exhaustive, just some of the main ones. It should also be noted that the Warwickshire care delivery environment (as with the UK as a whole) is complex and the system infrastructure and usage obviously reflects that.

Sector	Organizations/Staff Groups Involved
Secondary/Acute Care	<b>SWFT</b> <ul style="list-style-type: none"> <li>• Warwick Hospital</li> <li>• Leamington Rehab Hospital</li> <li>• Stratford Hospital</li> <li>• Ellen Badger Hospital, Shipston</li> </ul> <b>Other:-</b> <ul style="list-style-type: none"> <li>• Coventry &amp; Warwickshire Partnership Trust (particularly relevant for Mental Health)</li> <li>• University Hospitals of Coventry &amp; Warwickshire (particularly relevant for Acute Renal)</li> </ul>
Primary Care/GPs	<ul style="list-style-type: none"> <li>• GPs</li> <li>• Practice nurses</li> </ul>
Community/Home Care <i>(includes the whole of Warwickshire not just South Warwickshire. It includes care in the home, in GP surgeries and community clinics etc)</i>	<ul style="list-style-type: none"> <li>• District nurses</li> <li>• Midwives</li> <li>• Physiotherapy</li> <li>• Occupational Therapy</li> <li>• Dietetics</li> <li>• Speech &amp; language therapy</li> <li>• Podiatrists</li> <li>• Opticians</li> <li>• Community phlebotomy</li> <li>• Dentistry clinic</li> <li>• Limited imaging</li> </ul>
Social Services & Social Care	<ul style="list-style-type: none"> <li>• Social Workers</li> <li>• SWFT Community Emergency Response Teams &amp; County Council Reablement will be working together</li> </ul>

### Overview of the Management of the 4 Targeted Chronic Conditions

The table below provides a high level overview of how the 4 targeted conditions are managed within SWFT and the related community.

Condition	Typical Condition Management Process	Specialty IT Systems Involved
Renal Failure	Routine management by GPs and community nurses. Advanced cases managed by University Hospitals of Coventry & Warwickshire (UHCW). NB: SWFT does not provide an acute renal service	To be confirmed




Condition	Typical Condition Management Process	Specialty IT Systems Involved
Heart Failure	Routine management by heart failure nurse specialists in community. Monthly meetings to discuss care plans with community matrons. SWFT acute cardiac services involved as required	Medcon? Other to be confirmed
Diabetes	Routine management by GPs but SWFT take acute referrals and run nurse led clinics. Diabetic nurse specialists in hospital and one in community	HICOM Diamond & Twinkle (Paeds) - ? moving to Lorenzo
Depression	Routine management by GPs but could be referred to Coventry and Warwickshire Partnership Trust (CWPT)	To be confirmed

**Note** - further work is required to capture information regarding the specialty systems relating to the 4 core conditions above across the various care providers.

### Detailed Overview of SWFT ICT Systems

Information Required	Secondary /Acute Care	Primary Care/GPs	Community/Home Care	Social Services & Social Care	PHR/Telemetry
<p>Which information systems are supported within SWFT?</p> <p><i>Include major functional components of the systems</i></p> <p><i>Who is the supplier behind the development of the system?</i></p> <p><i>What is the potential for further developing or interfacing the solution to address the requirement of the C3 Cloud portal?</i></p> <p><i>What are the major information flows and dependencies within and between the systems?</i></p> <p><i>What types of data do the systems handle, e.g. patient history, care plan?</i></p>	<p><b>Lorenzo - PAS/EPR (CSC)</b> Web based, cloud hosted EPR system. Accessed through the national spine with smartcard.</p> <p>Largely a patient administration system with some clinical noting in outpatients. Coding for clinical &amp; business reporting &amp; payments. No mobile capability.</p> <p>Strategic direction is to exploit Lorenzo functionality wherever possible. Phase 2 of the Lorenzo deployment will include additional functions such as further expansion of clinical noting, producing discharge letters &amp; e-ordering/reporting. A business case is under review for e-prescribing - outpatient prescribing in totality and linked with discharge letter for inpatient stay (TTO meds). From December 2016.</p> <p>Integration potential restricted to what can be obtained through the integration engine. Specific requirements for development of the system itself would need to be discussed with CSC.</p> <p><b>E-records (Evolve from Kainos)</b></p>	<p><b>EMIS Web (EMIS Health)</b> GP system used across the whole South Warwickshire GP community. Practices in Warwickshire North use EMIS &amp; INPS Vision.</p> <p>Collects &amp; stores all patient data including clinical letters. Holds registers for the 4 targeted 'disease' groups. Transfers records electronically when patients move practice. Sends prescriptions electronically to the spine which is eventually pulled down by the pharmacies.</p> <p>Demographics pulled from national spine.</p> <p>Interfaces to Summary Care Record below.</p> <p>Limited potential for interfacing with GP systems – awaiting information from EMIS Health. Efforts by GP Connect to improve interoperability as described above. May be able to extract data but unlikely to be able to put data back in. Some mechanisms already available for extracting data from EMIS including Black Pear &amp; MIG (Medical</p>	<p><b>Global Assessment Platform (GAP/GAP2)</b> In-house open source community scheduling tool developed by SWFT ICT. Integrates with PAPI for demographics. Central database which synchronizes to ipads. Active Directory authentication.</p> <p>Will be replaced with GAP2 in Summer 2016 shortly. Potential for development &amp; integration.</p> <p><b>Lorenzo</b> Community use same instance as acute. Used minimally, e.g. children's services for recording visits/contacts</p>	<p><b>Careplus/Mosaic</b> Core caseload system - in process of changing from Careplus to MOSAIC</p> <p>Awaiting information from Social Services (Warwickshire County Council)</p>	<p>External funding bid submitted to have Phillips tele-monitoring in patients homes which connect to secondary/tertiary care, linked to Phillips hub.</p> <p>Social Services – some assistive technology, e.g. dementia monitoring</p>

Information Required	Secondary /Acute Care	Primary Care/GPs	Community/Home Care	Social Services & Social Care	PHR/Telemetry
	<p>Scanning of historic and new patient records from inpatient stays and outpatient appointments.</p> <p>Outpatient letters that are dictated through Winscribe are stored in E-records after authorisation.</p> <p>E-records offers some data capture forms (mainly in Outpatients). Example screenshots see 7.3.1.</p> <p>Can currently only provide information/outputs in flat/PDT type format.</p> <p><b>ICE – results reporting (Sunquest)</b> Used for electronic reporting of pathology &amp; imaging results. No electronic requesting yet in place. Will be replaced by Lorenzo requesting and reporting from September 2016 but ICE will be retained as view only for GP requests/results.</p> <p><b>JAC – Pharmacy System (JAC)</b> Mainly stock control system but currently also produces inpatient (IP) discharge summaries including 'To Take Out' (TTO) medications.</p> <p>Most IP discharge summaries are done on JAC but some, e.g. day surgery, pediatric &amp; ambulatory care, are done on paper or from departmental</p>	<p>Interoperability Gateway from Healthcare Gateway) not yet in place.</p> <p><b>Docman</b> - receives clinical letters from SWFT, UHCW, GEH and CWPT and potentially any Trust that hosts a Docman Hub. Used by all practices.</p> <p><b>Summary Care Record (HSCIC)</b> Copy of key information from a patient's GP record. Includes medications, adverse reactions, allergies but can include other information at the request of the patient, e.g. medical history, procedures, diagnoses, care plans etc. See Section 7.3.2.</p> <p>Usually accessed in emergency/unplanned scenarios.</p> <p>90% of patients in England have SCR but patients can opt out any time.</p> <p>Piloting access to SCR for prescribing in 36 community pharmacies in Warwickshire.</p> <p><b>ERS - E-Referral System (HSCIC)</b></p>			

Information Required	Secondary /Acute Care	Primary Care/GPs	Community/Home Care	Social Services & Social Care	PHR/Telemetry
	<p>systems. Discharge summary data is entered manually as free text. Standard template example see 7.3.3</p> <p>Discharge summaries are sent electronically to GPs through DocMan.</p> <p>Discharge summaries for Inpatients will be done through Lorenzo (Dec 16) but JAC will be retained as a pharmacy management system and will have read only access for discharge summaries &amp; medications.</p> <p>Paper drug charts are used for inpatients – no electronic prescribing yet but planning to move to Lorenzo e-prescribing. Inpatient TTO prescriptions sent directly to pharmacy from JAC. Hospital pharmacies can also access the Summary Care Record.</p> <p>JAC collects demographics, admission, discharge and transfer information (ADTs), free text discharge summary data and medications.</p> <p>JAC takes a feed from Lorenzo for demographics and ADTs. Probably amenable to integration &amp; development but the relevant functionality will be phased out. Uses HL7.</p>	<p>Combines electronic booking with a choice of place, date &amp; time for first hospital/clinic appointments. Patients book it in the GP surgery at the point of referral, or later at home on phone/online. Most services can be booked via ERS.</p> <p>National smartcard system. N3 based HL7 messaging. APIs available.</p> <p><b>Patient Online</b> – allows patients 24 hours access to part of their record (from EMIS):-</p> 			

Information Required	Secondary /Acute Care	Primary Care/GPs	Community/Home Care	Social Services & Social Care	PHR/Telemetry
	<p><b>Winscribe</b> – dictation system used across most of the acute sector for outpatient letters &amp; other documents.</p> <p>GP letters from outpatients are dictated through Winscribe and sent through DocMan. Some letters printed and sent through post (usually for out of area GPs).</p> <p><b>DIGIT (in house)</b> – patient tracking system currently in UAT. Pulls data from Lorenzo to display on screen in A&amp;E and wards. Nurses can request patient transfers to other wards &amp; enter basic notes. Integrates with BOB. Uses AD authentication. No coded data. Roles dictate what users can see. Will eventually replace A&amp;E Tracker &amp; paper versions of Medical Take. <b>BOB (in house)</b> – uses HL7 messaging from Rhapsody to feed DIGIT but may be used for other systems in the future</p> <p><b>Docman</b> - sends clinical letters to GPs.</p> <p><b>Cecil (in house)</b> – integrates with extracts from Lorenzo and puts them into DocMan on a daily basis for distribution</p> <p><b>Ormis (CSC)</b> – theatre management system.</p>				

Information Required	Secondary /Acute Care	Primary Care/GPs	Community/Home Care	Social Services & Social Care	PHR/Telemetry
	<b>Diamond &amp; Twinkle (Paeds) - diabetes system (Hicom)</b> Further information required. <a href="http://www.hicom.co.uk/diamond">http://www.hicom.co.uk/diamond</a> and <a href="http://www.hicom.co.uk/twinkle">http://www.hicom.co.uk/twinkle</a>				
<p>What kind of documents are created &amp; exchanged at:-</p> <ul style="list-style-type: none"> <li>point of transfer of care, e.g. between acute care centers &amp; nursing homes, e.g. discharge or transfer summary, care plan etc.</li> <li>point of referral, e.g. referral note, care plan, consultation note</li> </ul> <p>Which systems are involved?</p> <p>Are these documents electronic? If so what standards are used and can you provide an example/template?</p>	<p>The approach to transfer summaries varies according to the care provider &amp; care situation, e.g. hand written forms, dictated letters etc.</p> <p>GPs get scanned copy of the handwritten CAS Card following an ED attendance. Also scan CAS Cards into E-records. ED episodes will be coded in Lorenzo from Sept/Oct 2016 (trailing now) to allow a coded letter to go to the GP instead. Staff will enter the relevant information into Lorenzo.</p> <p>Referral letters come to the SWFT central booking center through the e-referrals system or on paper. Paper referral letters are scanned into E-records on receipt. Letters received through the e-Referral system are printed and scanned into E-records. Working with HSCIC to get e-referral letter directly into E-records.</p> <p>There are some electronic referral forms available on the SWFT internet which are used in an ad hoc way, e.g. social services, diabetes, podiatry &amp; physio.</p>	<p>Referral and transfer processes vary according to the provider and situation. Some of the 'general' practices are outlined below.</p> <p>EMIS records referrals and transfers of care between practices.</p> <p>GPs usually refer patients to secondary care electronically using the E-Referrals system outlined above.</p> <p>Some local templates also used outside of EMIS. See Section 7.3.4.</p> <p>Referrals to district nurses come in from single point of access (telephone triage system) and electronically sent to teams who ring GP/patient to get more detail. Book appointments through GAP.</p>			

Information Required	Secondary /Acute Care	Primary Care/GPs	Community/Home Care	Social Services & Social Care	PHR/Telemetry
	Internal referrals are usually done with a clinical letter. Inpatient referrals tend to be done on a slip of paper. Lorenzo has functionality for internal referrals but not good.	District nurses usually refer to GPs by phone. Letter sent to update on what they've done with the patient			
Is it possible to extract a Patient Summary in electronic format? If so what standards are used and can you provide an example/template?	<p><b>Lorenzo</b> – very unlikely</p> <p><b>E-records</b> – can extract whole or parts of record. Data has to be exported in PDFs and it has 7 zip encryption added as part of the process</p> <p><b>JAC</b> – produces a discharge letter</p>	<p><b>SCR</b> – all practices upload summarized data to the spine, e.g. allergies, medication, contraindications. This can be viewed within secondary care &amp; pharmacies</p> <p><b>EMIS</b> - patient summaries can be extracted from EMIS. Specific requirements would have to be investigated but an example is included for a test, see Section 7.3.5</p> <p><b>GEMIMA</b> – pulls together information from disparate NHS systems as outlined in the Section 7.3.6.</p>			
Do the systems provide any decision support features, e.g. drug interaction alerts, treatment conflicts etc?	<p><b>Lorenzo</b> - drug interactions/alerts available for inpatient prescribing but not yet implemented. It also has a clinical indicators function which is not used &amp; not well understood</p> <p><b>JAC</b> – capable but not used as SWFT don't have the prescribing module.</p>	<p><b>EMIS</b> - example of Alerts (pop up window);</p> <ul style="list-style-type: none"> <li>• Drug allergies</li> <li>• Medication reviews</li> <li>• Suggested clinical pathways</li> </ul> <p>Some of these will be nationally directed and some created locally</p> <p><b>GEMIMA</b> - includes a Risk Stratification tool to help practices with decision support.</p>			

Information Required	Secondary /Acute Care	Primary Care/GPs	Community/Home Care	Social Services & Social Care	PHR/Telemetry
What information exchange standards do the systems use?	Rhapsody supports HL7 (v2 and v3), HL7® FHIR®, CCDA, NCPDP, X12, IHE, DICOM, XML, binary, delimited and legacy formats.				
Are APIs available for systems, including external systems? If so, is information exchange one way or two-way from the existing systems?	APIs available for most systems but SWFT would chose to use the integration engine rather than integrate with individual source systems	Yes APIs available – see previous note on interoperability			
Can the systems accept and execute a patient's care plan provided by an external system i.e. C3-Cloud? If yes, please provide technical spec of the ICT system interface. If no, please give suggestions on workaround solutions	<b>Lorenzo</b> - unlikely  <b>E-records</b> – possibly as has an ingestion engine  <b>JAC</b> – no	<b>EMIS</b> – this would need further evaluation. Not sure if this is possible yet. Possibly any previous care plan could be scanned onto the system and READ coded?			
Can the systems provide an update on the progress of care plan execution for a given patient on a regular basis? If yes, please provide a technical specification of the ICT system interface. If no, please give suggestions on workaround solutions	<b>Lorenzo</b> - at the moment no. Care plans are only static tick lists.	Possibly – would need further investigation.			



Information Required	Secondary /Acute Care	Primary Care/GPs	Community/Home Care	Social Services & Social Care	PHR/Telemetry
Elaborate on the electronic prescription systems used (standard and multi dose packaging)	<p>No e-prescribing in place. Use paper charting. Business case in for Lorenzo e-prescribing to be implemented.</p> <p>Pharmacy use whole pack dispensing.</p>	<p>Electronic Prescription Service Release 2 (EPSR2) - practices send prescriptions electronically to pharmacies nominated by patient. Script goes to the spine and the pharmacy pull the script down from the spine.</p> <p>Developed by HSCIC. Runs on NHS N3 network.</p>	Community nurses hand-write prescriptions		
Do you have drug information databases guiding Electronic prescription (info about drugs, contraindications side effects of a drug). Is it possible to use these databases in C3-Cloud?	MiDatabank (Royal Pharmaceutical Society) – portal of on-line resources including British National Formulary (BNF).	<b>EMIS</b> – has drug formulary that is updated frequently with the latest guidance.			

## 6.2 Standards for EHR data formats and code systems

**Table 4. Summary of standards for EHR data formats and code systems**

Pilot ICT Landscape	South Warwickshire, United Kingdom	Basque Country, Spain	Region Jämtland Härjedalen, Sweden
Data format standards (e.g. HL7 CDA, IHE PCC templates, OpenEHR archetypes)	<p><b>Secondary/Acute Care:</b> Rhapsody supports HL7 (v2 and v3), HL7® FHIR®, CCDA, NCPDP, X12, IHE, DICOM, XML, binary, delimited and legacy formats.</p> <p><b>Primary Care:</b> HL7 predominantly</p> <p><b>Community</b> Largely as for secondary and primary care</p> <p><b>Social Care/PHR etc:</b> To be confirmed</p>	See Table 2.1	HISA, openEHR archetypes, HL7 v2/v3 messages
Coding systems (name, version, what is used for diagnoses, symptoms, drugs, etc.)	<p><b>Secondary/Acute Care:</b> Main coding done on Lorenzo (using Medicode). Coding done against event, e.g. inpatient admission, not against patient.</p> <p>Inpatient and outpatient appointment coding - ICD10 (diagnosis) &amp; OPCS4 (procedures). Outpatient diagnosis coding limited.</p> <p>A&amp;E - SNOMED code subset for diagnosis plus local codes.</p> <p><b>Primary Care:</b> Read 2 codes</p> <p><b>Community Care:</b> Largely as for secondary &amp; primary care. Community contacts (for treatments) coded on Lorenzo using SNOMED. GAP – used for billing for adult community contacts. Not coded.</p> <p><b>Social Services</b> Awaiting information</p>	CIE 10 (diagnostics and procedures)	<p>Diagnosis: ICD10</p> <p>Drugs: ATC</p> <p>Procedures: KVÅ</p> <p>International Classification Functioning disability and health: ICF</p> <p>Classification of activities in social service: KSI</p> <p>SNOMED CT</p>

### 6.2.1 Basque Country, Spain

Patient Data Fields to be exchanged	Are these being documented in local	Is it possible to exchange these information with	Which coding systems are used to
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	<b>information systems? Please name them</b>	<b>external systems in a structured format? In a document format? Through an API? Can you present the document templates or APIs?</b>	<b>document these (attribute name, coding system name, version)</b>
<b>Demographics</b>	No, Corporate catalog of patient demographic data	Yes, HL7 2.5	
<b>Problem list including active problems and past medical history</b>	Yes. Osabide Global	Yes, XML-SOAP	
<b>Family History</b>	Yes, Osabide Global		
<b>Allergies/Intolerances</b>	Yes. Osabide Global	Yes, XML-SOAP	
<b>Medications</b>	Yes. Presbide, as a module inside of Osabide Global	Yes, XML-SOAP	
<b>Vital Signs / Measurements</b>	Yes. Osabide Global	Yes, XML-SOAP	
<b>Lab Results</b>	Yes. , LIS	Yes, XML-SOAP	
<b>Procedures</b>	Yes. Osabide Global	Yes, XML-SOAP	
<b>Encounters/Episodes of Care/ Stays</b>	Yes, Osabide Global	Yes, XML-SOAP	
<b>Care Plan (Health Concerns, Goals, Interventions Planned/Achieved)</b>	Yes. Osanaia		

## 6.2.2 Region Jämtland Härjedalen, Sweden

<b>Patient Data Fields to be exchanged</b>	<b>Are these being documented in local information systems? Please name them</b>	<b>Is it possible to exchange these information with external systems in a structured format? In a document format? Through an API? Can you present the document templates or APIs?</b>	<b>Which coding systems are used to document these (attribute name, coding system name, version)</b>
<b>Demographics</b>	Master with integration to Cambio Cosmic®	CDA XML	None
<b>Problem list including active problems and past medical history</b>	Cambio Cosmic®	CDA XML	ICD10
<b>Family History</b>	Cambio Cosmic®	CDA XML	None
<b>Allergies/Intolerances</b>	Cambio Cosmic®	CDA XML	ICD10 (drugs/allergies) and ATC (drugs/substance)
<b>Medications</b>	Cambio Cosmic® (Medication catalog imported from SIL)	CDA XML	ATC
<b>Vital Signs / Measurements</b>	Cambio Cosmic®	CDA XML	None
<b>Lab Results</b>	Cambio Cosmic® (Results imported from Lab systems)	CDA XML	None

<b>Procedures</b>	Cambio Cosmic®	CDA XML	KVÄ (procedure codes i.e. surgery, treatments etc.)
<b>Encounters/Episodes of Care/ Stays</b>	Cambio Cosmic®	CDA XML	KVÄ (procedure codes i.e. surgery, treatments etc.) - Coded for financial/billing reasons.
<b>Care Plan (Health Concerns, Goals, Interventions Planned/Achieved)</b>	MEDDIX (point of transfer of care from secondary care to nursing home/home care)	-	-

### 6.2.3 South Warwickshire, United Kingdom

It should be noted that the data fields below could potentially be entered into a large number of systems. However, the table below focuses on the main systems only. It should also be noted that it would always be the intention to capture information such as this through the relevant integration engines, e.g. Rhapsody/MIG etc.

<b>Patient Data Fields to be Exchanged</b>	<b>Are these being documented in local information systems? Please name which systems</b>	<b>Is it possible to exchange these information items with external systems in a structured format, i.e. in a document, through an API etc? Can document templates, or details of APIs, be provided?</b>	<b>Which coding systems are used to document these (attribute name, coding system name, version)</b>
<b>Demographics</b>	<b>Lorenzo</b> - feeds all other interfaced systems  <b>EmisWeb</b> - Personal Demographics System (PDS)	Through Rhapsody integration engine	N/A
<b>Problem list including active problems and past medical history</b>	<b>Lorenzo</b> – entered unreliably  <b>JAC</b> - from discharge summary  <b>EmisWeb</b>	Through Rhapsody integration engine	<b>Lorenzo</b> - ICD10 for diagnosis. Lorenzo has capability to record SNOMED codes against patient but not used. SNOMED has 1,000s of conditions so difficult to find the right one). Currently prioritising codes into ‘favourites’ list.  <b>EMIS</b> – Read 2

<b>Family History</b>	<b>Lorenzo</b> – not routinely captured but could be if form set up  <b>EmisWeb</b>	Unlikely to be able to send this data in a message due to being unstructured text	We do not believe that this is coded
<b>Allergies/Intolerances</b>	<b>Lorenzo</b>  <b>JAC</b> - from discharge summary  <b>EmisWeb &amp; Summary Care Record</b>	Could potentially be captured through Rhapsody integration engine	<b>Lorenzo</b> - alerts lists with local coding  <b>EMIS</b> – not known if this is coded
<b>Medications</b>	<b>JAC</b> - but will move to Lorenzo  <b>EmisWeb</b>	Could share as XML message	<b>JAC</b> - check coding with Pharmacy  <b>EMIS</b> – Read 2
<b>Vital Signs / Measurements</b>	<b>Lorenzo</b> – some for outpatients for specific specialties  <b>JAC</b> - from discharge summary  <b>EmisWeb</b>		Not coded
<b>Lab Results</b>	<b>ICE</b> – later Lorenzo  <b>JAC</b> - from discharge summary	Through Rhapsody integration engine	Check with Pathology
<b>Procedures</b>	<b>Lorenzo</b>  <b>JAC</b> - from discharge summary	Through Rhapsody integration engine	<b>Lorenzo</b> - OPCS4
<b>Encounters/Episodes of Care/ Stays</b>	<b>Lorenzo</b> – ADTs  <b>JAC</b>	Through Rhapsody integration engine	Comply with national standards on NHS data dictionary
<b>Care Plan (Health Concerns, Goals, Interventions Planned/Achieved)</b>	<b>Lorenzo</b> - some in Lorenzo. Many in paper form  <b>JAC</b> - from discharge summary		Not coded

## 6.3 Security and privacy related ICT landscape

Table 5. Security and privacy related ICT landscape summary

Pilot ICT Landscape	South Warwickshire, United Kingdom	Basque Country, Spain	Region Jämtland Härjedalen, Sweden
Identity/attribute provider systems (e.g. LDAP, Active Directory) for care	See table in Section 6.3.3	Yes partially: -Authentication YES	Active Directory. Attributes for users

Pilot ICT Landscape	South Warwickshire, United Kingdom	Basque Country, Spain	Region Jämtland Härjedalen, Sweden
team members (types of attributes, single sign-on?, supported protocols)		-Authorization by roles NO	synced from EKO (LDAP).  SSO is available for certain systems.
Policy based access control system (standards for policy formats, exchange)	See table in Section 6.3.3	No partially:  The access policy is carried out in each information system:	No.
Secure (encrypted) communication among IT systems / applications (types of certificates)	See table in Section 6.3.3	Yes	Yes. Certificates used for users (on id card): SITHS Type 1 CA v1 (SITHS Card)  Certificates used system-to-system communication: SITHS Type 2 CA v1 (SHA 1. Until 31/12/2016), SITHS Type 3 CA v1 (SHA 512).
Audit Record Repository (format and exchange standards)	See table in Section 6.3.3	Yes	LogPoint. No standards used at this point. Currently using a customized connector for importing COSMIC logs.

### 6.3.1 Basque Country, Spain

*Which identity/attribute provider systems (e.g. LDAP, Active Directory, RDBMS tables only) are used for user account management of care team members (e.g. GPs, specialists, nurses, social care workers)?*

LDAP, Active Directory and usually RDBMS tables

*Which attributes (e.g. name, surname, role, organization, password, email, telephone) are stored for a user?*

Name, surname, organization, password

*Can users access multiple applications through a single business account; in other words, is single sign-on already implemented?*

YES

***If so, which protocol is supported for single sign-on (e.g. OpenID)?***

Oracle Enterprise Single Sign-on

***Is there a policy based access control system in place for dynamically managing access control policies (e.g. nurses can read-only referral documents of their patients)? If so, which standard(s) are supported?***

Currently it does not exist, it is under study. It is done at the level of each system according to functional job position-roles.

***Is secure communication (i.e. encrypted via digital security certificates) implemented for communication among different IT systems/applications? If so, what type(s) of digital security certificates are used?***

SSL certificate and x509 certificate

Message: WS-Security 1.0 / 1.1, WS-SecurityPolicy, WS-Policy, WSPolicyAttachment, WS-Security: Username Token Profile 1.0 / 1.1, WS-Security: X.509 Token Profile 1.0 / 1.1, WSSecurity: SAML Token Profile 1.0 / 1.1, WS-Security: KerberosToken Profile 1.1, WS-Reliable Messaging 1.0, WS-Addressing, WS-I Basic Profile 1.1

Transport layer: HTTP 1.0, HTTP 1.1, TLS, SSL

The valid authentication systems are:

- Using Active Directory (Microsoft Active Directory) corporate, which identifies an employee of Osakidetza by username / password or by business card.
- Kerberos Token issued by the corporate Active Directory.
- Authentication based on digital certification infrastructure (PKI)
- X.509 server that will identify systems (machines)
- X.509 client certificates that will identify individuals (people)
- For Web services, WS-Security authentication policies.
- The bus service will only be used for X.509 certificate-based authentication server.

The authorization system is based on user roles, based on permissions and actions over the various processes, so each user has assigned one role and can access to a number of different features.

***Is there any Audit Record Repository in place for logging all kinds of medical interactions in/out information systems? If so, which audit record format and exchange standards are supported?***

Yes, we have our own corporate audit trail tool for compliance with LOPD.

### **6.3.2 Region Jämtland Härjedalen, Sweden**

***Which identity/attribute provider systems (e.g. LDAP, Active Directory, RDBMS tables only) are used for user account management of care team members (e.g. GPs, specialists, nurses, social care workers)? Which attributes (e.g. name, surname, role, organization, password, email, telephone) are stored for a user? Can users access multiple applications through a single business account; in other words, is single sign-on already implemented? If so, which protocol is supported for single sign-on (e.g. OpenID)? If not, is it possible to implement a standards-based protocol on top of identity provider system for enabling single sign-on within C3-Cloud?***

Active Directory is used and attributes for users are synced from an LDAP system called EKO.

SSO is available for certain systems.

***Is there a policy based access control system in place for dynamically managing access control policies (e.g. nurses can read-only referral documents of their patients)? If so, which standard(s) are supported?***

No, there is no policy based access control system in place.

***Is secure communication (i.e. encrypted via digital security certificates) implemented for communication among different IT systems/applications? If so, what type(s) of digital security certificates are used?***

Yes, there is. Certificates used for users (on identification card): SITHS Type 1 CA v1 (SITHS Card). Certificates used system-to-system communication: SITHS Type 2 CA v1 (SHA 1. Until 31/12/2016), SITHS Type 3 CA v1 (SHA 512).

***Is there any Audit Record Repository in place for logging all kinds of medical interactions in/out information systems? If so, which audit record format and exchange standards are supported?***

Yes, system used is LogPoint. No standards used at this point. Currently using a customized connector for importing COSMIC logs.



### 6.3.3 South Warwickshire, United Kingdom

Information Required	Secondary /Acute Care	Primary Care/GPs	Community/Home Care	Social Services & Social Care	PHR / Telemetry
Can users access multiple applications through a single business account, i.e. is single sign-on implemented? If so, which protocol is supported for single sign-on (e.g. OpenID)? If not, is it possible to implement a standards-based protocol on top of identity provider system for enabling single sign-on within C3-Cloud?	<p>ISOSEC is used to enable session persistence through VDI for smartcard applications, e.g. Lorenzo.</p> <p>Windows Active Directory authentication is also used for some applications.</p> <p>Any single sign on capability for C3 cloud would need to be done through Windows Active Directory federation.</p>	No. Various national systems can be accessed if the user has the relevant privileges on their smartcard	<p>No. Various national systems can be accessed if the user has the relevant privileges on their smartcard</p> <p><b>GAP</b> – Active Directory authentication</p>	To be confirmed	Not known
Is there a policy based access control system in place for dynamically managing access control policies, e.g. nurses can read-only referral documents of their patients? If so, which standard(s) are supported?	<p>No central mechanism for this which covers all systems.</p> <p>Most systems have access rules set on a per user basis within the system itself. Some are authenticated using the users AD credentials, e.g. DIGIT</p> <p>National systems, i.e. Lorenzo, have role based access via smartcard. Actually person based access control</p>	<p>EMIS &amp; SCR – role based access via smartcard</p> <p>Practice Manager will manage access control policies. Most staff at practices have read and write access.</p>	<p>National systems, e.g. Lorenzo, EMIS &amp; SCR have role based access via smartcard</p> <p>GP – AD authentication</p>	To be confirmed	Not known

Information Required	Secondary /Acute Care	Primary Care/GPs	Community/Home Care	Social Services & Social Care	PHR / Telemetry
Is secure (encrypted) communication, i.e. encrypted via digital security certificates, implemented for communication among different IT systems/applications? If so, what type(s) of digital security certificates are used?	Yes	Yes	Yes	To be confirmed	Not known
Is there any Audit Record Repository in place for logging all kinds of medical interactions in/out information systems? If so, which audit record format and exchange standards are supported?	<p>All systems have an audit log facility of varying granularity.</p> <p>Systems such as Lorenzo and ICE have granular audit trails.</p>	All actions are audited o EMIS	To be confirmed	To be confirmed	Not known

## 6.4 Current practices for personalized care plan creation, execution and monitoring

In this section the current practices for personalized care plan creation, execution and monitoring at pilot sites are elaborated in the guidance of the tables below.

A judgement on the suitability of existing practices in the pilot site to meet the C3-Cloud requirements as a maturity level are coded as follows:

0 = not implemented.

1 = Service not implemented but being tested.

2 = Service partially meeting requirements\*\*. Divided in three levels of development:

a) 0-25 %

b) 25-75 %

c) >75 %

3 = Service 100% implemented and meeting requirements of C3-Cloud

### 6.4.1 Basque Country, Spain

C3-Cloud functionalities	As-is functionalities	Maturity vs C3-Cloud**
Creation of a care plan by a multi-disciplinary care team through a collaborative web-based application	<b>-OSANAIA</b> (Nursing Care Plan): <ul style="list-style-type: none"> <li>• +: The patient plan is created, web-based (intranet scope)</li> <li>• -: It is not multidisciplinary, it is for nurses</li> </ul>	<b>2a</b>
Availability of core care plans (i.e. template care plans not personalised yet) based on clinical guidelines	<b>-OSANAIA</b> : there are standardized plans that later are modified according to the patient <b>-OSABIDE</b> : there are specific <b>PAPs</b> , for example diabetes in “Oferta Preferente”. The “Oferta Preferente” refers to a set of preventive interventions and diseases control prioritized by the Health Plan Euskadi in Primary Care. <b>PAPs</b> (PLAN OF PLANNED ACTIVITIES) is the software application that has developed Osakidetza to support the “Oferta Preferente”. It reminds professionals to perform activities, facilitates registration and allows assessment of compliance.	<b>2b</b>
Machine processable representation of personalised care plans detailing the agreed goals, an ordered list of treatment interventions, clear roles for all of the care actors including the patient	<b>-Partially fulfilled by OSANAIA</b> : <ul style="list-style-type: none"> <li>• Machine processable representation of personalized care plan: there is no visual representation, but not graphical.</li> <li>• There are an ordered list of treatment interventions</li> <li>• Clear roles for all of the care. Actors: nurse and nursing assistant</li> <li>• It does not include the patient</li> </ul> <b>- Partially fulfilled by PAPs</b> : <ul style="list-style-type: none"> <li>• There is no graphical representation about future</li> </ul>	<b>2a</b>

	<p>Both OSANAIA and PAPs:</p> <ul style="list-style-type: none"> <li>• There are goals but they are not agreed with the patient.</li> <li>• There is list of interventions</li> <li>• There are not roles</li> <li>• The patient is not involved</li> </ul> <p><b>-PRESBIDE:</b> there is no graphical representation</p>	
Setting outcome indicators	<p><b>-OSANAIA:</b> each result has each own indicators In care and prescription there are pre-defined general goals, but not individualized for each patient.</p> <p><b>-OSABIDE GLOBAL:</b> There are indicators for PAPs, but they are not individualized for each patient.</p> <p><b>-PRESBIDE:</b> there are indicators of prescription quality. but not individualized for each patient Quality: dispensing, adherence</p>	<b>2 b</b>
Involving patient in the care plan creation process		<b>0</b>
Systematic and semi-automatic reconciliation of digitally represented clinical guidelines for individual chronic conditions.	<p><b>-PRESBIDE:</b> There are prescription supports: geriatrics, Interaction. The supports are informative or alarm. Currently there is a working group working on drug-disease (renal failure, liver failure) interaction. Drug contraindications with other CIEs, for example, heart failure. AINE Currently starting to work in disease-disease interactions</p>	<b>1</b>
Provide unified access to all relevant health and social records of the patient distributed in various providers (e.g. EHR, SCR, Personal Health Record [PHR], and homecare systems) in a dashboard	<p><b>-EHR</b> through Personal Health Folder (PHF) <b>-OSABIDE</b> and <b>PRESBIDE</b> in nursing homes <b>-OSANAIA</b> <b>-InterRai</b> tool <b>-Some issues in social and Health, there is no Access to the information from Social Services.</b></p>	<b>2c</b>
Monitoring the progress of the care plan	<p><b>-OSABIDE:</b> Professional practice is evaluated, what has been done, but not the plan, because there is not.</p> <p><b>-OSANAIA:OK</b></p>	<b>2b</b>
Supporting management and update of care plans during the transition of care among care providers	<p><b>-OSABIDE GLOBAL:</b> Through it, some information is communicated. It alerts the discharge. Some information can be visualized as admission reports and medication reconciliation.</p> <p><b>-OSANAIA:</b> Yes</p>	<b>2b</b>
Detecting the deviations from the care plan by accessing the most recent patient contextual data from EHR systems and patient	<p><b>-OSABIDE GLOBAL:</b> It notifies of standardized and PAPs and tele monitored patients.</p>	<b>2a</b>

empowerment platforms to trigger update of care plan	- <b>OSANAIA</b> : It warns of activities not performed. But there are not individualized alert systems. “individualizadas”.	
Utilisation of clinical decision support services (e.g. poly-pharmacy management, avoiding contraindications) during creation and execution of personalised care plans	<b>-PRESBIDE</b> : <ul style="list-style-type: none"> <li>• Drug-drug interactions: Yes. The contraindications interactions are the one that have been uploaded and the last update was in 2013. However, the system is ready to upload the interactions according to different levels (active ingredient ATC, ATC therapeutic group, etc.).</li> <li>• Disease-drug interaction: currently there is a working group working in renal failure and heart failure.</li> <li>• Disease-disease interactions: not yet.</li> </ul> Care Plan is a broader concept than drug plan. Care Plan includes items such as food, physical activity, etc. apart the drug plan.	<b>2b</b>
Communicating with a patient empowerment platform to collect patient preferences, context and feedback during care plan execution	Osakidetza provides tools for that, but it is not structured <b>-OSABIDE</b> : patient can examine the EHR through PHF <b>-PHF</b> : online communication with doctor, patient can upload reports, data.... NO: patient preferences, no feedback Yes: Living will NO: Advance Directives Advanced Care Plan	<b>2a</b>
Communication among care team members (asynchronous messaging, tele-conference) supporting collaborative creation and update of personalised care plan	<b>-Communication</b> : <ul style="list-style-type: none"> <li>• Videoconferencing system (Lync server) between healthcare professionals</li> <li>• OSABIDE: e-book or “evolutivos”</li> <li>• OSANAIA: e-book or “evolutivos”</li> <li>• PRESBIDE: any professional can write comment in each prescription. Useful for reconciliation</li> </ul> <b>-Multidisciplinary team</b> : <ul style="list-style-type: none"> <li>• OSABIDE; primary and specialized care.</li> <li>• OSANAIA: Nurses,</li> <li>• PRESBIDE; doctor, nurses and pharmacists working together</li> <li>• InterRAI:</li> <li>• Other: Integrated Intervention Programs for multi-morbid patient</li> <li>• Currently there is no access to no assisting profiles, except InterRAI tool.</li> </ul> <b>One-way f-2-f consults</b> <b>No communication with pharmacists, although is working on it.</b>	<b>2c</b>
Alerting MDT members to communicate any changes leading to care plan interventions to team members that are not present during the care plan development		<b>0</b>
Supporting regular face-to-face and virtual case review	Regular meetings to discuss cases in Primary Care and between levels of care	<b>2b</b>

meetings for review and update of care plans by multidisciplinary care team		
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## 6.4.2 Region Jämtland Härjedalen, Sweden

C3-Cloud functionalities	As-is functionalities	Maturity vs C3-Cloud
Creation of a care plan by a multi-disciplinary care team through a collaborative web-based application		0
Availability of core care plans (i.e. template care plans not personalised yet) based on clinical guidelines		0
Machine processable representation of personalised care plans detailing the agreed goals, an ordered list of treatment interventions, clear roles for all of the care actors including the patient		0
Setting outcome indicators		0
Involving patient in the care plan creation process		0
Systematic and semi-automatic reconciliation of digitally represented clinical guidelines for individual chronic conditions.		0
Provide unified access to all relevant health and social records of the patient distributed in various providers (e.g. EHR, SCR, Personal Health Record [PHR], and homecare systems) in a dashboard	Cambio Cosmic® (between primary and secondary care) NPO for others	2c
Monitoring the progress of the care plan		0
Supporting management and update of care plans during the transition of care among care providers		0
Detecting the deviations from the care plan by accessing the most recent patient contextual data from EHR systems and patient empowerment platforms to trigger update of care plan		0
Utilisation of clinical decision support services (e.g. poly-pharmacy management, avoiding contraindications) during creation and execution of personalised care plans	Cambio Cosmic® (premature functionality)	2a
Communicating with a patient empowerment platform to collect patient preferences, context and feedback during care plan execution		0
Communication among care team members (asynchronous messaging, tele-conference) supporting collaborative creation and update of personalised care plan	Meddix (at discharge have some functions)	2a
Alerting MDT members to communicate any changes leading to care plan interventions to team members that are not present during the care plan development		0
Supporting regular face-to-face and virtual case review meetings for review and update of care plans by multidisciplinary care team		0

## 6.4.3 South Warwickshire, United Kingdom

**General Points:**

- Minimal use of electronic care plans in SWFT, particularly dynamically managed care plans. Most care plans are paper based and are static rather than being updated through the course of a patient's management. They tend to be used/managed by individual staff groups rather than managed across all care providers. The use of care plans varies widely between staff groups and organizations. Generally better in primary care than secondary care with the use of EMIS etc.
- Community nurses have their own handwritten care plans which are multi-disciplinary – also used by community physios & OTs, podiatry etc. Other community care professionals have their own notes, e.g. Physio
- Nurses don't add to GP care plans and vice versa
- It should also be noted that the stated capability may be available but that it may not be used or we may not be aware that it is used
- A more detailed investigation would be required if more information is required around care plan usage and to see what is, or could be achieved, electronically.
- The scores given in the table below reflect the overall picture in SWFT not just the compliance of individual sectors, e.g. primary care, secondary care etc. However, where something is thought to be in place, this is recorded as text. A score of '2' generally means that the requirement is only met minimally or in certain settings

<b>C3-Cloud Functionalities</b>	<b>As-is Functionalities</b>	<b>Maturity vs C3-Cloud (0-3)</b>
Creation of a care plan by a multi-disciplinary care team through a collaborative web-based application	Generally not in place. GPs hold care plans for end of life patients and complex patients. Carers have a care plan so they know what medication the patient is on. Minimal in secondary care. Multi-disciplinary teams (MDTs) are practice based. Every practice has an MDT (called gold standard framework meetings). Heavily focused on palliative care and who has died (QOF). Attendance generally by district nurses, GPs & Macmillan nurses. Sometimes physios and OTs. Input from social services is very limited. Frequency and approach to care planning within MDTs varies.	0
Availability of core care plans (i.e. template care plans not personalised yet) based on clinical guidelines	Generally not in place but could potentially be made available, depending on specific requirements. GPs have some templates in clinical system based on clinical guidelines	2
Machine processable representation of personalised care plans detailing the agreed goals, an ordered list of treatment interventions, clear roles for all of the care actors including the patient	Generally not in place. Some information can be extracted from EMIS for GPs.	2
Setting outcome indicators	Generally not in place, except within primary care	2
Involving patient in the care plan creation process	Happens to varying degrees. Some patients hold nursing care plan themselves and can add to it but paper based not electronic. Paper based care plan from GPs to prevent re-admission	2
Systematic and semi-automatic reconciliation of digitally represented clinical guidelines for individual chronic condition	Minimal. Perhaps more in primary care	2

Provide unified access to all relevant health and social records of the patient distributed in various providers (e.g. EHR, SCR, Personal Health Record [PHR], and homecare systems) in a dashboard	Limited unification of systems, and sharing of information between care providers, across SWFT. Summary care records provides some of this	2
Monitoring the progress of the care plan	Care plans are only updated when contact made with the patient. May be better for complex patients	2
Supporting management and update of care plans during the transition of care among care providers	Minimal in secondary care but probably slightly better in primary care/community	2
Detecting the deviations from the care plan by accessing the most recent patient contextual data from EHR systems and patient empowerment platforms to trigger update of care plan	Minimal	2
Utilisation of clinical decision support services (e.g. poly-pharmacy management, avoiding contraindications) during creation and execution of personalised care plans	Minimal in secondary care but may be slightly better in primary care/community	2
Communicating with a patient empowerment platform to collect patient preferences, context and feedback during care plan execution		0
Communication among care team members (asynchronous messaging, tele-conference) supporting collaborative creation and update of personalised care plan		0
Alerting MDT members to communicate any changes leading to care plan interventions to team members that are not present during the care plan development		0
Supporting regular face-to-face and virtual case review meetings for review and update of care plans by multidisciplinary care team	More complex patients mainly	2

## 6.5 Current practices for clinical decision support

In this section the current practices for utilization of clinical decision support modules at pilot sites are elaborated in the guidance of the tables below.

A judgement on the suitability of existing practices in the pilot site to meet the C3-Cloud requirements as a maturity level are coded as follows:

0 = not implemented.

1 = Service not implemented but being tested.

2 = Service partially meeting requirements\*\*. Divided in three levels of development:

a) 0-25 %



### 6.5.1 Basque Country, Spain

C3-Cloud functionalities	As-is functionalities	Maturity vs C3-Cloud**
Providing decision support for managing poly-pharmacy	<p>Currently a support to prescription about the use of drugs in elderly is in preproduction in Osakidetza. The recommendations are uploaded at ATC level and they include drug groups and active ingredient affected by STOPP-START criteria. There are three kinds of recommendations: “potentially inappropriate”, “recommended use” and “considerations related to its use”. These fields are informative (no automatic alarms), although the tool provides the ability to create alerts if necessary in the future. The information included is based on STOPP-START criteria and the Polypharmacy Guidance 2015:  <a href="http://www.jitscotland.org.uk/resource/polypharmacy-guidance-march-2015/">http://www.jitscotland.org.uk/resource/polypharmacy-guidance-march-2015/</a>.</p> <p>There is a working group working in a project about “Wise use and polypharmacy” in elderly, more than 80 years, taking more than 10 drugs. Currently there is other project on going targeting patients over 65 taking 5 or more drugs. Both projects detect interactions drug-drug or drug-disease with potential risk. As example, some of these criteria affect to drug-heart failure.  See also table in Section 6.4.2.</p>	<b>2</b>
Providing decision support for scanning available recorded data for indications and contraindications to a treatment proposed for the personalized care plan	See table in Section 6.4.2.	<b>2</b>
Providing decision support for reconciling all the different conditions of the patients and possible goal conflicts	LITERATURE REVIEW	<b>1</b>

Providing decision support for proposing goals and interventions based on clinical guidelines	Regarding the guidelines used to identify potential interactions, the most common data bases to check interactions are Micromedex and Lexicom (the latter of Uptodate). These information sources are available to all Osakidetza professionals. In the hospital setting, professionals can also use specific databases, for example to validate interactions in HIV drugs ( <a href="http://www.hiv-druginteractions.org/">http://www.hiv-druginteractions.org/</a> ) or hepatitis C ( <a href="http://www.hep-druginteractions.org/">http://www.hep-druginteractions.org/</a> ). The goal in the near future is to include in Presbide the “severe” interactions, linked to the ATC classification.	<b>1</b>
Providing decision support for calculating risk factors based on the current conditions of the patient	<b>-OSABIDE:</b> Scales, tests. Surveys. Risk stratification of patients: they are classified in 4 stratum based on their Predictive Index. <b>-OSANAIA:</b> UPP risk assessment and older patient scales. Surveys Other: Social and Health Teams	<b>3</b>
Providing decision support for reconciling multiple treatment plans	<b>-PRESBIDE:</b> medication reconciliation.	<b>2a</b>
Providing programmable interfaces (APIs) (standard based where possible) for accepting decision support requests and returning results	¿?	¿?

### 6.5.2 Region Jämtland Härjedalen, Sweden

C3-Cloud functionalities	As-is functionalities	Maturity vs C3-Cloud
Providing decision support for managing poly-pharmacy	SIL (regarding improper medication in elderly)	<b>2a</b>
Providing decision support for scanning available recorded data for indications and contraindications to a treatment proposed for the personalized care plan		<b>0</b>
Providing decision support for reconciling all the different conditions of the patients and possible goal conflicts		<b>0</b>
Providing decision support for proposing goals and interventions based on clinical guidelines		<b>0</b>
Providing decision support for calculating risk factors based on the current conditions of the patient	At the National Diabetes Register (NDR) is a risk calculator for diabetic patients <a href="https://www.ndr.nu/#/risk">https://www.ndr.nu/#/risk</a> , not integrated to EHR.	<b>2a</b>
Providing decision support for reconciling multiple treatment plans		<b>0</b>

Providing programmable interfaces (APIs) (standard based where possible) for accepting decision support requests and returning results		0
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### 6.5.3 South Warwickshire, United Kingdom

#### General Points:

- A more detailed investigation would be required if more information is required around clinical decision support and to see what is, or could be achieved, electronically
- The scores given in the table below reflect the overall picture in SWFT not just the compliance of individual sectors, e.g. primary care, secondary care etc. However, where something similar is thought to be in place, this is recorded as text. A score of '2' generally means that the requirement is only met minimally or in certain settings. Compliance is generally better in primary than secondary care and the '2' scores are generally reflective of this
- It should also be noted that the stated capability may be available but that it may not be used or we may not be aware that it is used.

C3-Cloud Functionalities	As-is Functionalities *	Maturity vs C3-Cloud ** (0-3)
Providing decision support for managing poly-pharmacy	Not available in secondary care pharmacy system but available in EMIS for GPs. Community nurses can view the BNF on line	2
Providing decision support for scanning available recorded data for indications and contraindications to a treatment proposed for the personalized care plan	? some capability within primary care	2
Providing decision support for reconciling all the different conditions of the patients and possible goal conflicts	? some capability within primary care	2
Providing decision support for proposing goals and interventions based on clinical guidelines	? some capability within primary care	2
Providing decision support for calculating risk factors based on the current conditions of the patient	EMIS Web calculates risk factors but it definitely doesn't have an API for exchanging decision support protocols or results with other systems	2
Providing decision support for reconciling multiple treatment plans		0
Providing programmable interfaces (APIs) (standard based where possible) for accepting decision support requests and returning results		0

## 6.6 Current practices for patient empowerment

In this section the current practices for patient empowerment at pilot sites are elaborated in the guidance of the tables below.

A judgement on the suitability of existing practices in the pilot site to meet the C3-Cloud requirements as a maturity level are coded as follows:

0 = not implemented.

1 = Service not implemented but being tested.

2 = Service partially meeting requirements\*\*. Divided in three levels of development:

a) 0-25 %

b) 25-75 %

c) >75 %

3 = Service 100% implemented and meeting requirements of C3-Cloud

### 6.6.1 Basque Country, Spain

C3-Cloud functionalities	As-is functionalities	Maturity vs C3-Cloud**
Supporting web and mobile environments	Web y mobile for Personal Health Folder (PHF): information shared	<b>3</b>
Collecting real-time data from off-the-shelf wireless medical sensors	- <b>Personal Health Folder</b> : clinical follow-up. Constantes -CRM: Integration of data relating to patient's self- monitoring. The information is recorded in EHR -Betion	<b>3</b>
Monitoring the most recent status of the patients through the recorded activities	- Personal Health Folder: scales, pain, anxiety Tele monitoring -Oncomed (commercial app for patient, out of PHF).	<b>2b</b>
Monitoring possible risk factors through online patient-reported outcome measures (PROM) questionnaires based on integrated risk assessment	-Personal Health Folder: patient can integrate data (patient diary) The survey about Healthy life, which is uploaded directly, while other surveys that are completed are not automatically uploaded,	<b>2b</b>
Sharing the most recent context and feedback of the patient with the care plan execution platform	Personal Health Folder: patient can input into the EHR The information integrated by patient is recorded in CRM The tool is, but not the process.	<b>2a</b>

Presenting the targeted goals of the care plan, listing and reminding the action items to the patients regularly (like medications, exercises, diet, rehabilitation therapies)		<b>0</b>
Enabling patients to flag treatment interventions and corresponding goals, as “achieved” and “not achieved”.	Personal Health Folder: Tool for the patients to examine their EHR REPORTS: hospital discharge reports, radiology reports, pathology reports, primary care reports, lab results reports, surgical reports. Patients inputs into the PHR: by means of Patient’s diary	<b>0</b>
Supporting self-management training following international and national disease self-management programs	Active patient program, Osasun eskola web page. Active patient program on line!	<b>2c</b>
Providing educational intervention / training materials / tools supporting self-management	On line information and training not only to patients and caregivers but also to citizens, aimed at maintaining and promoting population health and health performance by making responsible disease-related decisions: Osasun eskola, Paciente activo, iBOTIKA	<b>2c</b>

### 6.6.2 Region Jämtland Härjedalen, Sweden

<b>C3-Cloud functionalities</b>	<b>As-is functionalities</b>	<b>Maturity vs C3-Cloud</b>
Supporting web and mobile environments	1177.se.	<b>2b</b>
Collecting real-time data from off-the-shelf wireless medical sensors	For diabetes glucose meters	<b>1</b>
Monitoring the most recent status of the patients through the recorded activities		<b>0</b>

Monitoring possible risk factors through online patient-reported outcome measures (PROM) questionnaires based on integrated risk assessment	For some patient groups, best in practice in patients with rheumatoid arthritis (and other inflammatory joint and bowel diseases). Not in practice for patients included in C3-Cloud.	<b>2a</b>
Sharing the most recent context and feedback of the patient with the care plan execution platform		<b>0</b>
Presenting the targeted goals of the care plan, listing and reminding the action items to the patients regularly (like medications, exercises, diet, rehabilitation therapies)	Reminders via SMS	<b>1</b>
Enabling patients to flag treatment interventions and corresponding goals, as “achieved” and “not achieved”.	See patients with inflammatory joint/bowel diseases above. Otherwise:	<b>0</b>
Supporting self-management training following international and national disease self-management programs	Starting up for some diseases, e.g. urinary incontinence	<b>1</b>
Providing educational intervention / training materials / tools supporting self-management	See previous question.	<b>1</b>

### 6.6.3 South Warwickshire, United Kingdom

#### General Points:

- A more detailed investigation would be required if more information is required around clinical decision support and to see what is, or could be achieved, electronically
- The scores given in the table below reflect the overall picture in SWFT not just the compliance of individual sectors, e.g. primary care, secondary care etc. However, where something similar is thought to be in place, this is recorded as text. A score of ‘2’ generally means that the requirement is only met minimally or in certain settings. Compliance is generally better in primary than secondary care and the ‘2’ scores are generally reflective of this
- It should also be noted that the stated capability may be available but that it may not be used or we may not be aware that it is used.

<b>C3-Cloud Functionalities</b>	<b>As-is Functionalities (Description)*</b>	<b>Maturity vs C3-Cloud** (0-3)</b>
Supporting web and mobile environments	<b>EmisWeb</b> - provides Patient Online access to parts of the GP record depending on permissions set by individual practices.	<b>2a</b>
Collecting real-time data from off-the-shelf wireless medical sensors		<b>0</b>
Monitoring the most recent status of the patients through the recorded activities	Available within EMIS. Variable within secondary care	<b>0</b>
Monitoring possible risk factors through online patient-reported outcome measures (PROM) questionnaires based on integrated risk assessment		<b>0</b>
Sharing the most recent context and feedback of the patient with the care plan execution platform		<b>0</b>
Presenting the targeted goals of the care plan, listing & reminding the action items to the patients regularly (like medications, exercises, diet, rehab therapies)	Better in primary care who also use text reminders for some activities	<b>2a</b>
Enabling patients to flag treatment interventions and corresponding goals, as “achieved” and “not achieved”		<b>0</b>
Supporting self-management training following international and national disease self-management programs		<b>0</b>
Providing educational intervention / training materials / tools supporting self-management	Patients can use the internet to obtain advice, e.g. Diabetes UK, British Heart Foundation etc.	<b>0</b>

‘Patient Online’ ([www.nhs.uk/patientonline](http://www.nhs.uk/patientonline)) allows patients and nominated carers to access their Summary Care Record. It is a 24 hour service and allows the following:-

- Book an appointment
- Order repeat prescriptions
- Change address
- Send secure messages
- View their medical record
- Create a personal health record

## 7 ADDENDUM

### 7.1 Patient interview questions

#### Patient interview questions 8.1 used in RJH and Basque country

The interview technique is open and semi structured. Start with an open question and the following questions are examples of questions to be used if the open discussion hasn't covered the topic already. Specific parts of C3-Cloud potential solutions could be asked for when appropriate.

Example of opening question;

*I am working on a project where we try to find out how patients with different diseases using home computers, I-pads, smartphones and different technical devices could get help to live a better and freer life. The intention is that we shall think freely, also about things not yet invented. When I say this, do you get any special ideas about what you would want to have?*

Example of follow up questions;

*Do you think you know sufficiently about your diseases and your medication?*

*How do you find information about your diseases or medication today?*

*Is there anything else you would want to have that could help you find information?*

*If you have a question about your diseases, your medication or your health, who and how do you ask today?*

*Would you appreciate another method and another way?*

*Your next of kin, do they have any specific need regarding information?*

*How do you contact your doctor or your nurse today?*

*Are there specific situations when you would want to have it in another way?*

*Is it often so that you forget your medication or don't get to a start with e.g. physical activity?*

*Could you think of anything that could be of help here for you?*

*Are there any medical technical devices that you wish existed today and that you had at home?*

*Do you have any problems with the medical technical devices you have today? Could you think of any improvements?*

*Do you have the impression that the communication between hospital doctors, your GP and the municipality nurse and help nurses works well today?*

*If not, what could make this better?*

*If all doctors and nurses helping you, and you yourself, could read and update the same document regarding your health and your care, do you think that could be good and improving your care?*


*What do you think about being able to contact your doctor (nurse) on the video when you have questions, or for an appointment?*

*Is there anything else you want to add?*



## 7.2 Basque Country

### 7.2.1 Summary Clinical Record

 <b>Osakidetza</b>	<b>Historia Clínica Resumida</b>		<b>FICTICIO</b> Primer Apellido	<b>ACTIVO</b> Segundo Apellido
	Fecha creación: 04/12/2015 Fecha de última actualización: 20/11/2015		<b>CIUDADANO</b> Nombre	<b>M</b> Sexo
Nº Historia Clínica (CIC) 10574682 DNI/I.T. Residencia/Pasaporte 92920000T NASS 481004103386 Código SNS BBBB8888BZ212441		<b>Domicilio</b> Tipo de vía: Calle/Kalea Nombre de la vía: Alango Número de la vía: 7    Piso: 001    Letra: A Código postal: 48992    Municipio: Getxo - Algorta Provincia: Bizkaia		
Fecha nacimiento 22/06/1977 CIP CA (TIS) 802494 CIP Europeo Teléfono 000000000		Cuidador Principal: Osanaia Apellido 1 Osanaia Apellido 2, Osanaia nombre		

#### DATOS DE SALUD

Existe información reservada por decisión del paciente: SI  
 Existe documento de instrucciones previas (DVA): SI

#### Alergias

Aínes  
 Caracoles  
 Grupo PARA

#### Vacunaciones


Vacuna Triple Vírica (SRP) Se niega 16/10/2015 00:00  
 Vacuna Gripe Puesta 16/10/2015 00:00  
 Vacuna Meningococo C (Conjugada) Dosis Extraordinaria 16/10/2015 00:00  
 Vacuna Hepatitis B No procede 16/10/2015 00:00  
 Vacuna DTP (Difteria-Tétanos-Tos ferina) 1ª dosis 16/10/2015 00:00  
 Vacuna BCG 1ª dosis 16/10/2013 00:00  
 Vacuna Td (Tétanos-difteria adultos) Dosis 16 años 16/10/2010 00:00

#### Problemas Resueltos, Cerrados o Inactivos

ENTERITIS ORIGEN PRESUMIBLEMENTE INFECCIOSO  
 Prueba Motivo Consulta  
 CORONAVIRUS ASOCIADO A SARS  
 ENFERMEDAD HODGKIN SIN ESPECIFICAR ABDOMEN  
 POLIMEDICADO

#### Problemas y Episodios Activos

Sistema	Código	Descripción	Fecha
No disponible	No disponible	DOLOR INGUINAL BILATERAL	07/10/2015
No disponible	No disponible	integración	09/02/2015
CIE9-MC	521.2	ABRACION DENTAL	01/01/2015
CIE9-MC	487.0	GRIPE CON NEUMONIA	01/12/2014
CIE9-MC	230.5	CARCINOMA DE CANAL ANAL	01/11/2014
CIE9-MC	997.1	COMPLICACIONES QUIRURGICAS-CARDIACAS	29/09/2014
CIE9-MC	922.31	CONTUSION DE ESPALDA	12/08/2013
No disponible	No disponible	enfermera hermana	29/05/2013

 <b>Osakidetza</b>	CIP CA (TIS) Primer Apellido <b>802494 FICTICIO</b>	Segundo Apellido <b>ACTIVO</b>	Nombre <b>CIUDADANO</b>	Fecha nacimiento <b>22/06/1977</b>	Sexo <b>M</b>
	<b>Historia Clínica Resumida</b> Fecha creación: 04/12/2015      Fecha de última actualización: 20/11/2015				

## TRATAMIENTO

### Recomendaciones


Recomendaciones no conocidas

### Fármacos

Medicamento	Posología	Vía Administración	Periodo		
			Desde	Hasta	Duración
YASMIN 21 COMPRIMIDOS (C.N. 671271 P.C.F. no disponible)	1 COMPRIMIDO / Acostarse	ORAL	19/11/2015	16/05/2016	179 días
IBUPROFENO 400MG 30 COMPRIMIDOS (P.C.F. no disponible)	1 COMPRIMIDO / 8 h	ORAL	19/11/2015	16/05/2016	179 días
CHAMPIX 1MG 56 COMPRIMIDOS RECUBIERTOS (C.N. 656183 P.C.F. no disponible)	1 COMPRIMIDO / 24 h	ORAL	19/11/2015	16/02/2016	89 días
FORTIMEL EXTRA CHOCOLATE 24 BOTELLA 200 ML (C.N. 504086 P.C.F. no disponible)	1 BOTELLA / 24 h	No disponible	19/11/2015	16/05/2016	179 días
APODREX 18X11 10 UNID A1 (C.N. 459750 P.C.F. no disponible)	2 APOSITO / 24 h	No disponible	19/11/2015	04/12/2015	15 días
LANTUS SOLOSTAR 100U/ML 5 PLUMAS 3ML (C.N. 656076 P.C.F. no disponible) LANTUS SOLOSTAR 100U/ML 5 PLUMAS 3ML (C.N. 656076)	300 UI / Acostarse	SUBCUTANEA	13/10/2015	09/04/2016	179 días
PARACETAMOL KERN PHARMA 100MG/ML 60ML EFG (C.N. 660173 P.C.F. no disponible) APIRETAL 100MG/ML SOLUCION ORAL 60ML (C.N. 750521)	1 1ML / 6 h	ORAL	13/10/2015	09/02/2016	119 días
PARACETAMOL 500MG 20 COMPRIMIDOS (P.C.F. no disponible) TERMALGIN 500MG 20 COMPRIMIDOS (C.N. 833673)	1 COMPRIMIDO / Desayuno y comida	ORAL	13/10/2015	09/04/2016	179 días
AMLODIPINO 5MG 30 COMPRIMIDOS (P.C.F. no disponible) ASTUDAL 5 5MG 30 COMPRIMIDOS (C.N. 879981)	1 SIN DEFINIR / 24 h	ORAL	29/09/2015	30/12/2015	92 días

### Diagnósticos Enfermeros Activos

Código NANDA	Descripción
00046	Deterioro de la integridad cutánea
00047	Riesgo de deterioro de la integridad cutánea

 <b>Osakidetza</b>	CIP CA (TIS) Primer Apellido		Segundo Apellido	Nombre	Fecha nacimiento	Sexo
	802494 FICTICIO		ACTIVO	CIUDADANO	22/06/1977	M
<b>Historia Clínica Resumida</b> Fecha creación: 04/12/2015      Fecha de última actualización: 20/11/2015						

### Resultados de Enfermería

Código NOC	Descripción
1619	Autocontrol de la diabetes
1103	Curación de la herida: por segunda intención
0401	Estado circulatorio
1101	Integridad tisular: piel y membranas mucosas

### Intervenciones de Enfermería

Código NIC	Descripción
4062	Cuidados circulatorios: insuficiencia arterial
3660	Cuidados de las heridas
1660	Cuidados de los pies
5603	Enseñanza: cuidados de los pies

### Alertas

ALERTA SOCIAL: Malos Tratos

BAJO ESTUDIO O ENSAYO CLÍNICO


PORTADOR DE DISPOSITIVOS: Ostomías - Gastrostomía

TRASTORNOS DEL METABOLISMO: Trastorno del metabolismo de los ácidos grasos / cuerpos cetónicos - Déficit Del Transporte De Carnitina

## **7.3 SWFT**

### **7.3.1 Data capture forms**

CARDIOLOGY																											
DEVICE FOLLOW UP CHECK																											
Hospital Number 1358251 NHS Number 9990005176 Patient Name TEST TEST Patient Address 7 Talisman Road Bicester  Postcode OX26 6HR DOB/Gender 01/01/1950 Female		South Warwickshire <small>NHS Foundation Trust</small>  <div style="color: red; font-weight: bold;">Fields marked * are mandatory</div> Date Seen* <input style="width: 150px;" type="text" value="27/7/2016"/>																									
Implant date* <input style="width: 100px;" type="text"/>	Device Type* <input style="width: 100px;" type="text" value="Select One"/>	Manufacturer* <input style="width: 100px;" type="text" value="Select One"/>																									
Clinician* <input style="width: 100px;" type="text" value="Select One"/>		Routine check* <input type="radio"/> Yes <input type="radio"/> No Reason if urgent <input style="width: 150px;" type="text"/>																									
Other Clinician <input style="width: 100px;" type="text"/>		Underlying rhythm <input style="width: 100px;" type="text"/>	%A pacing <input style="width: 50px;" type="text"/> %V pacing <input style="width: 50px;" type="text"/>																								
Any new symptoms* <input type="radio"/> Yes-detail below <input type="radio"/> No	Wound OK* <input type="radio"/> No-detail below <input type="radio"/> Yes	Any arrhythmias* <input type="radio"/> Yes-detail below <input type="radio"/> No	Any programming changes* <input type="radio"/> Yes-detail below <input type="radio"/> No																								
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<div style="background-color: #cccccc; padding: 5px 20px; border: 1px solid black;">Signature*</div>		<div style="display: flex; justify-content: space-around;"> <div style="background-color: #d9534f; color: white; padding: 5px 15px; border: 1px solid black;">Submit</div> <div style="background-color: #2e86c1; color: white; padding: 5px 15px; border: 1px solid black;">Cancel</div> </div>																									
Version 2																											

DIABETES	
<b>APPOINTMENT REQUEST FORM</b>	
Hospital Number 1358251 NHS Number 9990005176 Patient Name TEST TEST Patient Address 7 Talisman Road Bicester Postcode OX26 6HR DOB/Gender 01/01/1950 Female	South Warwickshire  <small>NHS Foundation Trust</small>
Fields marked * are mandatory	
Today's Date * 27/7/2016	
Referring Specialty * Please Select One	Appointment required - state when * <input type="text"/>
Specialty Referring To * Please select one	Priority * <input type="radio"/> Urgent (2-3 wks) <input type="radio"/> Routine
Please state if specific Consultant required <input type="text"/>	
Reason for Referral/Comments * <input type="text"/>	
Signature * <input type="text"/>	Professional Registration Number * <input type="text"/>
<input type="button" value="Submit"/> <input type="button" value="Cancel"/>	
Version 1	

GYNAECOLOGY / OBSTETRICS			
OUT PATIENT CLINICAL NOTES / HISTORY SHEET			
Hospital Number 1358251 NHS Number 9990005176 Patient Name TEST TEST Patient Address 7 Talisman Road Bicester  Postcode OX26 6HR DOB/Gender 01/01/1950 Female		<div style="text-align: right;"> <b>South Warwickshire</b>   <small>NHS Foundation Trust</small> </div> <div style="text-align: right; color: red; font-weight: bold;">Fields marked * are mandatory</div> Today's Date * 27/7/2016	
BMI	Age	Parity	Mode of Delivery
<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
Presenting Problem <input style="width: 100%; height: 40px;" type="text"/>			
LMP	Menstrual History		Contraception/HRT
<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>		<input style="width: 100%;" type="text"/>
			Last Cervical Smear Date <input style="width: 100%;" type="text"/> <input type="radio"/> Normal <input type="radio"/> Abnormal
IMB	PCB	Vaginal Discharge	Pain
<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No
Dyspareunia <input type="radio"/> Yes <input type="radio"/> No			
History of Presenting Complaints <input style="width: 100%; height: 60px;" type="text"/>			
Bowels	Bladder		
<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>		
Past Medical History Diabetes <input type="checkbox"/> VTE <input type="checkbox"/>		Past Surgical History	
<input style="width: 100%; height: 60px;" type="text"/>		<input style="width: 100%; height: 60px;" type="text"/>	
Regular Medication	Allergies	Family/Social History	
<input style="width: 100%; height: 60px;" type="text"/>	<input style="width: 100%; height: 60px;" type="text"/>	<input style="width: 100%; height: 60px;" type="text"/>	
Version 2			

GYNAECOLOGY / OBSTETRICS	
OUT PATIENT CLINICAL NOTES / HISTORY SHEET	
Build <input type="radio"/> Slim <input type="radio"/> Average <input type="radio"/> Obese <input type="radio"/> Grossly overweight	
Per Abdomen	LGE/Per Speculum
<div></div>	<div></div>
Bimanual Examination	
<div></div>	
Prolapse: Cystocele: <input type="radio"/> Mild <input type="radio"/> Moderate <input type="radio"/> Large Rectocele: <input type="radio"/> Mild <input type="radio"/> Moderate <input type="radio"/> Large CX Decent: <input type="radio"/> I <input type="radio"/> II <input type="radio"/> Procidencia	
Ultrasound: <input type="checkbox"/> TA <input type="checkbox"/> TVS	Uterine Size: <input type="radio"/> Normal <input type="radio"/> Enlarged <input type="radio"/> Small <div></div> Endometrial Thickness: <div></div> mm
Polyps <input type="radio"/> Yes <input type="radio"/> No	Details <div></div>
Fibroids <input type="radio"/> Yes <input type="radio"/> No	Details <div></div>
Rt. Ovary Normal <input type="radio"/> Yes <input type="radio"/> No	Details <div></div>
Lt. Ovary Normal <input type="radio"/> Yes <input type="radio"/> No	Details <div></div>
Saline Contrast Ultrasonography <input type="radio"/> Yes <input type="radio"/> No Further Information <div></div>	
Pipelle Uterine sound <div></div> Cm Sample <input type="radio"/> Minimal <input type="radio"/> Adequate <input type="radio"/> Clots	
Reason for not performing a Pipelle <input type="radio"/> Not necessary <input type="radio"/> Needs a formal Hysteroscopy <input type="radio"/> Polyps Suspicious Endometrium <input type="radio"/> Unhelpful scan <input type="radio"/> Could not cannulate the cervix <input type="radio"/> Patient discomfort	
Impression <div></div> Plan of Management <div></div>	Investigations: <input type="checkbox"/> Blood tests <div></div> <input type="checkbox"/> Microbiology <div></div> <input type="checkbox"/> Radiology <div></div> <input type="checkbox"/> Histology <div></div>
<input type="checkbox"/> Discharge <input type="checkbox"/> Letter to Patient with results <input type="checkbox"/> Letter to GP with results	Signature* <div></div> Signature* <div></div> Professional Registration Number* <div></div>
<div>Save Draft</div> <div>Submit</div> <div>Cancel</div>	



## 7.3.2 Summary Care Record Factsheet



# Summary Care Record Factsheet

The Summary Care Record (SCR) is a secure, electronic patient record that contains key information derived from patients' detailed GP records. It is accessed in emergency and unplanned care scenarios, where such information would otherwise be unavailable.

## What does the SCR contain?

The core dataset contains information about a patient's medication, allergies and any previous adverse reactions to medicines. Other information such as significant medical history, care plans, patient wishes or preferences (and other relevant information) can be added with the consent of the patient.

## Who uses the SCR?

- **Hospital pharmacies** – when reconciling medicines for new admissions.
- **GP out-of-hours services** – when treating patients with whom they are unfamiliar.
- **GPs** – when temporary residents, such as holiday-makers, visit their practice.
- **Accident and emergency clinicians** – when treating emergency patients.
- **Clinical staff in hospital wards** – when admitting new patients.
- **Ambulance staff** – checking patient details when responding to calls.
- **Staff at walk-in centres and minor injuries units** – when caring for patients who present for treatment.
- **Multidisciplinary teams** – when providing community and intermediate care services.

## What are the clinical benefits of SCR?

A range of healthcare professionals are finding that using SCR is adding value to their

clinical practice and improving the care they provide to patients.

These include:

### Improved safety

- Safer prescribing by reducing prescribing errors - a study found that one in five patients had an intervention that improved prescribing when SCR was made available to pharmacy staff.
- Improves the accuracy of prescribing decisions by identifying more medication discrepancies.
- Increases the ability of clinicians to make informed decisions, by providing them with key medical information when deciding on a treatment plan.

### Increased efficiency

- Significantly reduces the time taken by hospital pharmacists to reconcile medication, in some cases by over 50%.
- Reduces the time, effort and resources needed to obtain medication information directly from the patient's GP surgery. Time saved through phoning, faxing and

responding to queries can be reinvested in direct patient care.

### More effective care

- Provides access to essential medical information out of hours (OOHs) and on weekends (when GP practices aren't open).
- Supports the delivery of appropriate care to patients. For example - enabling GPs in OOHs services to treat patients, without having to refer them back to their usual GP.

### How does the SCR benefit patients?

SCRs improve the experience for many groups of patients and their carers, particularly:

- those with long-term conditions and complex health needs,
- vulnerable people and carers,
- children and their parents or guardians,
- those with mental health problems,
- those taking many different medicines,
- patients who find it difficult to communicate with healthcare staff.

### Summary Care Records:

- Are invaluable when a patient cannot give information (e.g. if they are unconscious), or when they are taken ill away from home and are unable to see their own GP.
- Give those with long-term conditions confidence that if needed, their key medical information is available wherever they travel in England.
- Enable safer prescribing of medication for patients, by providing information on a patient's allergies, adverse reactions and medications.
- Support those who struggle to make themselves understood, due to their illness (e.g. asthma sufferers).
- Allow GPs to share other information, such as end of life care plans and relevant

diagnoses, if they feel it will benefit the patient.

- Improve equality of care.

### What are people saying about SCR?

*"The Summary Care Record allows us to practice safe medicine; patients are often confused with regards to their medication and the SCR allows prescribing to be current and accurate."*

Triage Nurse, Out of Hours Service

*"The Summary Care Record is a vital tool to make care provided to patients safer, timelier and more effective. Ensuring that the Summary Care Record is used more widely will improve patient experience of services where urgent care is provided and improve some of the joins between different services, where experience is often worst for the patient."*

Neil Churchill, Director Improving Patient Experience, NHS England.

### What support is available to the NHS?

If you are interested in creating or viewing SCR's, our regional implementation teams can help. They offer practical advice and support, including step-by-step guides, training and engagement materials, alongside other useful resources. Please contact the manager in your area for more information:

North	<a href="mailto:patrick.nolan1@hscic.gov.uk">patrick.nolan1@hscic.gov.uk</a>
Midlands	<a href="mailto:oliver.christie@hscic.gov.uk">oliver.christie@hscic.gov.uk</a>
East	<a href="mailto:lesley.dent@hscic.gov.uk">lesley.dent@hscic.gov.uk</a>
London	<a href="mailto:lesley.dent@hscic.gov.uk">lesley.dent@hscic.gov.uk</a>
South	<a href="mailto:libby.pink@hscic.gov.uk">libby.pink@hscic.gov.uk</a>


### Further information

Website	<a href="http://www.hscic.gov.uk/scr">www.hscic.gov.uk/scr</a>
Email	<a href="mailto:scr.comms@hscic.gov.uk">scr.comms@hscic.gov.uk</a>
Twitter	@NHSSCR

If your service has yet to start viewing SCR's please contact the Summary Care Record team at the Health and Social Care Information Centre: [enquiries@hscic.gov.uk](mailto:enquiries@hscic.gov.uk)

### 7.3.3 Discharge summary

Page 1 of 1

South Warwickshire  
NHS Foundation Trust 

#### DRUGS AND DISCHARGE SUMMARY (PROVISIONAL)

Discharge Date : 21-Jul-2016 @ 15:10

Patient: Test Patient

Hosp. No.: 1010971

DOB: 19/03/1940

Address 6 Remburn Gardens, Lakin Road, Warwick, CV34 5BH

NHS No.: ?00 041 4643

G.P: PRIORY MEDICAL CENTRE

DR MJ BOX, PRIORY MEDICAL CENTRE, CAPE ROAD, WARWICK, addr4, CV34 4UN

Admission Date: 21/08/2015

Ward: CASTLE WARD

Consultant: Dr BERNHARD USSELMANN

Admission Reason:

Outpatient Appointment:

Diagnoses: fracture radius

Patient aware of Diagnoses: Yes

#### Discharge Medication

Drug	Dose	Route	Frequency	Days Supply	GP to continue	Pharmacy Note
ASPIRIN 75 mg Dispersible Tablets Prescribed By: MR MIKE WYATT	1 Tablet	Oral	ONCE a day	28	Yes	
MORPHINE SULPHATE 10 mg in 5mL Oral Solution Prescribed By: MRS EMMA SAMPAYS	10 mg PRN For pain relief	Oral	every FOUR HOURS	28	No	
PARACETAMOL 500 mg Tablets Prescribed By: MRS EMMA SAMPAYS	1 Tablet PRN For pain relief	Oral	or 2 tablets FOUR times a day	7	No	
PC - frequency changed as per drug chart. MRS EMMA SAMPAYS 13/11/2015 10:47						
RAMIPRIL 5 mg Capsules Prescribed By: MRS EMMA SAMPAYS	1 Capsule	Oral	ONCE a day	Patient's Own	Yes	

#### Notes transferred from the inpatient chart

CC AZ 13/11/15

MRS EMMA SAMPAYS 13/11/2015 11:01

#### Discharge Letter Notes

Presenting Illness	FALL
Co-morbidities/PMH	high cholesterol high blood pressure
Drug Sensitivities	NKDA
Drugs begun/stopped	analgesia started
Procedures + Tests 1	pin and plate
Procedures + Tests 2	nil
Treatment+Management	pin and plate
Disch/Pt/Family Info	nil
Action(s) for GP	nil
Pending Intervention	nil

Authorised by : Dr ABDUL ZAFAR

Consultant

Clinical Check By:

Dispensed By:

Final Check By:

Date:

GP Copy 1/4

**DRUGS AND DISCHARGE SUMMARY (PROVISIONAL)**

Discharge Date : 21-Jul-2016 @ 15:10

\*\*\* Non-verified Orders Exist \*\*\*

Patient: Test Patient

Hosp. No.: 1010971

DOB: 19/03/1940

Address 8 Remburn Gardens, Lakin Road, Warwick, CV34 5BH

NHS No.: ?00 041 4843

G.P.: PRIORY MEDICAL CENTRE

DR MJ BOX, PRIORY MEDICAL CENTRE, CAPE ROAD, WARWICK, addr4, CV34 4UN

Admission Date: 21/08/2015

Ward: CASTLE WARD

Consultant: Dr BERNHARD USSELMANN

Admission Reason:

Outpatient Appointment:

Diagnoses: fracture radius

Patient aware of Diagnoses: Yes

**Discharge Medication**

Drug	Dose	Route	Frequency	Days Supply	GP to continue	Pharmacy Note
ASPIRIN 75 mg Dispersible Tablets Prescribed By: MR MIKE WYATT	1 Tablet	Oral	ONCE a day	28	Yes	
MORPHINE SULPHATE 10 mg in 5mL Oral Solution Prescribed By: MRS EMMA SAMPAYS	10 mg PRN For pain relief	Oral	every FOUR HOURS	28	No	
PARACETAMOL 500 mg Tablets Prescribed By: MRS EMMA SAMPAYS	1 Tablet PRN For pain relief	Oral	or 2 tablets FOUR times a day	7	No	
PC - frequency changed as per drug chart. MRS EMMA SAMPAYS 13/11/2015 10:47						
RAMIPRIL 5 mg Capsules Prescribed By: MRS EMMA SAMPAYS	1 Capsule	Oral	ONCE a day	Patient's Own	Yes	

**Notes transferred from the inpatient chart**

CC AZ 13/11/15

MRS EMMA SAMPAYS 13/11/2015 11:01

**Discharge Letter Notes**

Presenting Illness	FALL
Co-morbidities/PMH	high cholesterol high blood pressure
Drug Sensitivities	NKDA
Drugs begun/stopped	analgesia started
Procedures + Tests 1	pin and plate
Procedures + Tests 2	nil
Treatment+Management	pin and plate
Disch/Pt/Family Info	nil
Action(s) for GP	nil
Pending Intervention	nil

Authorised by : Dr ABDUL ZAFAR

Consultant

Clinical Check By:

Dispensed By:

Final Check By:

Date:

Notes Copy 2/4

**DRUGS AND DISCHARGE SUMMARY****(PROVISIONAL)**

Discharge Date : 21-Jul-2016 @ 15:10

\*\*\* Non-verified Orders Exist \*\*\*

Patient: Test Patient

Hosp. No.: 1010971

DOB: 19/03/1940

Address 6 Remburn Gardens, Lakin Road, Warwick, CV34 5BH

NHS No.: ?00 041 4643

G.P: PRIORY MEDICAL CENTRE

DR MJ BOX, PRIORY MEDICAL CENTRE, CAPE ROAD, WARWICK, addr4, CV34 4UN

Admission Date: 21/08/2015

Ward: CASTLE WARD

Consultant: Dr BERNHARD USSELMANN

Admission Reason:

Outpatient Appointment:

Diagnoses: fracture radius

Patient aware of Diagnoses: Yes

**Discharge Medication**

Drug	Dose	Route	Frequency	Days Supply	GP to continue	Pharmacy Note
ASPIRIN 75 mg Dispersible Tablets Prescribed By: MR MIKE WYATT	1 Tablet	Oral	ONCE a day	28	Yes	
MORPHINE SULPHATE 10 mg in 5mL Oral Solution Prescribed By: MRS EMMA SAMPAYS	10 mg PRN For pain relief	Oral	every FOUR HOURS	28	No	
PARACETAMOL 500 mg Tablets Prescribed By: MRS EMMA SAMPAYS	1 Tablet PRN For pain relief	Oral	or 2 tablets FOUR times a day	7	No	
PC - frequency changed as per drug chart. MRS EMMA SAMPAYS 13/11/2015 10:47						
RAMIPRIL 5 mg Capsules Prescribed By: MRS EMMA SAMPAYS	1 Capsule	Oral	ONCE a day	Patient's Own	Yes	

**Notes transferred from the inpatient chart**

CC AZ 13/11/15

MRS EMMA SAMPAYS 13/11/2015 11:01

**Discharge Letter Notes**

Presenting Illness	FALL
Co-morbidities/PMH	high cholesterol high blood pressure
Drug Sensitivities	NKDA
Drugs begun/stopped	analgesia started
Procedures + Tests 1	pin and plate
Procedures + Tests 2	nil
Treatment+Management	pin and plate
Disch/Pt/Family Info	nil
Action(s) for GP	nil
Pending Intervention	nil

Authorised by : Dr ABDUL ZAFAR

Consultant

Clinical Check By:

Dispensed By:

Final Check By:

Date:

Pharmacy Copy 3/4



**DRUGS AND DISCHARGE SUMMARY (PROVISIONAL)**

Discharge Date : 21-Jul-2016 @ 15:10

\*\*\* Non-verified Orders Exist \*\*\*

Patient: Test Patient

Hosp. No.: 1010971

DOB: 19/03/1940

Address 6 Remburn Gardens, Lakin Road, Warwick, CV34 5BH

NHS No.: ?00 041 4643

G.P: PRIORY MEDICAL CENTRE

DR MJ BOX, PRIORY MEDICAL CENTRE, CAPE ROAD, WARWICK, addr4, CV34 4UN

Admission Date: 21/08/2015

Ward: CASTLE WARD

Consultant: Dr BERNHARD USSELMANN

Admission Reason:

Outpatient Appointment:

Diagnoses: fracture radius

**Discharge Medication**

Drug	Dose	Route	Frequency	Days Supply	GP to continue	Pharmacy Note
ASPIRIN 75 mg Dispersible Tablets Prescribed By: MR MIKE WYATT	1 Tablet	Oral	ONCE a day	28	Yes	
MORPHINE SULPHATE 10 mg in 5mL Oral Solution Prescribed By: MRS EMMA SAMPAYS	10 mg PRN For pain relief	Oral	every FOUR HOURS	28	No	
PARACETAMOL 500 mg Tablets Prescribed By: MRS EMMA SAMPAYS PC - frequency changed as per drug chart. MRS EMMA SAMPAYS 13/11/2015 10:47	1 Tablet PRN For pain relief	Oral	or 2 tablets FOUR times a day	7	No	
RAMIPRIL 5 mg Capsules Prescribed By: MRS EMMA SAMPAYS	1 Capsule	Oral	ONCE a day	Patient's Own	Yes	

**Notes transferred from the inpatient chart**

CC AZ 13/11/15

MRS EMMA SAMPAYS 13/11/2015 11:01

**Discharge Letter Notes**

Presenting Illness	FALL
Co-morbidities/PMH	high cholesterol high blood pressure
Drug Sensitivities	NKDA
Drugs begun/stopped	analgesia started
Procedures + Tests 1	pin and plate
Procedures + Tests 2	nil
Treatment+Management	pin and plate
Disch/Pt/Family Info	nil
Action(s) for GP	nil
Pending Intervention	nil

Authorised by : Dr ABDUL ZAFAR

Consultant

Clinical Check By:

Dispensed By:

Final Check By:

Date:

Patient Copy 4/4

### 7.3.4 Referral Form

#### South Warwickshire NHS Foundation Trust AQP AUDIOLOGY REFERRAL FORM

**The Hearing AQP Service is only for adults over the age of 55 experiencing difficulties with their hearing and communication.**

Please include a copy of any hearing test/screening you have carried out. Please note that ear wax removal is not part of the service and **MUST** be removed prior to attendance.

##### Patient

<b>Name:</b> Calling Name Surname	<b>D.O.B:</b> Date of Birth
<b>Address:</b> Home Full Address (single line)	<b>NHS No:</b> NHS Number
	Patient's phone (home): Patient Home Telephone
	Patient's phone (mobile): Patient Mobile Telephone

##### Referrer

GP name: Dr Free Text Prompt	Date: Long date letter merged
Signed:	Practice Name: Organisation Name
Practice Code: Organisation National Practice Code	

Priority: Urgent ☐ Routine ☐

Yes	No
<input type="checkbox"/>	<input type="checkbox"/>
Is the patient under 55 years of age	

##### Does the patient have any of the following symptoms:

<input type="checkbox"/>	Ear wax partially occluding or blocking the ear canals	<input type="checkbox"/>
<input type="checkbox"/>	Abnormal appearance of the outer ear or the eardrum, including middle ear fluid	<input type="checkbox"/>
<input type="checkbox"/>	Aural discharge or otalgia lasting >7 days in the last 90 days	<input type="checkbox"/>
<input type="checkbox"/>	Sudden (less than 7 days) or rapid (90 days or less) loss or deterioration of hearing	<input type="checkbox"/>
<input type="checkbox"/>	Fluctuating hearing loss, other than associated with colds	<input type="checkbox"/>
<input type="checkbox"/>	Noticeable asymmetry in hearing	<input type="checkbox"/>
<input type="checkbox"/>	Tinnitus	<input type="checkbox"/>
<input type="checkbox"/>	Vertigo including spinning, swaying or floating sensations	<input type="checkbox"/>
<input type="checkbox"/>	Complete or partial obstruction of the external auditory canal	<input type="checkbox"/>

If **NO** is ticked for all of the above statements, the patient is suitable for AQP and referral can be made to the Audiology Department, South Warwickshire NHS Foundation Trust.

If **YES** is ticked to **ANY** of the above statements, the patient is unsuitable for AQP and therefore a referral should be made to ENT through the normal pathway.

##### Domiciliary Visits:

House-bound patients will require a formal written referral for audiology assessment. ☐

### 7.3.5 Patient Summary

**MOUSE, Mickey (Mr)**Date of Birth: **01-Jan-1950 (66y)**

## Report Path: Local Record

123 Radford Road, Leamington Spa, Warwickshire, CV31 2BB

NHS Number:		Home Tel:	01926428321
Usual GP:	WILKINSON, Y (Dr)	Work Tel:	
Patient Type:	Dummy	Mobile Tel:	
Registered	23-Sep-2010	email	

---

**Problems****Active**

03-Nov-2015	Prostate-specific antigen monitoring
30-Apr-2013	Chronic obstructive pulmonary disease
30-Apr-2013	Type 2 diabetes mellitus
30-Apr-2013	Nut allergy
1994	Asthma

**Significant Past**

19-Jul-2016	Patient pregnant	12-Jul-2016
20-Aug-2015	Irritable bowel syndrome	13-Nov-2015
17-Jul-2015	Gout	08-Jul-2016
01-Apr-2013	Migraine	
17-Feb-2010	Tonsillectomy	30-Apr-2013
Oct-2005	Ingrowing great toe nail	01-Dec-2005

**Medication****Acute**

Naproxen 500mg tablets	One To Be Taken Twice A Day prn	28 tablet	30-Jun-2016
Chloramphenicol 1% eye ointment	Apply Three Or Four Times A Day To The Affected Eye	4 gram	30-Jun-2016
Amoxicillin 500mg capsules	One To Be Taken Three Times A Day	21 capsule	30-Jun-2016
Paracetamol 250mg/5ml oral suspension sugar free	Two To Four 5ml Spoonfuls Every 4 To 6 Hours When Necessary. No More Than 4 Doses In 24 Hours	100 ml	
Fluoxetine 20mg/5ml oral solution	One 5ml Spoonful To Be Taken Each Day	140 ml	
Colecalciferol 10,000unit tablets	As Directed	30 tablet	
Colecalciferol 5,000unit capsules	As Directed	30 capsule	
K-Lite bandage 10cm x 4.5m (Urgo Ltd)	As Directed	1 bandage	
Bactigras gauze dressing 5cm x 5cm (Smith & Nephew Healthcare Ltd)	As Directed	1 dressing	
Typhoid vaccine (live, oral, strain ty21a) gastro-resistant capsules	1 every other day for 3 days	3 capsule	



Mepore dressing 10cm x 11cm (Molnlycke Health Care Ltd)	As Directed	5 dressing
Nystatin 100,000units/ml oral suspension	1ml To Be Dropped Into The Mouth Four Times A Day. Keep Mixture In Contact With Affected Areas Of Mouth As Long As Possible	30 ml

**Repeat**

Mebeverine 135mg tablets	One To Be Taken Three Times A Day Twenty Minutes Before Food	84 tablet	30-Jun-2016
Erythromycin 250mg gastro-resistant capsules	Two To Be Taken Four Times A Day	56 capsule	30-Jun-2016
Citalopram 20mg tablets	One To Be Taken Each Day	14 tablet	
Mepore dressing 11cm x 15cm (Molnlycke Health Care Ltd)	As Directed	45 dressing	

**Repeat Dispensing**

Mepore dressing 11cm x 15cm (Molnlycke Health Care Ltd)	As Directed	45 dressing
---	-------------	-------------

**Allergies**

02-May-2013	H/O: penicillin allergy
30-Apr-2013	Nut allergy
30-Apr-2013	Adverse reaction to Paracetamol

**Health Status**

27-Jul-2016	Body mass index	22.2	kg/m2
27-Jul-2016	O/E - height	190	cm
27-Jul-2016	O/E - weight	80	kg
30-Jun-2016	Alcohol intake within recommended sensible limits		
30-Jun-2016	Cigarette smoker	30	/day
30-Jun-2016	O/E - blood pressure reading	120/89	mmHg
08-May-2015	Cervical neoplasia screen		
06-Nov-2013	Notes summary on computer sd		

**Immunisations**

21-Nov-2015	Seasonal influenza vaccination	Advised re side effects. Consent given.
21-Nov-2015	Full consent for immunisation	
21-Nov-2015	Seasonal influenza vaccination	Advised re side effects. Consent given.
21-Nov-2015	Full consent for immunisation	
21-Nov-2015	Seasonal influenza vaccination	Advised re side effects. Consent given.
21-Nov-2015	Full consent for immunisation	
21-Nov-2015	Seasonal influenza vaccination	Advised re side effects. Consent given.
21-Nov-2015	Full consent for immunisation	

21-Nov-2015	Seasonal influenza vaccination	Advised re side effects. Consent given.
21-Nov-2015	Full consent for immunisation	
21-Nov-2015	Seasonal influenza vaccination	Advised re side effects. Consent given.
21-Nov-2015	Full consent for immunisation	
19-Nov-2015	Seasonal influenza vaccination	Advised re side effects. Consent given.
19-Nov-2015	Full consent for immunisation	
07-Nov-2015	Seasonal influenza vaccination	Advised re side effects. Consent given.
07-Nov-2015	Full consent for immunisation	
24-Oct-2015	Seasonal influenza vaccination	Advised re side effects. Consent given.
24-Oct-2015	Full consent for immunisation	
24-Oct-2015	Seasonal influenza vaccination	Advised re side effects. Consent given.
24-Oct-2015	Full consent for immunisation	
24-Oct-2015	Seasonal influenza vaccination	Advised re side effects. Consent given.
24-Oct-2015	Full consent for immunisation	
10-Oct-2015	Seasonal influenza vaccination declined	
10-Oct-2015	Full consent for immunisation	
10-Oct-2015	Seasonal influenza vaccination	Advised re side effects. Consent given.
10-Oct-2015	Full consent for immunisation	
07-Oct-2015	Administration of second intranasal seasonal influenza vacc	Advised re side effects. Consent given.
07-Oct-2015	Full consent for immunisation	
07-Oct-2015	Administration of first intranasal seasonal influenza vacc	Advised re side effects. Consent given.
07-Oct-2015	Full consent for immunisation	
07-Oct-2015	Administration of first intranasal seasonal influenza vacc	Advised re side effects. Consent given.
07-Oct-2015	Full consent for immunisation	
07-Oct-2015	Administration of first intranasal seasonal influenza vacc	Advised re side effects. Consent given.
07-Oct-2015	Full consent for immunisation	
03-Oct-2015	Seasonal influenza vaccination	Advised re side effects. Consent given.
03-Oct-2015	Full consent for immunisation	
16-Sep-2015	Seasonal influenza vaccination	Advised re side effects. Consent given.
16-Sep-2015	Full consent for immunisation	
02-Sep-2015	Influenza vaccination	add this text to show whats happened
17-Aug-2015	Meningitis ACW & Y vaccination	side effects explained and leaflet given to patient
17-Aug-2015	Meningitis ACW & Y vaccination	side effects explained and leaflet given to patient
14-Apr-2015	Full consent for immunisation	
15-Nov-2014	Seasonal influenza vaccination	Advised re side effects. Consent given.
15-Nov-2014	Full consent for immunisation	
25-Oct-2014	Seasonal influenza vaccination	Advised re side effects. Consent given.
25-Oct-2014	Full consent for immunisation	

18-Oct-2014	Seasonal influenza vaccination	Advised re side effects. Consent given.
18-Oct-2014	Full consent for immunisation	
11-Oct-2014	Seasonal influenza vaccination	Advised re side effects. Consent given.
11-Oct-2014	Full consent for immunisation	
04-Oct-2014	Seasonal influenza vaccination	Advised re side effects. Consent given.
04-Oct-2014	Full consent for immunisation	
29-Nov-2013	Influenza vaccination	
29-Oct-2013	Seasonal influenza vaccination	Advised re side effects. Consent given.
29-Oct-2013	Seasonal influenza vaccination	Advised re side effects. Consent given.
19-Oct-2013	Seasonal influenza vaccination	Advised re side effects. Consent given.
19-Oct-2013	Seasonal influenza vaccination	Advised re side effects. Consent given.
08-Oct-2013	Seasonal influenza vaccination	Advised re side effects. Consent given.
07-Oct-2013	Seasonal influenza vaccination	Advised re side effects. Consent given.
04-Oct-2013	Seasonal influenza vaccination	Advised re side effects. Consent given.
23-May-2013	Full consent for immunisation	
17-May-2013	Immunisations	te/diph/polio
16-May-2013	First meningitis C vaccination	
16-May-2013	Full consent for immunisation	
09-May-2013	1st diph tet acell pertus, haem influ b, inactiv polio vacc	
09-May-2013	Immunisation status	Comments:
09-May-2013	First pneumococcal conjugated vaccination	INFOR
09-May-2013	1st diph tet acell pertus, haem influ b, inactiv polio vacc	CONSENT
09-May-2013	Immunisation status	Comments:
30-Apr-2013	Recommend travel vaccinations	
30-Apr-2013	First typhoid vaccination	
30-Apr-2013	1st hepatitis A vaccination	
30-Apr-2013	Pneumococcal vaccination	
30-Apr-2013	Influenza vaccination	
11-Apr-2012	Influenza vaccination	
22-Dec-2004	First tetanus and low dose diphtheria vaccination	
15-Dec-2004	Second typhoid vaccination	
10-Nov-2004	First typhoid vaccination	
10-Nov-2004	1st rabies vaccination	
12-Jun-1999	Low dose diphtheria, tetanus and inactivated polio vaccinati	

**Planned Events**

30-May-2013	O/E - blood pressure reading
30-Jul-2013	Cervical neoplasia screen
30-Jul-2013	Asthma follow-up
30-Apr-2014	Type 2 diabetes mellitus
30-Apr-2014	Chronic obstructive pulmonary disease annual review
01-May-2014	Medication review
28-Jul-2016	Review pregnancy due date
28-Jul-2016	Offer Diabetes Management Plan
28-Jul-2016	Consider Statin
28-Jul-2016	Offer Asthma Management Plan
28-Jul-2016	No admissions avoidance care plan
28-Jul-2016	On Unplanned Admissions Register

**Last 3 Consultations**

27-Jul-2016	GP Surgery (Waterside Medical Centre) TEW, Melanie (Nurse)
Examination	O/E - weight 80 kg • O/E - height 190 cm • Body mass index 22.2 kg/m2 • Ideal weight 83 kg • Peak exp. flow rate: PEFR/PFR 630 L/min • Depression screening using questions
Comment	Predicted peak expiratory flow rate using EN 13826 standard 564 L/min
04-Jul-2016	GP Surgery (Waterside Medical Centre) BEYER, Chris (Mr)
Comment	On supportive care register
04-Jul-2016	GP Surgery (Waterside Medical Centre) BEYER, Chris (Mr)
Comment	On supportive care register fgfg Personal care plan offered fgfg Provision of copy of care plan fgfg

**Values and Investigations (Latest Value)**

27-Jul-2016	Predicted peak expiratory flow rate using EN 13826 standard	564	L/min
27-Jul-2016	Peak exp. flow rate: PEFR/PFR	630	L/min
27-Jul-2016	Ideal weight	83	kg
27-Jul-2016	Body mass index	22.2	kg/m2
27-Jul-2016	O/E - height	190	cm
27-Jul-2016	O/E - weight	80	kg
30-Jun-2016	Urine leucocyte test = +++		
30-Jun-2016	Urine nitrite positive		
30-Jun-2016	Urine blood test = negative		
30-Jun-2016	Urine protein test negative		
30-Jun-2016	Cigarette smoker	30	/day
30-Jun-2016	Urine glucose test negative		
30-Jun-2016	O/E - blood pressure reading	120/89	mmHg
19-Nov-2015	Alcohol intake	200	U/week
19-Nov-2015	O/E - pulse rate	150	beats/min
19-Nov-2015	Waist circumference	250	cm
21-Oct-2015	Minutes from waking to first tobacco consumption	10	min
21-Oct-2015	Cigar smoker	6	/day
06-Aug-2015	FEV1/FVC percent	60	%
06-Aug-2015	Forced vital capacity - FVC	6.28	litre
06-Aug-2015	Forced expired volume in 1 second	3.82	litre
06-Aug-2015	Peak expiratory flow rate before bronchodilation	720	L/min
29-May-2015	Six item cognitive impairment test	20	/28
08-May-2015	Pack years	0	year
13-Feb-2015	Peak expiratory flow rate after bronchodilation	5	L/min
13-Feb-2015	FEV1/FVC ratio after bronchodilator	7	
13-Feb-2015	FEV1/FVC ratio before bronchodilator	6	
13-Feb-2015	FVC after bronchodilation	2	litre
13-Feb-2015	FEV1 after bronchodilation	3	litre
13-Feb-2015	FEV1 before bronchodilation	9005	litre
18-Jul-2014	QRISK cardiovascular disease 10 year risk score	50.3	%
18-Jul-2014	Haemoglobin A1c level - IFCC standardised	10	mmol/mol
18-Jul-2014	Blood glucose level	10	mmol/L
18-Jul-2014	Random blood sugar normal		
18-Jul-2014	Serum cholesterol/HDL ratio	7	
18-Jul-2014	Serum HDL cholesterol level	4	mmol/L
18-Jul-2014	Total cholesterol measurement	8	mmol/L
18-Jul-2014	Alcohol use disorders identification test	10	/40
18-Jul-2014	Alcohol use disorder identificatn test consumptn questionnaire	5	/12
11-Oct-2013	Standard chest X-ray normal		

	sd		
11-Jun-2013	QRISK2 cardiovascular disease 10 year risk score	31	%
07-May-2013	Serum glucose level	5.6	mmol/L
07-May-2013	Serum triglycerides	1.6	mmol/L
07-May-2013	Serum cholesterol	5.4	mmol/L
01-May-2013	Alcohol consumption	8	U/week
30-Jan-2013	Cx. smear: repeat 6 months		
30-Jan-2013	Cerv.smear: borderline changes	GMS: GMS	
	(Another Practice)		
12-Apr-2007	Cx. smear: repeat 3 years		
12-Apr-2007	Cervical smear: negative		

### 7.3.6 Gemina



## GEMIMA – healthcare business intelligence at your fingertips

**GEMIMA** is an intuitive, cost effective, highly intelligent business information tool. It provides Clinical Commissioning Groups, Commissioning Support Units, GP practices and other healthcare providers with essential data to better understand local health requirements, drive efficiencies in your services, and improve outcomes for patients.

Developed by the NHS for the NHS, the fully integrated web-based application incorporates a wealth of information in one place, giving you access to multiple reports and datasets to support patient pathway analysis, contract monitoring, risk stratification and much more. Importantly, GEMIMA is fully compliant with NHS information governance requirements and reports are only accessible to authorised staff.

## Services

### Multiple reports including:

- Urgent care dashboard
- Advanced risk stratification
- Medicines management
- Finance and contract monitoring
- QIPP
- Key performance indicators
- QOF clinical comparators
- Practice budget statements
- Quality
- Statistical analysis to identify variation

### Training

### Remote and helpdesk support



## Delivering efficiencies today

Intuitive and logical, with just a few clicks you can instantly access meaningful reports to help you improve patient care, reduce costs and obtain relevant information to support service redesign projects. Local and regional data is constantly collated, decoded and added to GEMIMA in real time, meaning you always have access to the very latest information. The intuitive dashboards present the knowledge you need in a logical date order with a choice of viewing options, both tabular and graphical, and reports can be printed or exported in multiple formats including pdf, Excel and Word.

We are always on hand to support you. Although GEMIMA is incredibly easy to use, and our user guides provide handy, step by step tips and information, you can also call upon our friendly and knowledgeable team for extra support. With many years' experience of working with NHS data, we can help you and your staff to access and analyse the data, advise on which reports you need and even work with you to create your own, tailored reports. We can also provide one-to-one and group training courses, as well as remote access support via individuals' computers.

For GP practices, GEMIMA enables you to understand your registered patients in a very different way - who your most expensive patients are, presentations at A&E and prescription patterns over a given period, and much more. In this way you gain essential insight into how you might consider modifying care plans and pathways to improve self-care, reduce GP appointments and hospital admissions, and support patients' needs in the most cost effective way.

## Building a better tomorrow

For CCGs, GEMIMA is equally indispensable, providing essential information to support your strategic commissioning decisions - helping to drive improvements in efficiencies, quality, patient experiences and health outcomes.

You are also able to track, monitor and compare the performance of your local providers against others, and benchmark against national and regional targets.

Information is presented clearly, enabling you to see spend on patients and medicines management. A full suite of reports is also available, including in-patient and out-patient monthly waiting list reports by provider and specialty, quarterly practice population updates, and QIPP reports.

We have our finger on the pulse of the ever changing NHS and are attuned to our customers' evolving needs.

**We continually create new reports and system functionality that will enhance your business decisions, profitability and efficiencies.**