



---

## Deliverable 3.2.1

### Technical Requirements of EMPOWER Architecture

---

Project title:	Support of Patient Empowerment by an intelligent self-management pathway for patients
Project acronym:	EMPOWER
Project identifier:	FP7-ICT-2011-288209
Project instrument:	STREP
Web link:	<a href="http://www.empower-fp7.eu">www.empower-fp7.eu</a>
Dissemination level:	CO (confidential)
Contractual delivery:	August 31, 2012
Actual delivery:	August 31, 2012
Leading partner:	SRDC

## Document History

Version	Date	Changes	From	Review
V0.1	2012-04-26	Initial Document	SRDC	All Partners
V0.2	2012-06-05	SRDC Use Cases	SRDC	All Partners
V0.3	2012-06-08	Mobile app related Use Cases	ICOM	All Partners
V0.4	2012-06-08	SRFG input	SRFG	All Partners
V0.5	2012-06-13	Multimodal UI use cases + functional requirements	ICOM	All Partners
V0.6	2012-06-14	HMGU input	HMGU	All Partners
V0.7	2012-06-14	SRFG Revision	SRFG	All Partners
V0.8	2012-06-19	SRDC Provided First Consolidated Version	SRDC	All Partners
V0.9	2012-06-20	SRDC Revision	SRDC	All Partners
V1.0	2012-06-21	SRDC Revision	SRDC	All Partners
V1.1	2012-06-22	ICOM Revision	ICOM	All Partners
V1.2	2012-06-29	SRDC Revision	SRDC	All Partners
V1.3	2012-07-13	HMGU and ICOM Revision	HMGU, ICOM	All Partners
V1.4	2012-08-03	SRFG Revision	SRFG	All Partners
V1.5	2012-08-08	SRDC Revision	SRDC	All Partners
V1.5.1	2012-08-9	Input for Task 4.2 according to minutes and personal talks	HMGU	All Partners
V1.6	2012-08-09	ICOM Revision	ICOM	All Partners

## EMPOWER Consortium Contacts

Beneficiary	Name	Phone	E-Mail
SRFG	Manuela Plößnig	+43 662 2288 402	manuela.ploessnig@salzburgresearch.at
HMGU	Claudia Hildebrand	+49 89 3187 4182	hildebra@helmholtz-muenchen.de
GOIN	Siegfried Jedamzik	+49 8 41956161	siegfried.jedamzik@googlemail.com
USI	Peter J. Schulz	+41586664724	peter.schulz@usi.ch
SRDC	Asuman Dogac	+90 312 210 13 93	asuman@srdc.com.tr
ICOM	Ilias Lamprinos	+302106677953	labil@intracom.gr
MOH	Unal Hulus	+903125851907	unal.hulus@saglik.gov.tr

# 1 Table of Contents

1	Table of Contents .....	3
2	Executive Summary .....	6
3	EMPOWER in a Nutshell.....	7
4	Purpose.....	8
5	Reference Documents.....	8
6	Content of the EMPOWER Requirement Specification document .....	8
6.1	Scope of the EMPOWER platform Requirement Specification Document .....	8
6.2	Main issues addressed by the Requirement Specification Document according to IEEE standards .....	9
7	Overview of requirements from the perspective of the overall EMPOWER system.....	10
8	Description of the use cases .....	16
8.1	Glossary .....	16
8.2	Overview of the Actors involved in EMPOWER Use Cases .....	16
8.3	Recommendations from the Pre-Study .....	20
8.4	Task 4.1 Use Cases “Knowledge-based Pathway Engine”.....	23
8.4.3	UC-4.1.1 Manage Pathways Knowledge Model .....	24
8.4.4	UC-4.1.2 Manage EMPOWER Inbox .....	26
8.4.5	UC-4.1.3 Open Inbox Message.....	27
8.4.6	UC-4.1.4 Get Chronicle View of Consultations.....	29
8.4.7	UC-4.1.5 Navigate EMPOWER UI Dashboard .....	30
8.4.8	UC-4.1.6 Patient Receives Messages.....	31
8.5	Task 4.2 Use Cases “Trends and Visualisation of Self-management Services” ....	32
8.5.3	UC-4.2.1 Presentation of Trends and Visualization of Self-management Services .....	32
8.5.4	UC-4.2.2 Creating a visual template .....	41
8.5.5	UC-4.2.3 Present ODL Graphs .....	42
8.6	Task 4.3 Use Cases “Patient Consent Management and Security” .....	43
8.6.3	UC-4.3.1 Manage Patient Consent .....	43
8.6.4	UC-4.3.2 Find Contact Information from EMPOWER White pages .....	48
8.6.5	UC-4.3.3 Create EMPOWER User.....	49
8.6.6	UC-4.3.4 Patient Inserts/Modifies Contact Info.....	50
8.6.7	UC-4.3.5 Manage Patient Profile and Settings .....	51
8.6.8	UC-4.3.6 Manage Identifiers for User Identity .....	53
8.6.9	UC-4.3.7 Authenticate User .....	54
8.6.10	UC-4.3.8 Send Audit Record.....	55
8.6.11	UC-4.3.9 Authenticate EMPOWER Component (Node) for Secure Channel..	57
8.7	Task 5.2 Use Cases “Diabetes based Personalised Adaptive Recommender Engine” .....	58
8.7.3	UC-5.2.1 Create Machine Processable Diabetes Guideline .....	58
8.7.4	UC-5.2.2 Assign Diabetes Guideline to Patient .....	59
8.7.5	UC-5.2.3 Execute and Monitor Diabetes Guideline .....	60
8.7.6	UC-5.2.4 Generate Recommendation about the Patient .....	62
8.7.7	UC-5.2.5 Create Recommendation Rules for Diabetes Patients .....	63
8.7.8	UC-5.2.6 Approve/Update/Extend Recommendations by the Recommender Engine	65
8.8	Task 5.3 Use Cases “Diabetes based Personalised Adaptive Action Plan” .....	66
8.8.3	UC-5.3.1 Manage Goals for the Action Plan .....	66
8.8.4	UC-5.3.2 Manage Actions for the Action Plan .....	67
8.8.5	UC-5.3.3 Weekly View of Actions.....	69
8.8.6	UC-5.3.4 Manage Actions of the Running Action Plan .....	70

8.8.7	UC-5.3.5 System Reminds Patient to Take Medications or for Upcoming Visits and Tests .....	71
8.8.8	UC-5.3.6 Weekly Feedback and Evaluation .....	72
8.8.9	UC-5.3.7 Manage Action Plan Process Model .....	73
8.8.10	UC-5.3.8 View Calendar (includes visits, medications and exercises recommended by the Medical Professional) .....	74
8.8.11	UC-5.3.9 Extract Printable Calendar .....	76
8.9	Task 5.4 Use Cases "Integration into an accompanying PHRS" .....	77
8.9.3	UC-5.4.1 Manage Information Material .....	77
8.9.4	UC-5.4.2 Assess Information Material .....	78
8.9.5	UC-5.4.3 Explore Patient Information Material .....	79
8.9.6	UC-5.4.4 Communication with Persons Sharing Similar Situations .....	80
8.9.7	UC-5.4.5 Provide help information .....	81
8.9.8	UC-5.4.6 Patient views information material about diabetes-specific nutrition .....	82
8.9.9	UC-5.4.7 Import EHR and/or PHR Data to the used PHR System .....	83
8.9.10	UC-5.4.8 Retrieve PHR Data from the used PHR System for the EMPOWER Components.....	84
8.10	Task 6.1 Use Cases "Monitoring Vital, Physical and Mental Parameters" .....	86
8.10.3	UC-6.1.1 Collection of ODLs.....	86
8.10.4	UC-6.1.2 Provide Mental Health Support .....	89
8.10.5	UC-6.1.4 Synchronize PHR Data with PHRS .....	94
8.10.6	UC-6.1.5 Record Medication Changes.....	94
8.11	Task 6.2 Use Cases "Monitoring Physical and Lifestyle Activities" .....	96
8.11.3	UC-6.2.1 Manage Physical Activities .....	96
8.11.4	UC-6.2.1.1 Record Physical Activity.....	97
8.11.5	UC-6.2.2 Food Diary recording Eating Behaviours.....	98
8.11.6	UC-6.2.3 Evaluating Food Diary.....	99
8.11.7	UC-6.2.4 Calculate Nutrients Distribution.....	100
8.11.8	UC-6.2.5 Nutritional Information Material .....	101
8.11.9	UC-6.2.6 Insulin Reminder.....	102
8.11.10	UC-6.2.7 Manage Observations of Daily Living .....	103
8.12	Task 6.3 Use Cases "Providing Multimodal Services and Interfaces" .....	104
8.12.3	UC-6.3.1 Select User Interface Modality .....	104
8.13	Task 6.4 Use Cases "EHR/PHR Interoperability with Health Applications" .....	107
8.13.3	UC-6.4.1 Import EHR Data using IHE XPHR .....	107
8.13.4	UC-6.4.2 Import EHR Data through epSOS Network .....	108
8.13.5	UC-6.4.3 Import PHR Data using IHE XPHR .....	109
8.13.6	UC-6.4.4 Export Data from PHR .....	110
9	Description of requirements.....	112
9.10	WP4 requirements.....	113
9.10.3	Task 4.1 requirements. Knowledge-based Pathway Engine.....	113
9.10.4	Task 4.2 requirements. Trends and Visualisation of Self-management Services .....	117
9.10.5	Task 4.3 requirements. Patient Consent Management and Security .....	118
9.11	WP5 requirements.....	129
9.11.3	Task 5.2 requirements. Diabetes based Personalised Adaptive Recommender Engine .....	129
9.11.4	Task 5.3 requirements. Diabetes based Personalised Adaptive Action Plan .....	133
9.11.5	Task 5.4 requirements. Integration into an accompanying PHRS.....	134
9.12	WP6 requirements.....	137
9.12.3	Task 6.1 requirements. Monitoring Vital, Physical and Mental Parameters ..	137
9.12.4	Task 6.2 requirements. Monitoring Physical and Lifestyle Activities .....	140
9.12.5	Task 6.4 requirements. EHR/PHR Interoperability with Health Applications. ....	141

## Abbreviations

APE	Action Plan Engine
ARR	Audit Record Repository
ATNA	Audit Trail and Node Authentication
BPM	Business Process Management
EHR	Electronic Health Record
EHRs	Electronic Health Record System
EIP	Enterprise Interchange Pattern
ESB	Enterprise Service Bus
epSOS	European Patients Smart Open Services
HL7	Health Level Seven
IDE	Interactive Development Environment
IHE	Integrating Healthcare Enterprise
MP-DG	Machine Processable Diabetes Guideline
ODL	Observation of Daily Living
PHA	Personal Health Application
PHR	Personal Health Record
PHRS	Personal Health Record System
PKI	Public/Private Key Infrastructure
SyRS	System Requirements Specification
SRS	Software Requirements Specification
TLS	Transport Layer Security
XPHR	Exchange of Personal Health Record

## 2 Executive Summary

In this Deliverable 3.2.1 “Technical Requirements of EMPOWER Architecture” document (within the scope of Task 3.2 “Task 3.2 Gathering Technical Requirements of EMPOWER Architecture”), the requirement analysis of the EMPOWER System is described. In requirement gathering process, the use cases of the system is collected and grouped according to the tasks of the EMPOWER Project. These use cases are presented in Section 8. This section and its subsections describe in detail how the system will be used, which actors will use the system, the main flow of the use, the interaction among the internal components in these use cases, pre-conditions and expected post-conditions..

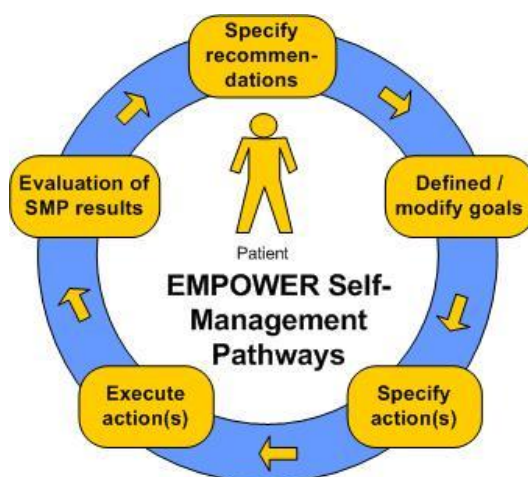
After that, by examining the use cases, the coarse-grained architectural components of the EMPOWER system are identified. The components are presented in Section 9. In this section, the functional, non-functional and data requirements of the components are described in detail.

This Deliverable 3.2.1 will be a base for the D3.3.1 “Conceptual Design of EMPOWER Architecture”, where architectural design of the EMPOWER system will be realized.

### 3 EMPOWER in a Nutshell

Patient Empowerment involves patients to a greater extent in their own healthcare process and disease management becomes an integrated part of their daily lives. The capability of self-management opens to them the possibility for patients not only to contribute to their own healthcare but also to be more in control of their disease. EMPOWER develops a modular and standard-based Patient Empowerment Framework which facilitates the self-management of diabetes patients based on PHRs and on context-aware, personalised services. EMPOWER focuses the research and development efforts on a patient-centric perspective that also involves healthcare professionals. EMPOWER provides knowledge-based Self-Management Pathways for diabetes patients. This includes

- (1) Services for the specification and execution of actions to change behaviour according to diabetes-specific health care needs. Patients can develop personalised action plans which include recommendations from the treating Medical Professionals and patients' preferences
- (2) Services for monitoring of vital, physical, mental parameters as well as physical and lifestyle activities based on health standards.



EMPOWER semantically integrates multiple information sources (EHR/PHR, diabetes guidelines, patterns of daily living) for a shared knowledge model. The Self-Management Pathways facilitate the specification of recommendations that allow specifying individual goals for the patient. Based on these goals, relevant information and their preferences patients can specify their individual diabetes-specific actions. The Self-Management Pathways are an iterative process where executed actions and reported patterns of daily life can be evaluated. Recommendations, goals and actions can be updated iteratively according to current needs and preferences. Finally, the services in EMPOWER will embrace semantic interoperability based on health standards such as HL7<sup>1</sup> and IHE<sup>2</sup> profiles.

EMPOWER addresses long-term goals and short-term activities in order to facilitate the self-management of patients with diabetes and thus the treatment of chronic diseases. The pilot applications in Germany and Turkey will demonstrate that the holistic and patient-centric approach of EMPOWER can improve disease management by personalised self-management services helping diabetes patients to cope better with their condition.

---

<sup>1</sup> <http://www.hl7.org>

<sup>2</sup> <http://www.ihe.net>

## 4 Purpose

The purpose of Deliverable D3.2.1 is to gather and analyze the scientific and technical requirements of the EMPOWER architecture. The system requirements of the EMPOWER architecture will be based on the end-users' requirements analyzed in Task 8.1 "Requirements of EMPOWER Pilot Application" and partly on the state of the art technologies surveyed in Task 3.1.

The Requirements Specification document will guide EMPOWER project in further phases, specifically the design phase.

The conception of this Requirements Specification Document follows the recommendations of the well-established standards IEEE Std. 830-1998 and IEEE Std. 1233-1998 (Guides for software/system requirements specifications).

## 5 Reference Documents

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

1. EMPOWER Project's Description of Work
2. IEEE STD 830-1998: "IEEE Recommended Practice for Software Requirements Specifications"
3. IEEE STD 1233-1998: "IEEE Guide for Developing System Requirements Specifications"
4. Websites dealing with the content of IEEE standard guides and the way to use them (for instance: <http://www.microtoolsinc.com/Howrsrs.php>)

## 6 Content of the EMPOWER Requirement Specification document

### 6.1 Scope of the EMPOWER platform Requirement Specification Document

This requirement specification document aims to provide a complete and detailed description of the functions (and related system performances or use issues) to be performed by the EMPOWER platform. The document will assist EMPOWER partners and potential users to determine if the system specified meets their needs or how the system specifications must be modified to meet their needs. And it will guide the effective realization of the EMPOWER platform prototype.

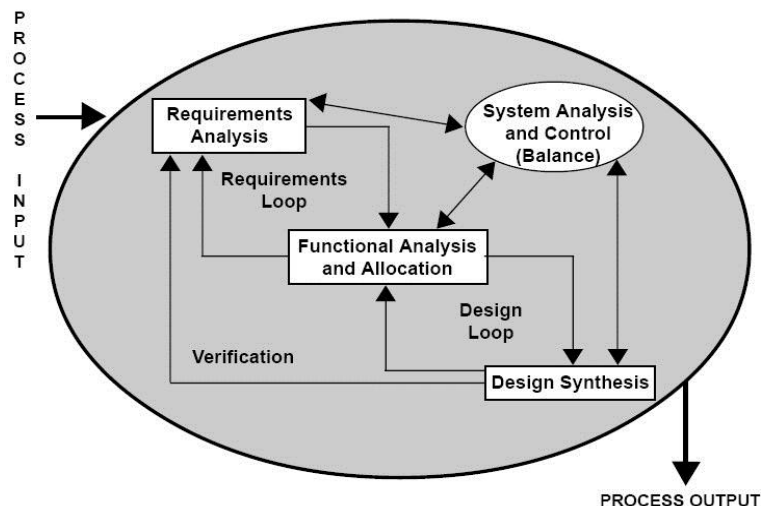
*Requirements analysis* in systems engineering encompasses those tasks that go into determining the needs or conditions to meet for a new or altered product, taking account of the possibly conflicting requirements of the various stakeholders, such as beneficiaries or users. It is an early stage in the more general activity of requirements engineering which encompasses all activities concerned with eliciting, analyzing, documenting, validating and managing software or system requirements<sup>3</sup>.

In classical engineering methodologies, the requirement analysis phase is carried out in interaction with the functional analysis phase (see Figure 1).

---

<sup>3</sup> [http://en.wikipedia.org/wiki/Requirements\\_analysis](http://en.wikipedia.org/wiki/Requirements_analysis)





**Figure 1. Schema of System Requirement Specification process** (from *Systems Engineering Fundamentals*. Defense Acquisition University Press, 2001)

## 6.2 Main issues addressed by the Requirement Specification Document according to IEEE standards

Requirements analysis process includes three types of activity<sup>4</sup>:

- Eliciting requirements*: the task of identifying the various types of requirements (also called requirements gathering) from various sources including project documentation, business process documentation, and stakeholder interviews. Analysts can employ several techniques to elicit the requirements from the customer. These may include the development of, the identification of use cases, the use of workplace and creating requirements lists. Prototyping may be used to develop an example system that can be demonstrated to stakeholders.
- Analyzing requirements*: determining whether the stated requirements are clear, complete, consistent and unambiguous, and resolving any apparent conflicts.
- Recording requirements*: Requirements may be documented in various forms, usually including a summary list and may include natural-language documents, use cases, user stories, or process specifications.

Following IEEE Standards, the requirement specification document should specify *what functions are to be performed on what data to produce what results at what location for whom*. It should focus on the services to be performed. More precisely, the basic issues addressed by the requirement specification document must be the following:

- Functionality*. What is the system supposed to do?
- External interfaces*. How does the software interact with people, the system's hardware, other hardware, and other software?
- Performance*. What is the speed, availability, response time, recovery time of various software functions, etc.?
- Attributes*. What is the portability, correctness, maintainability, security, etc. considerations?
- Design constraints imposed on an implementation*. Are there any required standards in effect, implementation language, policies for database integrity, resource limits, operating environment(s) etc.?

<sup>4</sup> [http://en.wikipedia.org/wiki/Requirements\\_analysis](http://en.wikipedia.org/wiki/Requirements_analysis)

The requirement specification document should contain all of the software and system requirements to a level of detail sufficient to enable designers to design a system to satisfy those requirements, and testers to test that the system satisfies those requirements. These requirements should include at a minimum a description of every input (stimulus) into the system, every output (response) from the system, and all functions performed by the system in response to an input or in support of an output.

All of the requirements that relate to a software or system are not equally important. Some requirements may be essential, while others may only be desirable. IEEE Standards recommend to rank requirements by distinguishing those which are essential, conditional, and optional.

- a) *Essential*. Implies that the software will not be acceptable unless these requirements are provided in an agreed manner.
- b) *Conditional*. Implies that these are requirements that would enhance the software product, but would not make it unacceptable if they are absent.
- c) *Optional*. Implies a class of functions that may or may not be worthwhile. This gives the supplier the opportunity to propose something that exceeds the SRS.

## 7 Overview of requirements from the perspective of the overall EMPOWER system

Basically, each functional part of the overall EMPOWER system (see figure 2 below) has its own requirements, and has to be analyzed in the requirements specifications document.

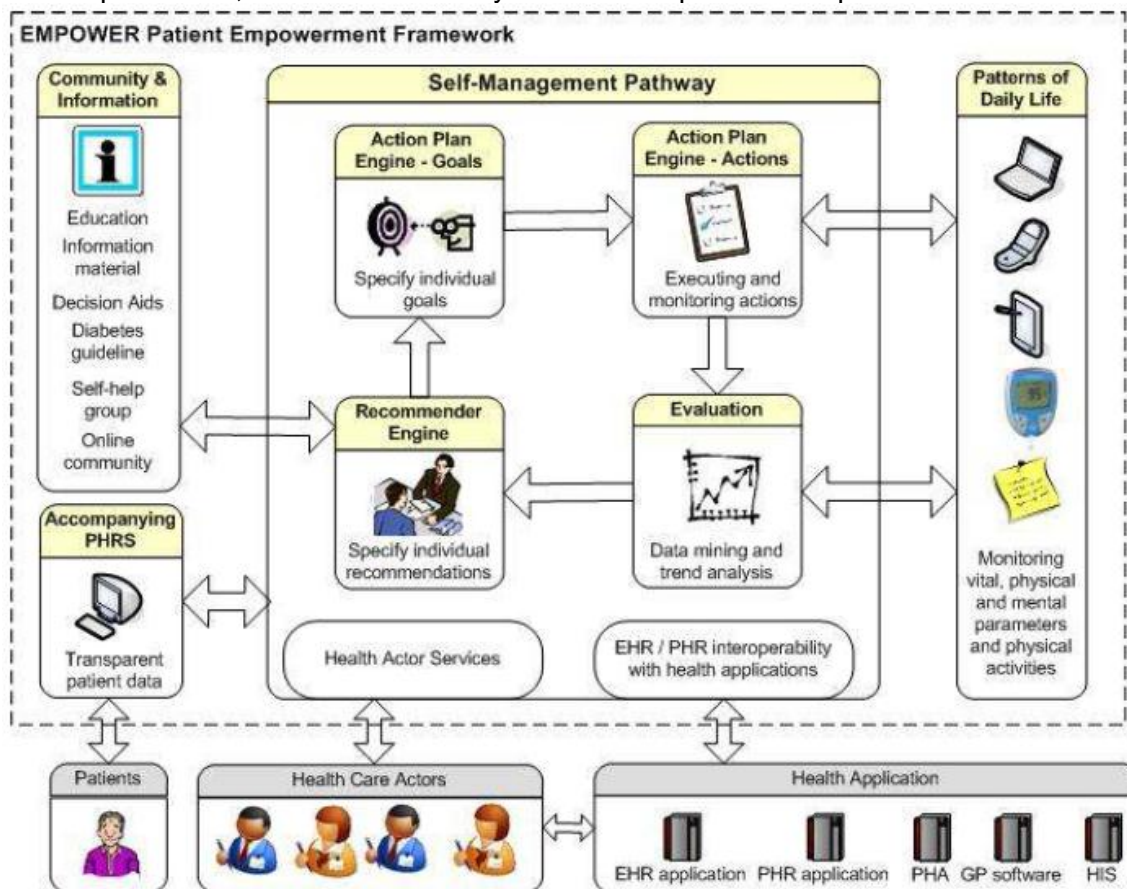


Figure 2. Overview of the initial implementation of EMPOWER Framework

Technical requirements have to be described for each functionality provided by the EMPOWER interoperability architecture. From a very general and end-user point of view, those functionalities are the following:

- Knowledge models and services for self-management of diabetes
- Data and trend analysis of results generated by self-management pathway components
- Knowledge models and services for shared decision support and specifying recommendations
- Knowledge models and services for a personalised, adaptive action plan
- Multimodal services and interfaces for patterns of daily living
- Interoperability with PHR/EHR systems
- Patient education mechanisms
- Security and Privacy of the components listed above

However, those general functionalities are made possible by more invisible (and non-end-user) functionalities of the EMPOWER architecture, which precisely ensures the (syntactic and semantic) interoperability between the different systems the EMPOWER architecture is coping with: first of EHR systems from different hospitals. Those functionalities also bring specific technical requirements. Some of them are represented on Figure 2 above.

Given the actual state of EMPOWER platform description, requirements specifications have to be provided for the following components and functions (classified by workpackage and by task in the following table):

- **Self-Management Pathways (SMP): SRFG**
- **Personalised Adaptive Recommender Engine: SRDC**
- **Personalised Adaptive Action Plan: SRFG**
- **Multimodal-based Interfaces and Patterns of Daily Living: ICOM**
- **Accompanying PHR system: SRFG**
- **Patient Consent Management and Security: SRFG**
- **EHR/PHR Interoperability with Health Applications: SRDC**

WORKPACKAGE	COMPONENTS AND FUNCTIONS BY TASK	PARTNERS RESPONSIBILITIES
<b>Workpackage 4</b> Secure Self-Management Pathways	Task 4.1 Knowledge-based Pathway Engine	<b>SRFG</b>
	Task 4.2 Trends and Visualisation of Self-management Services	<b>HMGU</b>
	Task 4.3 Patient Consent Management and Security	<b>SRFG</b>
<b>Workpackage 5</b> Patient Empowerment Services	Task 5.2 Diabetes based Personalised Adaptive Recommender Engine	<b>SRDC</b>
	Task 5.3 Diabetes based Personalised Adaptive Action Plan	<b>SRFG</b>
	Task 5.4 Integration into an accompanying	<b>SRFG</b>

	PHRS	
<b>Workpackage 6</b> Interoperability and Multimodal-based Patterns of Daily Living	Task 6.1 Monitoring Vital, Physical and Mental Parameters	<b>ICOM</b>
	Task 6.2 Monitoring Physical and Lifestyle Activities	<b>SRFG</b>
	Task 6.3 Providing Multimodal Services and Interfaces	<b>ICOM</b>
	Task 6.4 EHR/PHR Interoperability with Health Applications	<b>SRDC</b>

A first step before identifying the precise technical requirements of the EMPOWER architecture (taken along its different functional components) is the precise description of use cases. The use cases are presented in Section 8, task by task.

Before describing the actors and the use cases of the EMPOWER system, it is worth presenting the EMPOWER envisaged operation/use from the identified actors. The two main actors of the EMPOWER system is the **Patient** and the **Medical Professionals (all types of medical staff, such as Physicians, Nurses, Dieticians, etc.)**. From the Medical Professional view, the EMPOWER system will help the medical professionals to provide recommendations to their Patients by looking at the Patients' EHR/PHR data and well-known diabetes guidelines (Figure 3). On the other hand, from the Patient view, the system will help their self-management of their diabetes diseases. In that respect, mainly, the Patients, after getting the recommendation of their Medical Professionals, they will specify their goals and the actions to reach these goals (Figure 4). After that by executing the defined actions (with the help of EMPOWER) and entering their Observation and Daily Living (ODL) values to the EMPOWER system, the Patients and the Medical Professionals will be able to monitor the Patients' progress in their self-management of their diseases through user-friendly and focused reports (Figure 5). Finally, by examining these reports, the Medical Professionals can assess the current situation of their Patients and adjust the recommendations, goals and actions if necessary.

### The doctor's view – Consultation (Diabetes Disease Management)

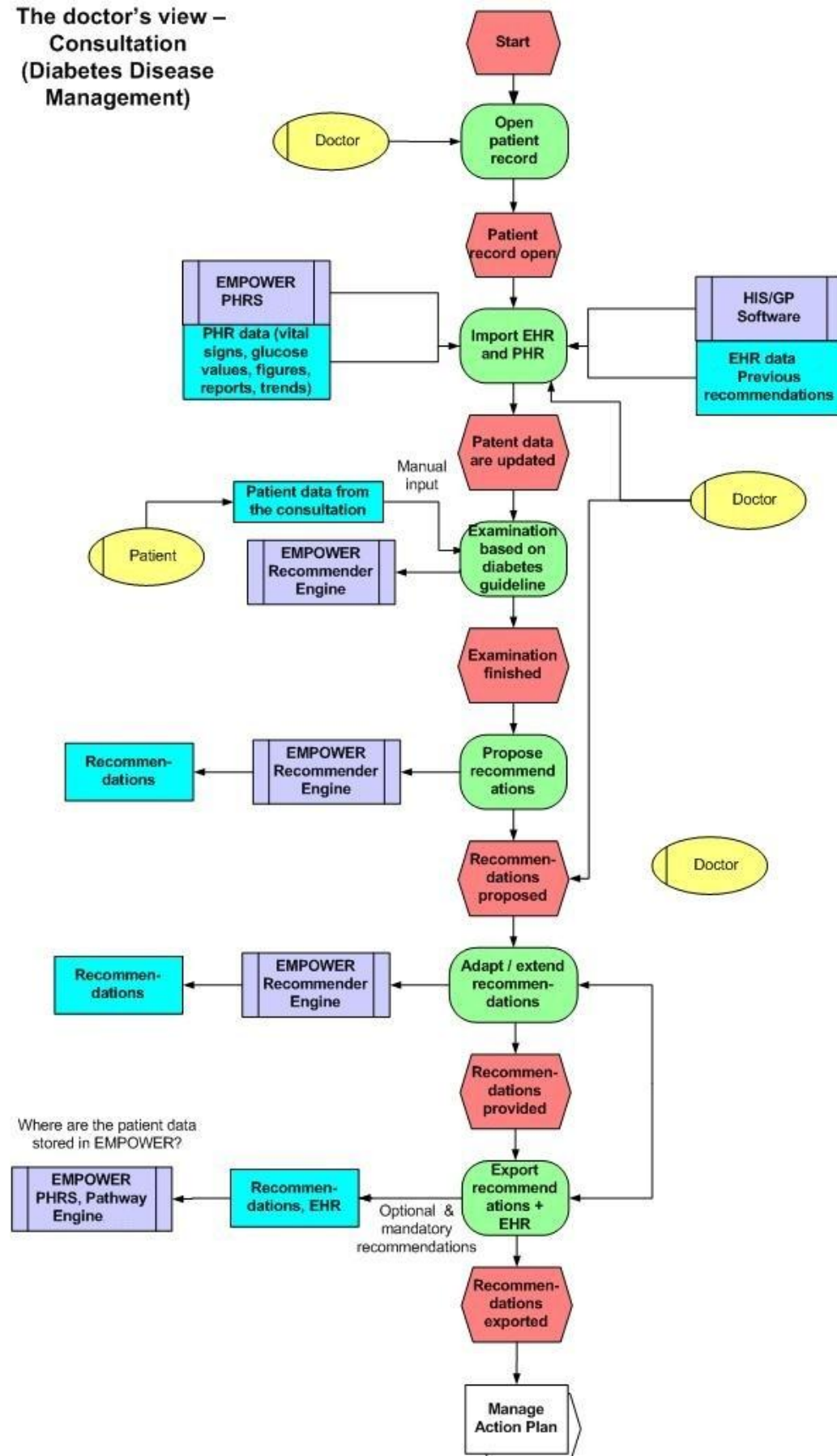
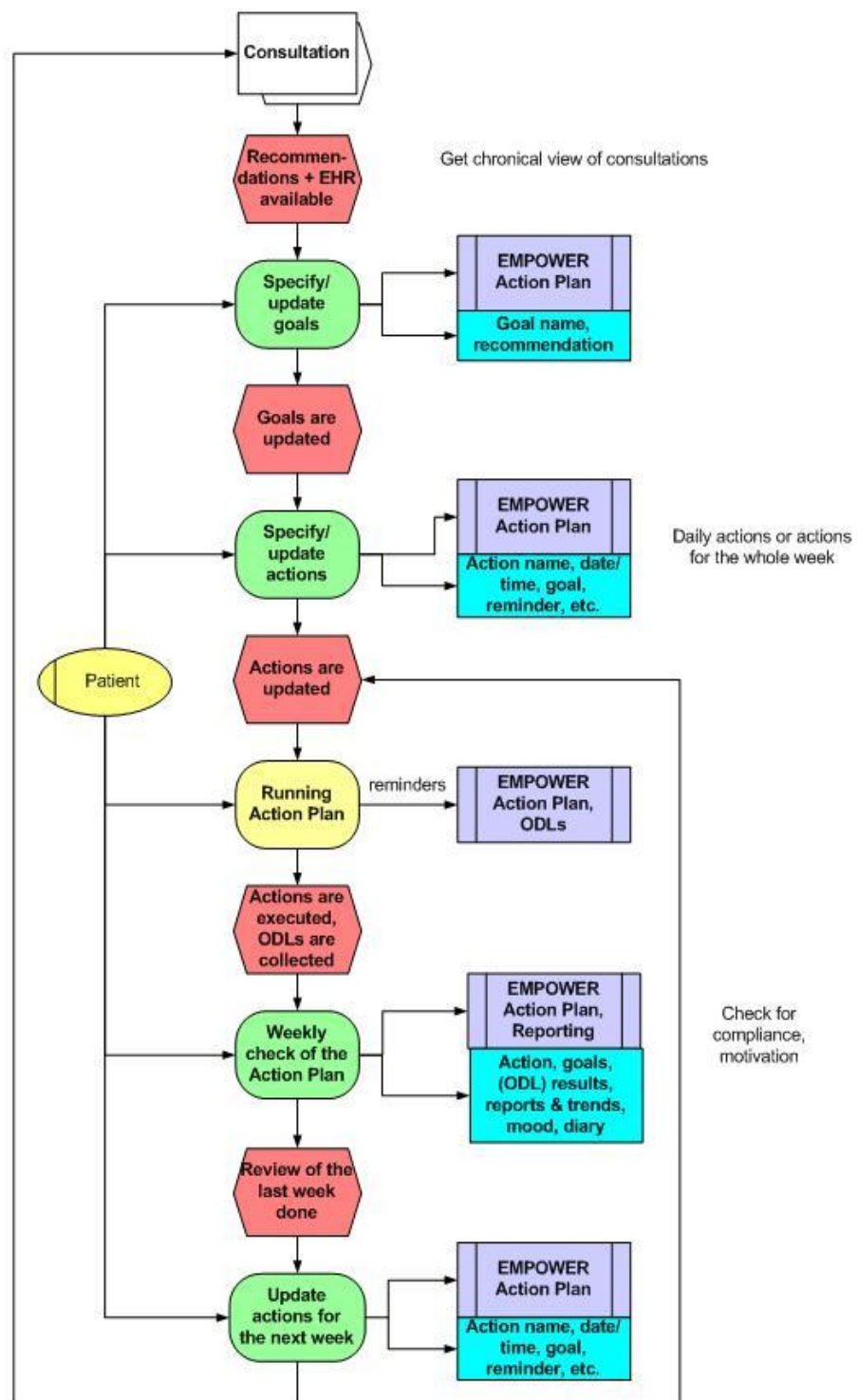


Figure 3 The Medical Professionals' use of EMPOWER System – the Consultation

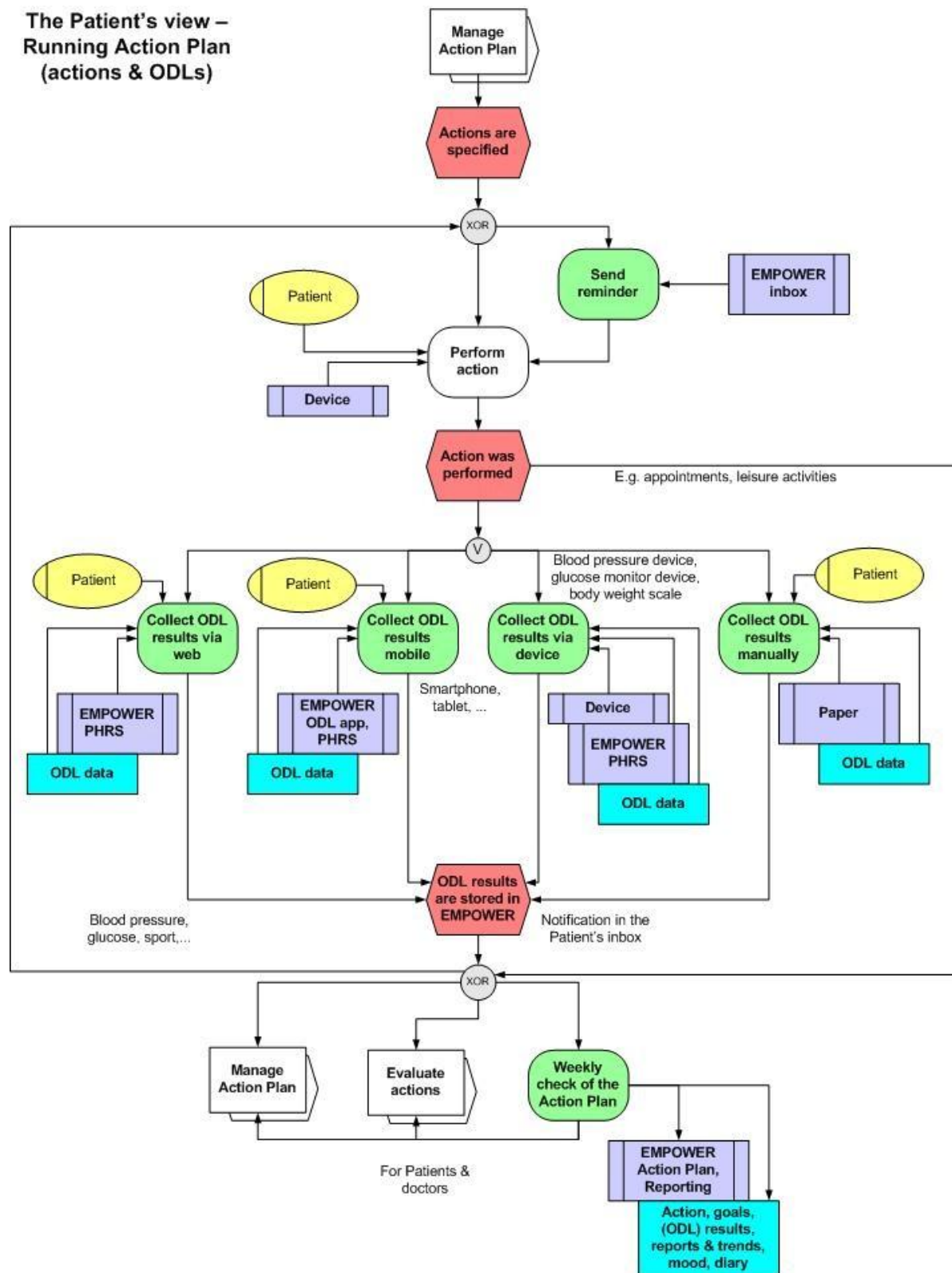
**The Patient's view –  
Manage Action Plan  
(goals and actions)**



**Figure 4 The Patients' use of EMPOWER System – Management of the Goals and Actions**



### The Patient's view – Running Action Plan (actions & ODLs)



**Figure 5 The Patients' use of EMPOWER System – Execution of the Actions and Entering ODL Results**

## 8 Description of the use cases

### 8.1 Glossary

Term	Description
IDE for BPM Modelling	Interactive Development Environment with appropriate plugins to support rule based BPM modelling. To support iterative development: Storyboards can be used together with BPM visual design tool. The resulting diagrams might feedback to the story boards
EMPOWER Knowledge Model	A collection of rule based BPM process models, Knowledge base includes rule base and static EMPOWER terminologies.
Pathways Knowledge Model	EMPOWER Knowledge Model supporting the EMPOWER self-management pathway.
Action Plan Knowledge Model	EMPOWER Knowledge Model supporting Action plans. The Pathways Knowledge Model will provide particular high-level processes to coordinate the Action Plan among the system components and EMPOWER users.
System Knowledge Models	Knowledge models needed for the EMPOWER system. These are associated with the Pathways Engine
Component Knowledge Models	To support modularization and potentially reusability. These are not relevant to the EMPOWER Knowledge Model. Any component can use BPM and any process engine. For example, a PHRS or PHA has functionalities (workflows, page web flow) that can benefit from BPM. One idea is to support storyboards and their implementation with a BPM visual design tool.

### 8.2 Overview of the Actors involved in EMPOWER Use Cases

There are the following actors in the EMPOWER Project:

1. Human Users
  - a. **Content Administrator:** this actor provides and updates the information material available in the EMPOWER PHRS.
  - b. **Knowledge Worker:** is an actor managing knowledge such as process models and EMPOWER terminologies
  - c. **Medical Professionals:** This actor is assumed to be an expert in the diabetes. The Medical Professionals, general practitioners, dietician, nurses, etc. are considered to be in this category.
  - d. **Patients:** This actor is for the diabetes patients themselves. The main beneficiary of the EMPOWER project. The family member of a patient can also perform tasks on behalf of the patient if the patient gives consent. In EMPOWER, the family members are also assigned to Patient role as they may have an account in the PHR, too. In the PHR, a patient can set another



patient as a family member. In other words, in addition to giving consent to a medical professional, the patients can give consent to other patients, too.

- e. **System Administrator:** manages the system configuration and data including patient data within the system.
2. Software Users
- a. **Personal Health Record System (PHRS):** The EMPOWER Components will be integrated as modules into an existing PHR System. In this respect, the PHR system is a software user.
  - b. **Personal Health Application (PHA):** An external PHA can benefit from the EMPOWER components. The PHA can be either a desktop application or a mobile application.
  - c. **Electronic Health Record System (EHRS):** An EHR System residing in a hospital can reach some of the functionalities of the EMPOWER system. For example, the EHR system can reach the PHR information of a diabetes patient.

In the following Figure 6, Figure 7 and Figure 8, the consolidated Use Case Diagrams of the EMPOWER system are presented. Each of the use cases are described in the following subsections in detail.

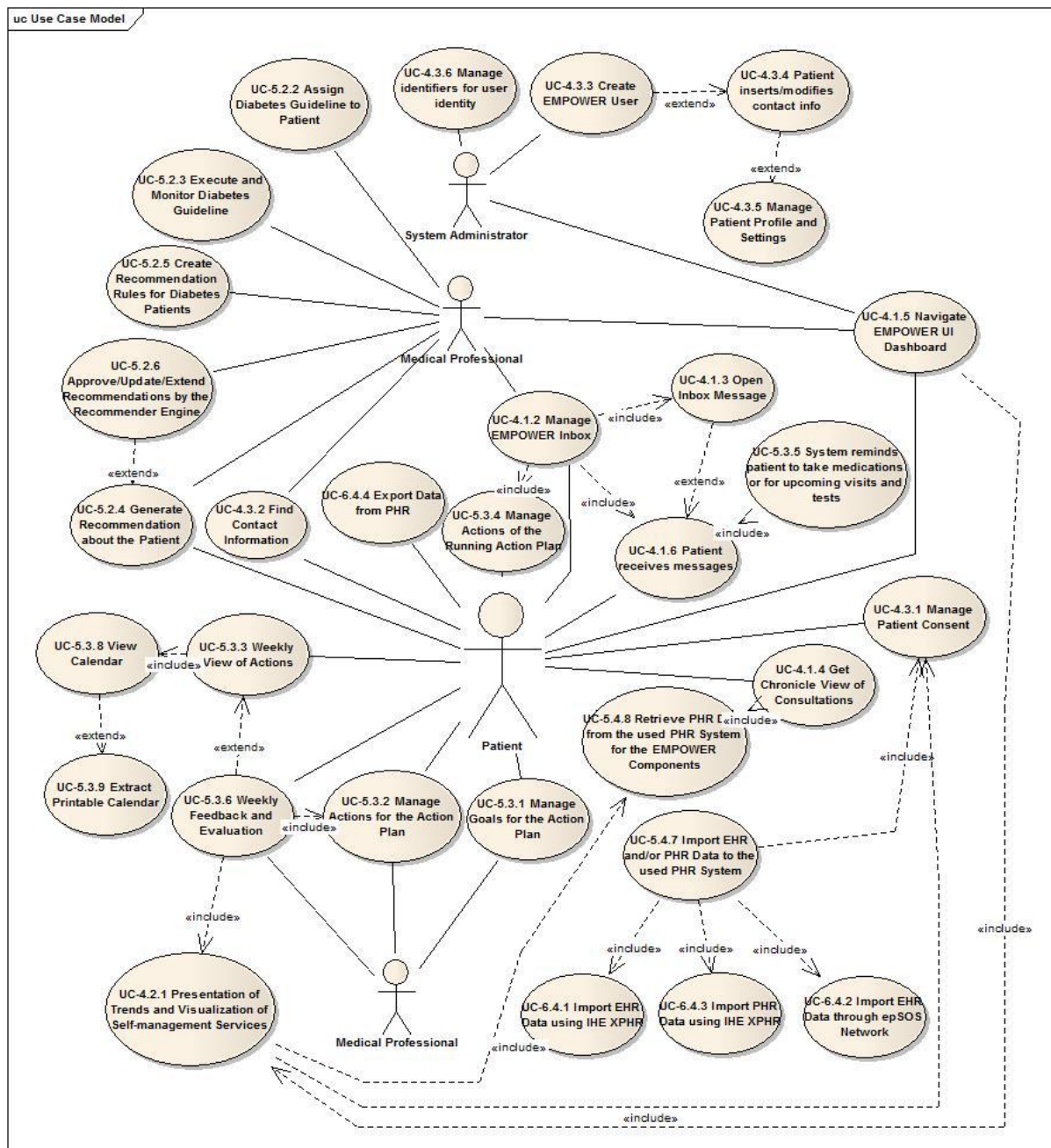
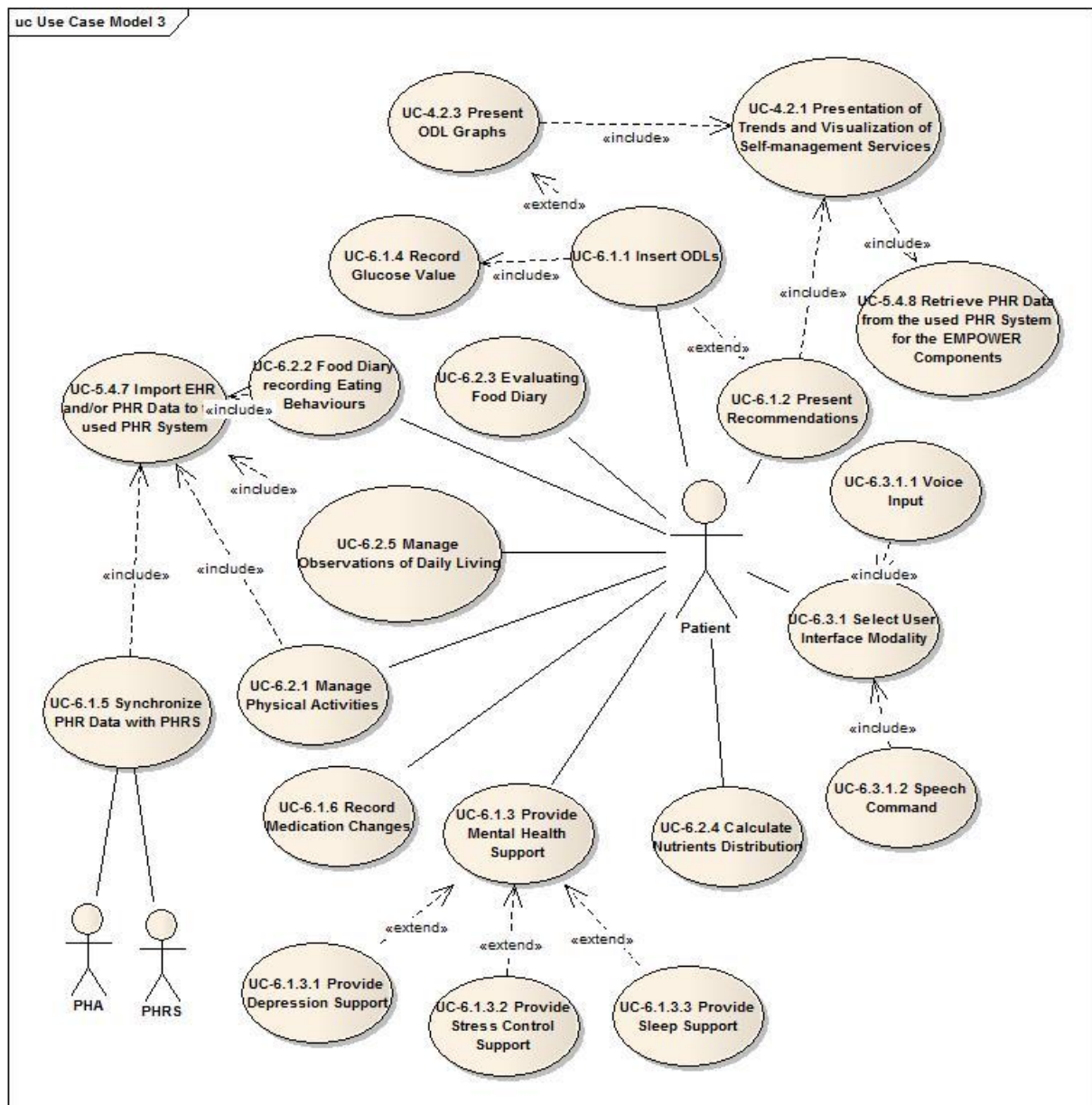


Figure 6 Consolidated Use Case Diagram - Part 1



### Figure 7 Consolidated Use Case Diagram - Part 2

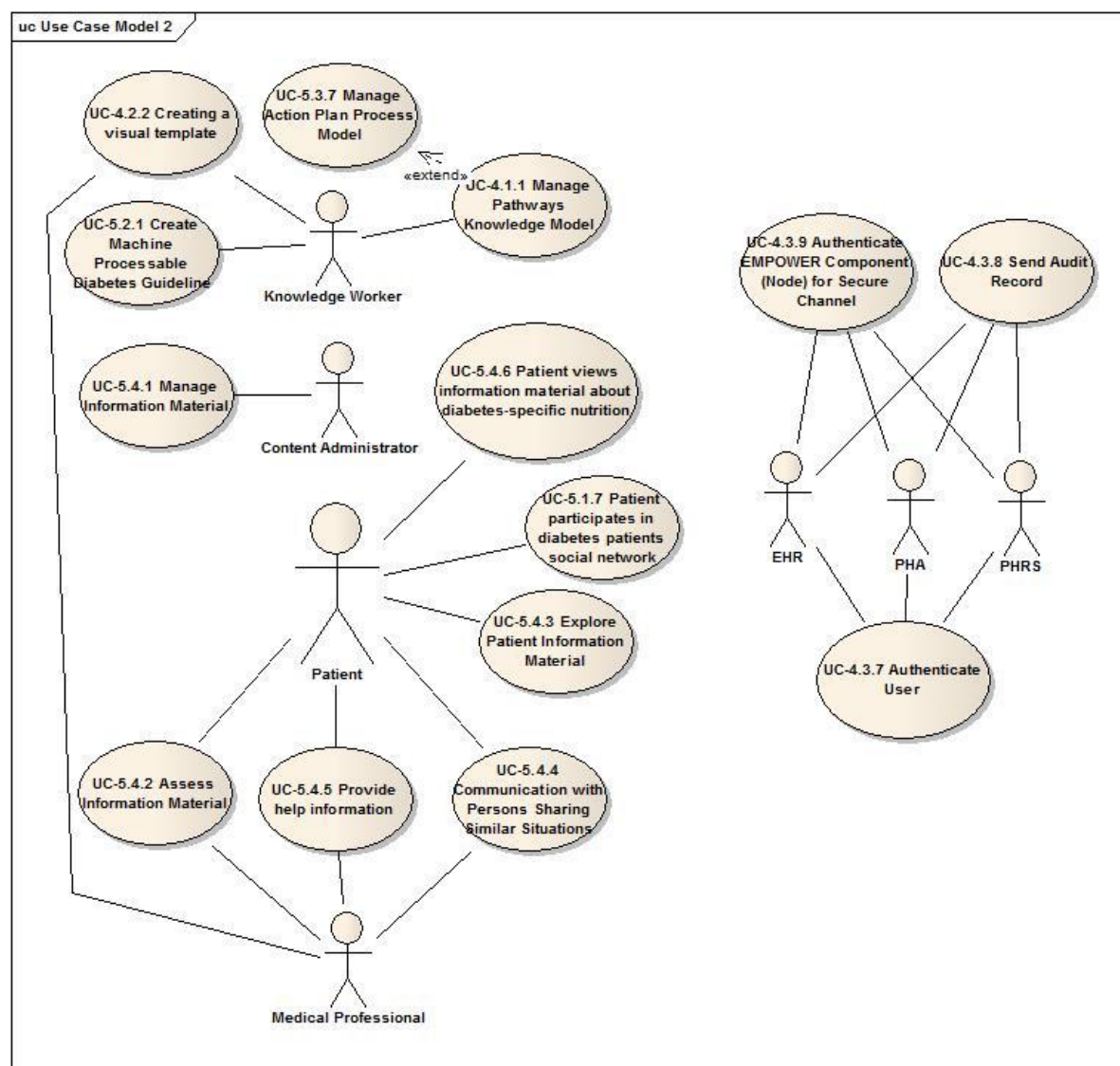


Figure 8 Consolidated Use Case Diagram - Part 3

### 8.3 Recommendations from the Pre-Study

Based on the results of deliverable D2.1.1 "Strategies for Empowering Patients for Web-based Self-management" the following table depicts an overview EMPOWER will support the following recommendations identified in D2.1.1 by the use cases specified in this document:

**Recommendation:** Follow a holistic approach in "Patient Empowerment" for chronic care and diabetes; Increase the awareness of regular monitoring

**Use Cases:** the approach in EMPOWER is based on both medical and individual requirements and needs and specifies and refines goals and actions in an iterative process. The physician's recommendations for treatment, the self-management goals and actions are related to each other. This ensures traceability and increases the awareness why actions for self-management and self-control are relevant. Additionally, the weekly review of the Action Plan will support self-management and hence, monitoring on a periodical base.

Relevant use cases:

UC-5.2.5 Create Recommendation Rules for Diabetes Patients

UC-5.3.1 Manage Goals for the Action Plan

UC-5.3.2 Manage Actions for the Action Plan

UC-5.3.6 Weekly Feedback and Evaluation

**Recommendation:** Foster patient empowerment with “meaningful” interventions; Develop services with “quick” wins for the target groups; Aim at easy to use, almost seamless collection process of Observation of Daily Livings (ODLs)

**Use Cases:** EMPOWER supports these recommendations by a two-fold approach. On the one hand EMPOWER offers a range of “meaningful” and relevant ODL services and the Action Plan for self-control and self-management. On the other hand ODL services are embedded as actions into the Action Plan and actions are basically related to goals and recommendations. With this approach the relevance of an action is always traceable and transparent.

Relevant use cases:

see ODL use cases in section 8.10 and section 8.11

see use case for the Action Plan in section 8.8

**Recommendation:** Promote face-to-face interaction and technology supported interaction equally

**Use Cases:** This recommendation suggests that patients should be able to integrate the EMPOWER services and functions into their real world. EMPOWER offers both technology-based services for self-management and self-control and services for communicating with persons sharing similar situations based on social media. Additionally, the EMPOWER approach also includes the treating doctor by supporting the consultation by the Recommender Engine

Relevant use cases:

see ODL use cases in section 8.10 and section 8.11

see use cases for the Recommender Engine in section 8.7

**Recommendation:** Consider services and strategies supporting newly learned behavior patterns - be repetitive; Tell them why.

**Use Cases:** Repetitions will be supported in several ways. When Patients configure an action they can activate a reminder which will be performed by the running Action Plan. Additionally, EMPOWER will support several maturity levels aiming at providing the appropriate level of information for the user, e.g. EMPOWER will provide more information and reminders for a beginner. The maturity level can be configured in the users profile.

Relevant use cases:

UC-5.3.2 Manage Actions for the Action Plan

UC-5.3.4 Manage Actions of the Running Action Plan

UC-4.3.5 Manage Patient Profile and Settings

**Recommendation:** Monitor continuously and provide timely feedback

**Use Cases:** This recommendation refers to a continuously monitoring of relevant parameters for diabetes patients. EMPOWER supports that issue by the weekly management and review of the Action Plan, by providing reminders for upcoming events and by notifying the Patient when thresholds are exceeded.

Relevant use cases:

UC-5.3.6 Weekly Feedback and Evaluation

UC-5.3.4 Manage Actions of the Running Action Plan

**Recommendation:** Cater for the need of social interaction; Connect with already existing social networks.

**Use Cases:** Social interactions and sharing experiences with patients in similar situations can be an additional source of information and motivation for patients. EMPOWER supports that by involving social media such as a forum or a self-help group.

Relevant use cases:

UC-5.4.4 Communication with Persons Sharing Similar Situations

**Recommendation:** Get the partner involved and develop services that include both.

**Use Cases:** Including family members into diabetes management is another important form of social support. The Consent Editor in EMPOWER allows a Patient to grant and to deny access to other persons such as family members but also to medical persons

Relevant use cases:

UC-4.3.1 Manage Patient Consent

**Recommendation:** Didactical concept of multimedia information and resources for younger senior citizens

**Use Cases:** EMPOWER offers a community-based setting for exchanging information and experiences and services for mobile devices that particularly address younger people.

Relevant use cases:

see ODL use cases in section 8.10 and section 8.11

see use case for the Action Plan in section 8.8

**Recommendation:** Cater for current, updated information; Aim for personalized information; Help to keep track on the "bigger picture" of the course of the chronic disease

**Use Cases:** These recommendations will be supported in several ways. Firstly, information material provided by EMPOWER, will be enriched by the EMPOWER terminology allowing the user identifying relevant information material more quickly. Secondly, the Patients can assess information material by tagging and annotating them. In this way information material of unpredictable quality becomes more transparent. Thirdly, EMPOWER will provide personalized messages or reminders for actions or to upcoming self-management steps supported by the Self-Management Pathway.

Relevant use cases:

UC-5.3.4 Manage Actions of the Running Action Plan

UC-4.1.1 Manage Pathways Knowledge Model

**Recommendation:** Provide streamlined and visualized information.

**Use Cases:** This recommendation refers to meaningful and concise evaluation of collected medical parameters and other relevant self-management data. The two main target groups (Patients; Medical Professionals) will need this information in different level of details and in some case with different presentation. EMPOWER supports it accordingly.



Relevant use cases:

See use case for visualisation and trends in section 8.5

**Recommendation:** Be aware of different emotional strategies influencing the use of EMPOWER services; Closely follow all interaction design and usability strategies for senior citizens; Unlock the value of gender-differences in internet based health information behavior

**Use Cases:** the maturity levels will support the needs of different groups and affects the visualisation of ODL results including trend charts, the Self-Management Pathways and the way how ODL services can be used (e.g. web, mobile, printouts). The maturity levels are specified in detail in Deliverable D5.1.1 “Learning paths for self-management services”

Relevant use cases:

See use case for visualisation and trends in section 8.5

UC-4.1.1 Manage Pathways Knowledge Model

see ODL use cases in section 8.10 and section 8.11

**Recommendation:** Cater for accompanying measures to keep pilot-users in the pilot implementation

**Use Cases:** For the EMPOWER Pilot Applications it would be useful to offer an accompanying off-line support, such as an off-line self-help group. To know each other face-to-face would also decrease the barrier for online communication and for exchanging information and hence, the compliance for EMPOWER.

Relevant use cases:

UC-5.4.4 Communication with Persons Sharing Similar Situations

**Recommendation:** Do not follow a “top-down” approach to all patients (for physicians)

**Use Cases:** This recommendation refers to physicians and points out that they should not deliver instructions to all patients in the same form. The medical guidelines performed by the Recommender Engine will consider this recommendation by covering the different diabetes types based on rules for the different decision situations. These guidelines can be adapted based on the physician’s needs.

Relevant use cases:

see use cases for the Recommender Engine in section 8.7

In addition to the above recommendations, the following requirements are identified for the pilot applications:

- Provide an Electronic Version of German Diabetes Passport
- Provide a PHRS for the pilot in Germany.
- Integration with patient terminals (Kiosks), which are not yet available.
- Data download from medical health card (eGK), e.g. via 3rd party card reader.
- Generate a customized guideline that is exclusive to EMPOWER.
- Integration of data from Diabetes Minimum Health Data Set of Turkey.
- Integration with National Health Information System (via eSaglikKaydim PHR)
- Support of ASTM’s CCR Standard (via eSaglikKaydim PHR)
- Integration with Health Coding Reference Server of Turkey.

- Integration with “Doctor Data Bank” of Turkey.
- Accordance to Ethical and Legal Requirements in Germany
- Accordance to Ethical and Legal Requirements in Turkey
- Interoperability with other EHR Systems (e.g. DocStar).

All these requirements are described in “D8.1.1 Requirement Specifications and Scenario of the Pilot Application” in detail. While defining the EMPOWER use cases, are defined to cover the above-mentioned requirements are taken into account.

## 8.4 Task 4.1 Use Cases “Knowledge-based Pathway Engine”

### 8.4.3 UC-4.1.1 Manage Pathways Knowledge Model

UC-4.1.1	Manage Pathways Knowledge Model
Description	<p>A knowledge worker can manage the <b>Pathways Knowledge Model</b> using an appropriate IDE (Interactive Development Environment)</p> <p>The knowledge model is a set of rule based Business Process models (BPM). What is meant by knowledge can include rules and other business logic utilizing EMPOWER terminologies patient information or settings or patient state in the executing process model.</p> <p>A process engine executes the process models and interacts with human actors via the EMPOWER inbox and other services (e.g. multimodal ODL components, interoperability services, personal health application services, action plan services, recommender services). The engine can be notified and listen to activities and actions of the human user via the EMPOWER user’s interactions with EMPOWER components. What the engine requires can be dependent on the BPM models. Consider that the engine should be notified when BPM related tasks or steps are completed. For example, a web form is submitted by an EMPOWER user and that is relevant to a step in a BMP model; or the user logs in; or the user opens an inbox mail message and the engine requires an automatic notification of that event.</p> <p>Furthermore, other components might use the engine as a means to listen to events in other components.</p> <p>There will be one default pathway knowledge model for EMPOWER created by a knowledge worker. This knowledge model can be e.g. adapted for each Pilot Application to national aspects such as diabetes care plans or ethical requirements e.g. as part of the Consent Editor, or any adaptations needed to satisfy particular user or system requirements of the pilot. Furthermore, there can be alternative models using for testing or demonstration of scenarios e.g. mock patient interacts with system during a short demo.</p> <p>Knowledge workers organize modeling folders to distinguish production models from pre-production testing, or other testing (unit/integration test, scenarios). Folder naming conventions should agree with the EMPOWER configuration requirements. For example: folders/subfolders for production, pre-production, test (unit/integration tests, scenarios)</p> <p>The knowledge model is composed of one or more rule-based BPM-</p>



	<p>process models for the self-management pathways e.g. comprises:</p> <ul style="list-style-type: none"> <li>• Introducing new patients and users to the EMPOWER pathways</li> <li>• Promoting the self-management workflow by e.g. reminding the Patient to update the Action Plan or to inform the Patient about new information material or new groups or to remind the Patient to make the periodic diabetes appointment with his Medical Professional.</li> <li>• Supporting system and component interactions via BPM</li> <li>• Handle inbox related BPM models e.g. default actions taken when a user interacts with their inbox e.g. opening a new mail causes automatic acknowledgement to the engine</li> </ul> <p>There can be core BPM process models that support the EMPOWER system and component interactions. Creating BPM models rather than creating alternative software.</p>
<b>Parent</b>	-
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	UC-5.3.7 Manage Action Plan Process Model
<b>Scope</b>	Pathway Engine, IDE Modeling Tool
<b>Actor(s)</b>	Knowledge Worker
<b>Goal</b>	To manage Pathways Knowledge Models
<b>Trigger</b>	Knowledge worker opens IDE for modeling activities
<b>Frequency</b>	<ul style="list-style-type: none"> <li>• High frequency during implementation phase for EMPOWER knowledge models or when EMPOWER software is customized for a new health provider.</li> <li>• Application pilots phase: there should be little or no managing of models during the pilot</li> </ul>
<b>Pre-conditions</b>	<ul style="list-style-type: none"> <li>• Appropriate tools (IDE with modeling plugin, configuration for rule base)</li> <li>• Software source control tool</li> <li>• Knowledge work with appropriate expertise</li> </ul>
<b>Post-conditions</b>	<p>Process model is saved.</p> <p>Process model is committed to the software repository when ready.</p>
<b>Success Post-conditions</b>	<p>Process model is saved.</p> <p>Process model is committed to the software repository when ready.</p>
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. Knowledge Worker opens modeling tool</li> <li>2. Open appropriate folder of knowledge model in pre-production state or choose other test folder.</li> <li>3. Manage (create, remove, update) a rule based BPMN2 based process model</li> <li>4. Decide whether to replace production model with pre-production model.</li> <li>5. Decide whether to commit changes to software repository</li> </ol>

<b>Extensions</b>	-		
<b>Open Issues</b>	<ul style="list-style-type: none"> <li>• Must have naming conventions for file names (process models)</li> <li>• Must have convention for organizing the collection of process models by knowledge model identifier, status (production, pre-production, for unit/integration test),</li> <li>• EMPOWER configuration uses the “production” folder, the default knowledge model folder should be named “default”</li> </ul>		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 4,2012</i>	<i>SRFG</i>	<i>initial</i>

#### 8.4.4 UC-4.1.2 Manage EMPOWER Inbox

<b>UC-4.1.2</b>	<b>Manage EMPOWER Inbox</b>
<b>Description</b>	<p>The EMPOWER user (Patient, Medical Professional, System Administrator) can manage their inbox, especially to read messages (alerts, reminders) and respond to messages from the system. The system might communicate with Medical Professionals on behalf of the patient e.g. send message about access rights to patient information or other action plan related activities.</p> <p>The user views an inbox menu widget in the EMPOWER DASHBOARD that indicates the number of unread messages. The user opens it. The inbox is displayed in an organized manner depending on the message category or type.</p> <p>The inbox is the central communication between EMPOWER users and the Pathway Engine. The Pathway Engine is the primary manager of the inbox. There are inbox services that can be used to create a default UI component in the EMPOWER dashboard that can be further modified. Also, the PHRS could extend an existing inbox using the EMPOWER inbox services.</p> <p>The inbox receives notifications from the BPM process engine regarding the process tasks executed, (e.g. ODL results, results of other actions) Normally, the EMPOWER components communicate with the inbox indirectly via the BPM process models.</p> <p>Users will receive alerts and reminders in their inbox, even links and web forms to complete. Users can reply to particular messages according to the BPM process model e.g. a message reminds the patient to complete a task, (“please measure blood pressure”) and provides a web form to answer; next the patient submits that form with the needed information.</p>
<b>Parent</b>	-
<b>Included sub-use cases</b>	UC-4.1.6 Patient Receives Messages UC-5.3.4 Manage Actions of the Running Action Plan UC-4.1.3 Open Inbox Message
<b>Extended sub-use cases</b>	-

<b>Scope</b>	Pathway Engine, PHRS/PHA		
<b>Actor(s)</b>	Patient, Medical Professionals		
<b>Goal</b>	Users can manage their EMPOWER Inbox or an administrator can manage all inboxes		
<b>Trigger</b>	User opens Inbox or Service reads inbox from PHRS		
<b>Frequency</b>	A common daily activity		
<b>Pre-conditions</b>	An authenticated EMPOWER User has appropriate role or consent to manage their inbox or someone else's inbox e.g. family member or an EMPOWER administrator is managing the inboxes.		
<b>Post-conditions</b>	The inbox is displayed.		
<b>Success Post-conditions</b>	The inbox is displayed in an organized manner depending on the message category or type.		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The user views an inbox menu widget in the EMPOWER dashboard that indicates the number of unread messages.</li> <li>2. The user opens partially to view messages by type or other organization scheme defined PHA or PHRS</li> <li>3. The inbox is displayed in an organized manner depending on the message category. User can sort messages</li> <li>4. User can choose actions on messages</li> <li>5. User can select action to perform</li> <li>6. User can send messages to EMPOWER user e.g. Medical Professional and send references to health reports or information references. Users can lookup contact from contact list. User might send Medical Professional a list of questions before an appointment.</li> <li>7. User can reply to certain messages to complete a task or reply to user</li> <li>8. User can remove messages</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	<ul style="list-style-type: none"> <li>• Should/can the Patient send messages?</li> <li>• Should/can the Patient send the Medical Professional send a link the e.g. an evaluation report?</li> </ul>		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	June 4,2012	SRFG	initial

#### 8.4.5 UC-4.1.3 Open Inbox Message

<b>UC-4.1.3</b>	<b>Open Inbox Message</b>
<b>Description</b>	<p>User can open messages and visualize the contents and carry out further actions depending on the content or type of message. This might include input forms, data, documents, etc.</p> <p>Attachments should be references. If the user accesses the reference, then an authorization check is made whether the receiver can read the referred resource or visualization. .e.g. Medical Professional receives patient health</p>

	<p>report reference.</p> <p>User visualizes the message: the message visualization, possible response action is listed and attachments by category or type.</p> <p>Messages might require the user to complete a task as part of a running process model. E.g. complete task to record an ODL (body weight)</p> <p>Acknowledgement message is automatically notifies receipt to sender:</p> <ul style="list-style-type: none"> <li>• If the sender is a process engine, acknowledgement feedback is usually necessary within the process steps</li> </ul>
<b>Parent</b>	-
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	UC-4.1.6 Patient Receives Messages
<b>Scope</b>	Pathway Engine, PHRS
<b>Actor(s)</b>	Patient, Medical Professional
<b>Goal</b>	To open inbox messages and receive messages. Messages might require the user to complete a task as part of a running process model. Message can be visualized.
<b>Trigger</b>	User opens inbox message
<b>Frequency</b>	This use case is a frequent use case.
<b>Pre-conditions</b>	EMPOWER user views a Message inbox
<b>Post-conditions</b>	EMPOWER user views a Message
<b>Success Post-conditions</b>	<ul style="list-style-type: none"> <li>• User visualizes message, possible response action are listed and attachments by category or type.</li> <li>• When opening a message, a process model might require an automatic acknowledgement to know if a user has opened the message, however, not to another EMPOWER user.</li> </ul>
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. User views inbox</li> <li>2. User selects message to open</li> <li>3. User views message overview and info about any attached references to resources .e.g. health reports and current access rights. The UI indicates whether the user is authorized to view reference, or not. If not, then the user is given a chance to send a request for authorization message to owner. That message is viewed by the owner in their message box and in the content manager editor.</li> <li>4. User might take follow-up actions that are listed for the message,</li> <li>5. User might select attachment if permitted or request access to it again if access was rescinded. The view requires a security check</li> </ol>
<b>Extensions</b>	-
<b>Open Issues</b>	If displaying message content or a link reference, how are references to

	reports, etc. visualized and printed? Separate window?		
Version	Date	Author	Changes
0.1	June 4,2012	SRFG	initial

#### 8.4.6 UC-4.1.4 Get Chronicle View of Consultations

<b>UC-4.1.4</b>	<b>Get Chronicle View of Consultations</b>
<b>Description</b>	<p>This use case presents an overview of the consultations with the Medical Professionals. It includes the following data forwarded by the Recommender Engine and Action Plan Engine:</p> <ul style="list-style-type: none"> <li>• Dates of the consultation</li> <li>• Name of the Medical Professional</li> <li>• Subject of the consultation</li> <li>• The recommendations</li> <li>• Additional documents or EHR data</li> </ul> <p>The Patient can sort the information and filter it. By default, the most recent appointment is presented first.</p>
<b>Parent</b>	-
<b>Included sub-use cases</b>	UC-5.4.8 Retrieve PHR Data from the used PHR System for the EMPOWER Components
<b>Extended sub-use cases</b>	-
<b>Scope</b>	Pathway Engine, PHRS/PHA
<b>Actor(s)</b>	Patient
<b>Goal</b>	Get History of recommendations and other consultation information for use in patient Action plan. From the list application and access the latest consultation should be retrievable.
<b>Trigger</b>	User initiated or Action plan or PHRS provides list or filter query automatically.
<b>Frequency</b>	The frequency of the use case depends on the number of consultations with Medical Professionals.
<b>Pre-conditions</b>	The Recommender Engine has provided the required data for the consultations.
<b>Post-conditions</b>	-
<b>Success Post-conditions</b>	-
<b>Main Flow</b>	1. The Patient logs to the PHRS

	2. The Patient clicks the consultation view 3. The PHRS presents the consultation view in a chronicle view 4. Option – the Patient sorts the view by clicking a column		
<b>Extensions</b>	-		
<b>Open Issues</b>	Are there a consultation event and recommendations and other consultation information available? (TODO list from Medical Professional, patient information as PDFs e.g. lab results, Medical Professional's report)		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 4,2012</i>	<i>SRFG</i>	<i>initial</i>

#### 8.4.7 UC-4.1.5 Navigate EMPOWER UI Dashboard

<b>UC-4.1.5</b>	<b>Navigate EMPOWER UI Dashboard</b>
<b>Description</b>	<p>User is provided with dashboard with menus to navigate EMPOWER menu and interact with EMPOWER functionalities. Options might be customized or limited by application or device.</p> <p>There can be default views for the dashboard depending on the type of EMPOWER user (patient, medical professional, System Administrator)</p> <p>Dashboard default should include:</p> <ol style="list-style-type: none"> <li>1) Inbox with short status of unread/total count and longer overview by type of message (unread/total count)</li> <li>2) Selector to choose EMPOWER user if user is allowed access to Family members</li> <li>3) Current EMPOWER User</li> </ol> <p>Dashboard default view for the patient might include:</p> <ul style="list-style-type: none"> <li>• One suggestion for the dashboard could be the weekly guideline</li> <li>• Another suggestion could include an additional overview about e.g. recommendations + goals + actions + results for the e.g. last month / 3 months <ul style="list-style-type: none"> <li>◦ Action plan status – on achieving goals,</li> </ul> </li> <li>• Reminders, alerts, new inputs <ul style="list-style-type: none"> <li>◦ Recent activities (recent ODLs),</li> <li>◦ Upcoming activities ( appointments, actions, Action plan assessment)</li> </ul> </li> </ul>
<b>Parent</b>	-
<b>Included sub-use cases</b>	UC-4.2.1 Presentation of Trends and Visualization of Self-management Services
<b>Extended sub-use cases</b>	-
<b>Scope</b>	PHRS, PHA, Security Module
<b>Actor(s)</b>	Patient, Medical Professional, System Administrator
<b>Goal</b>	To display and navigate EMPOWER Dashboard and menus

<b>Trigger</b>	<ul style="list-style-type: none"> <li>The PHRS or PHA might provide an application dependent trigger – this depends on how the PHRS or PHA integrates the navigation services.</li> <li>Triggered by EMPOWER User</li> <li>Process model might indicate when to display the view (web flow rule) and what view is appropriate for the user role (rule)</li> </ul>		
<b>Frequency</b>	Frequent – common widget in all user interfaces		
<b>Pre-conditions</b>	EMPOWER user logged in.		
<b>Post-conditions</b>	Indicate system status or login status. (If failures, provide alternate view informing user of the problem and how to resolve)		
<b>Success Post-conditions</b>	EMPOWER User views the default EMPOWER dashboard and menu options appropriate for their device and application scope e.g. PHRS		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>Application displays a dashboard and menu options to the EMPOWER user depending on the user type.</li> <li>A patient receives a default view depending on the application. In the PHRS the user might view the default Action Plan View.</li> <li>Patient may next choose a menu item.</li> </ol> <p>Alternate: If the EMPOWER user has a Medical professional role, then an appropriate Dashboard and menu options are displayed</p>		
<b>Extensions</b>	Maybe there will be additional / several views for the dashboard depending on role of EMPOWER user (patient, medical professional, System Administrator)		
<b>Open Issues</b>	<p>A. Dashboard default view for family member when viewing patient information</p> <p>B. Dashboard default view for medical professionals</p> <p>The family member accessing the EMPOWER user data must affect all user interfaces</p>		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	June 4,2012	SRFG	initial

#### 8.4.8 UC-4.1.6 Patient Receives Messages

<b>UC-4.1.6</b>	<b>Patient receives messages</b>
<b>Description</b>	<p>Patient – Medical Professional communication is essential for the improvement of the patient's condition. Effective communication is proven to improve patient satisfaction and safety as well as better health outcomes and lower costs. Therefore, it should be facilitated. Sending messages to patients supports treatment and reduces the need for frequent hospital visits.</p> <p>In addition to this communication, in the execution of an action plan, several messages, alerts and reminders will be sent to the patient by the Action Plan Engine.</p>

<b>Parent</b>	UC-4.1.2 Manage EMPOWER Inbox UC-5.3.5 System Reminds Patient to Take Medications or for Upcoming Visits and Tests		
<b>Included sub-use cases</b>	-		
<b>Extended sub-use cases</b>	-		
<b>Scope</b>	PHRS/PHA, Action Plan Engine		
<b>Actor(s)</b>	Patient		
<b>Goal</b>	The patient reads messages		
<b>Trigger</b>	The patient triggers the Received Messages		
<b>Frequency</b>	The more Medical Professionals the patient has given consent to the more frequently she will receive messages.		
<b>Pre-conditions</b>	In order to receive messages the patient has to give consent to Medical Professionals.		
<b>Post-conditions</b>	The patient receives new messages coming from supervising Medical Professionals.		
<b>Success Post-conditions</b>	The patient receives and reads new messages, or browses through old ones.		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The patient logs in to the PHA or PHRS.</li> <li>2. The patient taps on the Received Messages option.</li> <li>3. The patient is shown all inbox messages, both read and unread.</li> <li>4. She taps on a mail message.</li> <li>5. Then, she reads the message</li> <li>6. She returns to inbox and possibly continues reading more messages.</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 8, 2012</i>	<i>ICOM</i>	<i>Initial version</i>

## 8.5 Task 4.2 Use Cases “Trends and Visualisation of Self-management Services”

### 8.5.3 UC-4.2.1 Presentation of Trends and Visualization of Self-management Services

<b>UC-4.2.1</b>	Presentation of Trends and Visualization of Self-management Services
-----------------	--



<b>Description</b>	<p>To provide efficient data and trend analysis functionality, the medical data should be presented in the optimal way for all users of a system. Enabling various views on the data supports different user perspectives and usage of multiple devices in a flexible and user-friendly way.</p> <p>The medical professionals or patients query a PHR to display trends of medical data in a required format. Patient can access the trend analysis services from his/her mobile device or at the information kiosk. The PHR displays information according to the predefined templates for each group of users (medical professionals, patients). The data presentation is adapted to the specific resources (e.g. screen size) of display devices as well.</p>
<b>Parent</b>	UC-4.2.3 Present ODL Graphs
<b>Included sub-use cases</b>	<p>UC-4.2.1.1 Presentation of Trends and Visualization of Self-management Services for the patients</p> <p>UC-4.2.1.2 Presentation of Trends and Visualization of Self-management Services for the medical professionals</p> <p>UC-5.4.8 Retrieve PHR Data from the used PHR System for the EMPOWER Components</p> <p>UC-4.3.8 Send Audit Record</p>
<b>Extended sub-use cases</b>	-
<b>Scope</b>	Reporting Module, PHA
<b>Actor(s)</b>	Medical Professional, Patient
<b>Goal</b>	To provide user with the relevant trends in an efficient format
<b>Trigger</b>	This use case is triggered by the Medical Professional or a Patient.
<b>Frequency</b>	The use case is a frequent use case. Trend visualization can be performed by users whenever using the software.
<b>Pre-conditions</b>	The user logs in to the PHR system and queries trends visualization
<b>Post-conditions</b>	Graphics are successfully shown to the user
<b>Success Post-conditions</b>	Graphics are successfully shown to the user
<b>Main Flow</b>	<ul style="list-style-type: none"> <li>• A user logs in to the PHR.</li> <li>• A user clicks a button to access the trends visualization section</li> <li>• User chooses a presentation template from the list of available templates</li> <li>• Graphics are displayed according to the predefined requirements A user changes the scale or range of the displayed graphics</li> <li>• A user can print the displayed information if a printing device is available</li> </ul>
<b>Extensions</b>	-
<b>Open Issues</b>	The type of graphic representations to be used still have to be defined

Version	Date	Author	Changes
0.2	June 13, 2012	HMGU	Replaced Trends with Graphics and Open Issue added

#### 8.5.3.1 UC-4.2.1.1 Presentation of Trends and Visualization of Self-management Services for the patients

<b>UC-4.2.1.1</b>	<b>Presentation of Trends and Visualization of Self-management Services for the patients</b>
<b>Description</b>	To provide efficient data and trend analysis functionality, the medical data should be presented in the optimal way for the patients. Patients can access trends on home desktop via internet, kiosk at the Medical Professional's office or hospital, or via a mobile phone.
<b>Parent</b>	UC-4.2.1 Presentation of Trends and Visualization of Self-management Services
<b>Included sub-use cases</b>	UC-5.4.8 Retrieve PHR Data from the used PHR System for the EMPOWER Components UC-4.3.8 Send Audit Record
<b>Extended sub-use cases</b>	-
<b>Scope</b>	Reporting Module, PHA
<b>Actor(s)</b>	Patient
<b>Goal</b>	To provide patients with the relevant trends in an efficient format
<b>Trigger</b>	This use case is triggered by a Patient.
<b>Frequency</b>	The use case is a frequent use case. Trend visualization can be performed by users whenever using the software.
<b>Pre-conditions</b>	The user logs in to the PHR or PHA system and queries trends visualization
<b>Post-conditions</b>	Trends are successfully shown to the patient
<b>Success Post-conditions</b>	Trends are successfully shown to the patient
<b>Main Flow</b>	<ul style="list-style-type: none"> <li>• A patient logs in to the PHR/PHA.</li> <li>• A patient clicks a button to access the trends visualization section</li> <li>• A patient chooses a presentation template from the list of available templates</li> <li>• Graphics are displayed according to the predefined requirements A patient changes the scale or range of the displayed graphics</li> <li>• A patient can print the displayed information if a printing device is available</li> </ul>
<b>Extensions</b>	-
<b>Open Issues</b>	-

Version	Date	Author	Changes
0.2	June 13, 2012	HMGU	Sub-usecases for kiosk, desktop and mobile removed, Main Flow tidied up.

#### 8.5.3.1.1 UC-4.2.1.1.1 Presentation of Trends and Visualization of measured and threshold glucose values for the patients

<b>UC-4.2.1.1.1</b>	<b>Presentation of Trends and Visualization of measured and threshold glucose values for the patients</b>
<b>Description</b>	A graph should be displayed that visualizes the measured and the threshold glucose values in a simplified form in order to be intuitively understood by the patient. The threshold values should be defined by the doctor..
<b>Parent</b>	UC-4.2.1 Presentation of Trends and Visualization of Self-management Services
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	UC-4.2.1.1 Presentation of Trends and Visualization of Self-management Services for the patients
<b>Scope</b>	Reporting Module, PHA
<b>Actor(s)</b>	Patient
<b>Goal</b>	To provide patients with a optimized display of their glucose measurements and the threshold values.
<b>Trigger</b>	This use case is triggered by a patient.
<b>Frequency</b>	The use case is a frequent use case. Trend visualization can be performed by users whenever using the software.
<b>Pre-conditions</b>	The user logs into the PHR or PHA system and queries trends' visualization, relevant data is available, the doctor has entered a valid threshold value.
<b>Post-conditions</b>	Trends are successfully shown to the patient
<b>Success Post-conditions</b>	Trends are successfully shown to the patient
<b>Main Flow</b>	<ul style="list-style-type: none"> <li>• A patient logs in to the PHR/PHA.</li> <li>• A patient clicks a button to access the trends' visualization section</li> <li>• A patient chooses a presentation template from the list of available templates</li> <li>• Graphics are displayed according to the predefined requirements A patient changes the scale or range of the displayed graphics</li> <li>• A patient can print the displayed information if a printing device is available</li> </ul>
<b>Extensions</b>	-

<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>August 09, 2012</i>	<i>HMGU</i>	<i>Creation of extending sub-use case</i>

#### 8.5.3.1.2 UC-4.2.1.1.2 Presentation of Trends and Visualization of pulse and stress level values for the patients

<b>UC-4.2.1.1.2</b>	<b>Presentation of Trends and Visualization of pulse and stress level values for the patients</b>
<b>Description</b>	A graph should be displayed that visualizes the pulse and stress level values in simplified form in order to be intuitively understood by the patient.
<b>Parent</b>	UC-4.2.1 Presentation of Trends and Visualization of Self-management Services
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	UC-4.2.1.1 Presentation of Trends and Visualization of Self-management Services for the patients
<b>Scope</b>	Reporting Module, PHA
<b>Actor(s)</b>	Patient
<b>Goal</b>	To provide patients with an optimized display of their pulse and stress level values.
<b>Trigger</b>	This use case is triggered by a patient.
<b>Frequency</b>	The use case is a frequent use case. Trend visualization can be performed by users whenever using the software.
<b>Pre-conditions</b>	The user logs into the PHR or PHA system and queries trends' visualization, relevant data is available.
<b>Post-conditions</b>	Trends are successfully shown to the patient
<b>Success Post-conditions</b>	Trends are successfully shown to the patient
<b>Main Flow</b>	<ul style="list-style-type: none"> <li>• A patient logs into the PHR/PHA.</li> <li>• A patient clicks a button to access the trends visualization section</li> <li>• A patient chooses a presentation template from the list of available templates</li> <li>• Graphics are displayed according to the predefined requirements A patient changes the scale or range of the displayed graphics</li> <li>• A patient can print the displayed information if a printing device is available</li> </ul>
<b>Extensions</b>	-

<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>August 09, 2012</i>	<i>HMGU</i>	<i>Creation of extending sub-use case</i>

#### 8.5.3.2 UC-4.2.1.2 Presentation of Trends and Visualization of Self-management Services for the medical professionals

<b>UC-4.2.1.2</b>	<b>Presentation of Trends and Visualization of Self-management Services for the Medical Professionals</b>
<b>Description</b>	To provide efficient data and trend analysis functionality the medical data should be presented in the optimal way for the Medical Professionals. Medical Professionals access the trend analysis services via desktop web-application.
<b>Parent</b>	UC-4.2.1 Presentation of Trends and Visualization of Self-management Services
<b>Included sub-use cases</b>	UC-5.4.8 Retrieve PHR Data from the used PHR System for the EMPOWER Components UC-4.3.8 Send Audit Record
<b>Extended sub-use cases</b>	-
<b>Scope</b>	Reporting Module
<b>Actor(s)</b>	Medical Professional
<b>Goal</b>	To provide health professionals with the relevant trends in an efficient format
<b>Trigger</b>	This use case is triggered by a medical professional.
<b>Frequency</b>	The use case is a frequent use case. Trend visualization can be performed by users on whenever using the software.
<b>Pre-conditions</b>	The user logs in to the PHR system and queries trends visualization
<b>Post-conditions</b>	Graphics are successfully shown to the Medical Professional
<b>Success Post-conditions</b>	Graphics are successfully shown to the Medical Professional
<b>Main Flow</b>	<ul style="list-style-type: none"> <li>• A Medical Professional opens a web-browser</li> <li>• A Medical Professional logs in to the PHR.</li> <li>• A Medical Professional clicks a button to access the trends visualization section</li> <li>• A Medical Professional chooses a presentation template from the list of available templates</li> <li>• Graphics are displayed according to the predefined requirements</li> <li>• A Medical Professional can change the scale or range of the displayed graphics</li> <li>• A Medical Professional can print the displayed information if a</li> </ul>

	printing device is available		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.2</b>	<i>June 13, 2012</i>	<i>HMGU</i>	<i>replace trends by graphics, Main Flow tidied up</i>

8.5.3.2.1 UC-4.2.1.2.1 Presentation of Trends and Visualization of measured and threshold glucose values for the medical professionals

<b>UC-4.2.1.2.1</b>	<b>Presentation of Trends and Visualization of measured and threshold glucose values for the medical professionals</b>
<b>Description</b>	A graph should be displayed that visualizes the measured in comparison to the threshold glucose values. The threshold value should be defined by the doctor. Visualized data may be extended according to the requirements.
<b>Parent</b>	UC-4.2.1 Presentation of Trends and Visualization of Self-management Services
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	UC-4.2.1.2 Presentation of Trends and Visualization of Self-management Services for the medical professionals
<b>Scope</b>	Reporting Module
<b>Actor(s)</b>	Medical Professional
<b>Goal</b>	To provide health professionals with the display of the measurements and the threshold values for the specific patient.
<b>Trigger</b>	This use case is triggered by a medical professional.
<b>Frequency</b>	The use case is a frequent use case. Trend visualization can be performed by users on whenever using the software.
<b>Pre-conditions</b>	The user logs into the PHR system and queries trends visualization, relevant data is available.
<b>Post-conditions</b>	Graphics are successfully shown to the Medical Professional
<b>Success Post-conditions</b>	Graphics are successfully shown to the Medical Professional
<b>Main Flow</b>	<ul style="list-style-type: none"> <li>• A Medical Professional opens a web-browser</li> <li>• A Medical Professional logs into the PHR.</li> <li>• A Medical Professional clicks a button to access the trends visualization section</li> <li>• A Medical Professional chooses a presentation template from the list of available templates</li> <li>• Graphics are displayed according to the predefined requirements</li> </ul>

	<ul style="list-style-type: none"> <li>• A Medical Professional can change the scale or range of the displayed graphics</li> <li>• A Medical Professional can print the displayed information if a printing device is available</li> </ul>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>August 09, 2012</i>	<i>HMGU</i>	<i>Creation of extending sub-use case</i>

#### 8.5.3.2.2 UC-4.2.1.2.2 Presentation of Trends and Visualization of glucose and mood values for the medical professionals

<b>UC-4.2.1.2.1</b>	<b>Presentation of Trends and Visualization of glucose and mood values for the medical professionals</b>
<b>Description</b>	A graph should be displayed that visualizes the glucose and mood values. These could be utilized by the physicians to get a hint at a depression or to get additional information on the interpretation of the glucose values
<b>Parent</b>	UC-4.2.1 Presentation of Trends and Visualization of Self-management Services
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	UC-4.2.1.2 Presentation of Trends and Visualization of Self-management Services for the medical professionals
<b>Scope</b>	Reporting Module
<b>Actor(s)</b>	Medical Professional
<b>Goal</b>	To provide health professionals with a visualization of the glucose and mood values of the specific patient.
<b>Trigger</b>	This use case is triggered by a medical professional.
<b>Frequency</b>	The use case is a frequent use case. Trend visualization can be performed by users whenever using the software.
<b>Pre-conditions</b>	The user logs into the PHR system and queries trends visualization, relevant data is available.
<b>Post-conditions</b>	Graphics are successfully shown to the medical professional
<b>Success Post-conditions</b>	Graphics are successfully shown to the Medical Professional
<b>Main Flow</b>	<ul style="list-style-type: none"> <li>• A Medical Professional opens a web-browser</li> <li>• A Medical Professional logs in to the PHR.</li> <li>• A Medical Professional clicks a button to access the trends visualization section</li> <li>• A Medical Professional chooses a presentation template from the</li> </ul>

	list of available templates <ul style="list-style-type: none"> <li>• Graphics are displayed according to the predefined requirements</li> <li>• A Medical Professional can change the scale or range of the displayed graphics</li> <li>• A Medical Professional can print the displayed information if a printing device is available</li> </ul>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>August 09, 2012</i>	<i>HMGU</i>	<i>Creation of extending sub-use case</i>

8.5.3.2.3 UC-4.2.1.2.3 Presentation of Trends and Visualization of pulse and stress level values for the medical professionals

<b>UC-4.2.1.2.3</b>	<b>Presentation of Trends and Visualization of pulse and stress level values for the medical professionals</b>
<b>Description</b>	A graph should be displayed that visualizes the pulse and stress level values.
<b>Parent</b>	UC-4.2.1 Presentation of Trends and Visualization of Self-management Services
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	UC-4.2.1.2 Presentation of Trends and Visualization of Self-management Services for the medical professionals
<b>Scope</b>	Reporting Module
<b>Actor(s)</b>	Medical Professional
<b>Goal</b>	To provide health professionals with a visualization of the pulse and stress level values of the specific patient.
<b>Trigger</b>	This use case is triggered by a medical professional.
<b>Frequency</b>	The use case is a frequent use case. Trend visualization can be performed by users on whenever using the software.
<b>Pre-conditions</b>	The user logs into the PHR system and queries trends visualization, relevant data is available.
<b>Post-conditions</b>	Graphics are successfully shown to the medical professional
<b>Success Post-conditions</b>	Graphics are successfully shown to the medical professional
<b>Main Flow</b>	<ul style="list-style-type: none"> <li>• A Medical Professional opens a web-browser</li> <li>• A Medical Professional logs in to the PHR.</li> </ul>



	<ul style="list-style-type: none"> <li>• A Medical Professional clicks a button to access the trends visualization section</li> <li>• A Medical Professional chooses a presentation template from the list of available templates</li> <li>• Graphics are displayed according to the predefined requirements</li> <li>• A Medical Professional can change the scale or range of the displayed graphics</li> <li>• A Medical Professional can print the displayed information if a printing device is available</li> </ul>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	August 09, 2012	HMGU	Creation of extending sub-use case

#### 8.5.4 UC-4.2.2 Creating a visual template

<b>UC-4.2.2</b>	Creating a visual template
<b>Description</b>	A template designer module provides an interface to modify templates that enable a customizable user interface and allow different views on the data for different user groups. This way several visual templates that define the content to be displayed to the users as well as the layout options can be created and modified,
<b>Parent</b>	-
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	-
<b>Scope</b>	Reporting Module
<b>Actor(s)</b>	Medical Professional, Knowledge Worker
<b>Goal</b>	To provide user with functionality to define templates for the medical data visualization.
<b>Trigger</b>	This use case is triggered by the Medical Professional or Knowledge Worker.
<b>Frequency</b>	The use case is not a frequent use case. Templates are designed usually during the implementation of the system and may be adapted later in rare cases only.
<b>Pre-conditions</b>	The user logs in to the PHR system and selects the template design function
<b>Post-conditions</b>	Visual templates are designed and stored on the system
<b>Success</b>	Templates are successfully saved and can be used within the visualization

<b>Post-conditions</b>	services		
<b>Main Flow</b>	<ul style="list-style-type: none"> <li>• A user logs in to the PHR.</li> <li>• A user clicks a button to access the template designer</li> <li>• A user selects the data fields to be included in the template</li> <li>• A user chooses layout options for the template</li> <li>• A user gets a preview of the applied template on the screen</li> <li>• A user saves the template to the system</li> </ul>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 13, 2012</i>	<i>HMGU</i>	<i>Initial version</i>

### 8.5.5 UC-4.2.3 Present ODL Graphs

<b>UC-4.2.3</b>	<b>Present ODL Graphs (the system presents graphical representation of glucose levels, weight and exercise results in selected time interval)</b>
<b>Description</b>	The patient can scroll through graphs and see her progress in time. The more measurements she has fed the system the more detailed the graph is. Each graph represents the time progress of one measurement. The patient can select which measurement to view each time by choosing the measurement's name from a drop-down list. She can also specify a time interval based on the date each measurement has been inserted.
<b>Parent</b>	-
<b>Included sub-use cases</b>	UC-4.2.1 Presentation of Trends and Visualization of Self-management Services
<b>Extended sub-use cases</b>	-
<b>Scope</b>	PHRS/PHA, Reporting Module
<b>Actor(s)</b>	Patient
<b>Goal</b>	The patient should see a graph of the measurements she has previously logged into the system.
<b>Trigger</b>	The patient triggers this UC
<b>Frequency</b>	Several times a week
<b>Pre-conditions</b>	The patient has fed the system with previous measurements related to the observed entity.
<b>Post-conditions</b>	A graph showing the dates and values of the patient's measurements related to the observed entity
<b>Success Post-conditions</b>	The patient views the measurements graph.

<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The patient logs in to the PHRS/PHA.</li> <li>2. The patient taps on the Measurements option from the application's menu.</li> <li>3. The patient selects the type of measurements from a predefined list.</li> <li>4. The patient views existing measurements of the selected type</li> <li>5. The patient taps on a "Graph" icon present in the same page A new page lets the patient define the time window for which results should be depicted, and, following this; a "Submit" button should be hit.</li> <li>6. A graph is generated and presented in accordance with the values defined in step 6.</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.2</b>	<i>June 22, 2012</i>	<i>ICOM</i>	<i>Modification of the main flow</i>

## 8.6 Task 4.3 Use Cases "Patient Consent Management and Security"

### 8.6.3 UC-4.3.1 Manage Patient Consent

<b>UC-4.3.1</b>	<b>Manage Patient Consent</b>
<b>Description</b>	<p>The Patient Consent Editor is the central tool for the Patient to manage who will have access to which information in his PHR system. This comprise e.g.</p> <ul style="list-style-type: none"> <li>- To grant/deny the access for medical persons to ODL results, including evaluations and trends</li> <li>- To grant/deny the access for other persons (e.g. family members) to view / add / modify /delete PHR data</li> <li>- To review incoming requests from other EMPOWER users (e.g. Doctor) for access to a resource type or a specific resource e.g. the user shares a reference to a resource with a doctor. The request is received in the inbox; however, the Consent tool should show these requests so that the user can act upon them.</li> </ul> <p>Additionally, the Patient can configure which applications are allowed to import data into the PHRS, e.g.</p> <ul style="list-style-type: none"> <li>- To grant/deny the import of EHR data from the EHR/PHR Data Manager</li> <li>- To grant/deny the import of PHR data from ODL services</li> </ul> <p>This use case is web-based.</p> <p>Alternative (web based or from configuration module) System manager or configuration indicates which services can do what, e.g.</p>

	allow ODL Collector, PHA or PHRS read/write patient info; Patients then only view the applications/services and their possible access options allowed by the system. For example, a service might send ODL messages from a provider, but the system doesn't allow that service to read the patient information, only post entries.
<b>Parent</b>	-
<b>Included sub-use cases</b>	UC-4.3.1.1 Patient Gives Consent to Medical Professional Using the Consent Editor Tool UC-4.3.1.2 Patient Removes Medical Professional from the "Given Consent" List UC-4.3.1.3 Grant or Deny Access to Patient Data based on Consent UC-4.3.8 Send Audit Record
<b>Extended sub-use cases</b>	-
<b>Scope</b>	Consent Management
<b>Actor(s)</b>	Patient, System Administrator
<b>Goal</b>	To enable the patient to control access to their information by services (applications) and users. To enable the System administrator to manage service/application access control.
<b>Trigger</b>	The use case is triggered by the Patient.
<b>Frequency</b>	The use case is a rare use case.
<b>Pre-conditions</b>	The Patient is logged in and opens the Consent Editor.
<b>Post-conditions</b>	The Patient has updated the Consent Editor settings.
<b>Success Post-conditions</b>	Changes are stored persistently.
<b>Main Flow</b>	<p>(1) The Patient logs in to the PHRS</p> <p>(2) The Patient clicks the Patient Consent Editor</p> <p>(3) The user views an interface that displays current settings, latest changes and a menu bar that includes option to view history of changes, options to modify their consent settings.</p> <p>(4) The patient chooses to modify Consent Settings. This comprises</p> <ul style="list-style-type: none"> <li>To grant/deny the access for other EMPOWER users to view / add / modify /delete PHR data</li> <li>To grant/deny the access to other EMPOWER users to view results (e.g. trends)</li> <li>To grant/deny to other EMPOWER users the import of EHR data</li> <li>To grant/deny the import of PHR data from ODL services</li> </ul> <p>(5) The Patient saves the changes</p> <p>There should be easy ways to assign access rules, for example display a complete readable sentence for each consent statement.</p> <p>Alternative:</p>

	System manager or configuration indicates which services can do what, e.g. allow ODL collector PHA or PHRS read/write patient info. Patients then only view the applications/services and their access options allowed.		
<b>Extensions</b>	When the user creates a mail message and shares a reference to a resource, then the default read access is automatically assigned. No new request message is sent to the inbox.		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	<i>June 4,2012</i>	SRFG	Initial version

#### 8.6.3.1 UC-4.3.1.1 Patient Gives Consent to Medical Professional Using the Consent Editor Tool

<b>UC-4.3.1.1</b>	<b>Patient gives consent to medical professional using the Consent Editor Tool</b>
<b>Description</b>	Medical data are strictly confidential. The only ones allowed to have access are the patient's Medical Professional. In a medical application the patient gives consent to Medical Professional to reach her medical data. The Consent Editor includes a list of hospitals and Medical Professional which are involved in the EMPOWER system.
<b>Parent</b>	UC-4.3.1 Manage Patient Consent
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	-
<b>Scope</b>	Consent Management (Consent Editor)
<b>Actor(s)</b>	Patient
<b>Goal</b>	The patient provides access to her PHR data to her supervising Medical Professional.
<b>Trigger</b>	The patient triggers the Consent Editor
<b>Frequency</b>	Before attending a visit with a Medical Professional for the first time, the patient should give him access to her medical data. Usually patients prefer to stick with a Medical Professional, thus giving consent to a new Medical Professional is a rare case.
<b>Pre-conditions</b>	The patient logs in to the PHA.
<b>Post-conditions</b>	The patient gives consent to a Medical Professional.
<b>Success Post-conditions</b>	The patient successfully gives consent to a Medical Professional and the Medical Professional is allowed to view the patient's PHR data.
<b>Main Flow</b>	1. The patient logs in to the PHA or PHR System.

	<ol style="list-style-type: none"> <li>2. The patient taps on the Consent Editor.</li> <li>3. The patient views the list of Medical Professional she has previously given consent to.</li> <li>4. The patient selects to give consent to a new Medical Professional.</li> <li>5. The list of medical hospitals is displayed. The patient chooses the hospital in which their Medical Professional works.</li> <li>6. The list of Medical Professional working in the selected hospital is displayed.</li> <li>7. The patient selects a Medical Professional from the list.</li> <li>8. Finally, the patient hits the give consent button.</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	The question is how we acquire the list and information of available Medical Professionals and hospitals.		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 8, 2012</i>	<i>ICOM</i>	<i>Initial version</i>

## 8.6.3.2 UC-4.3.1.2 Patient Removes Medical Professional from the “Given Consent” List

<b>UC-4.3.1.2</b>	<b>Patient removes Medical Professional from the “Given Consent” list</b>
<b>Description</b>	The patient should be able to remove the names of Medical Professionals she has previously given consent to.
<b>Parent</b>	UC-4.3.1 Manage Patient Consent
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	-
<b>Scope</b>	Consent Management (Consent Editor)
<b>Actor(s)</b>	Patient
<b>Goal</b>	To remove the Medical Professional from the consent list.
<b>Trigger</b>	The patient triggers this use case.
<b>Frequency</b>	Whenever a treatment is completed or a patient decides she should stop visiting a Medical Professional for any reason.
<b>Pre-conditions</b>	The patient logs in to the EMPOWER system. The patient should have previously given consent to the Medical Professional.
<b>Post-conditions</b>	The Medical Professional’s name is removed from the “Given Consent” list.
<b>Success Post-conditions</b>	The Medical Professional is no longer included in the “Given Consent” list, but the name of the Medical Professional can still be found in the list of names to give consent to.

<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The patient logs in to the EMPOWER system.</li> <li>2. The patient taps on the Consent Editor.</li> <li>3. The patient views the list of Medical Professional she has previously given consent to.</li> <li>4. The patient selects the Medical Professional's name to be deleted from the list.</li> <li>5. Finally, she taps on the delete button and confirms the deletion.</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 8, 2012</i>	<i>ICOM</i>	<i>Initial version</i>

## 8.6.3.3 UC-4.3.1.3 Grant or Deny Access to Patient Data based on Consent

<b>UC-4.3.1.3</b>	Grant or Deny Access to Patient Data based on Consent		
<b>Description</b>	When there is an attempt to patient data in PHR from either other users or other components of the EMPOWER system, the consent will be given based on the patient consent.		
<b>Parent</b>	UC-4.3.1 Manage Patient Consent		
<b>Included sub-use cases</b>	-		
<b>Extended sub-use cases</b>	-		
<b>Scope</b>	Consent Management (Consent Engine)		
<b>Actor(s)</b>	All EMPOWER Users and Components		
<b>Goal</b>	To grant or deny data access.		
<b>Trigger</b>	Data access attempt triggers this use case.		
<b>Frequency</b>	This use case is a very frequent use case.		
<b>Pre-conditions</b>	The patient logs in to the EMPOWER system. The patient should have previously given consent to the Medical Professional.		
<b>Post-conditions</b>	The access is either granted or denied.		
<b>Success Post-conditions</b>	The access is either granted or denied.		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The user or component tries to reach patient data.</li> <li>2. Consent Engine retrieves the consent rules of the patient.</li> <li>3. Consent Engine will decide whether to grant or deny the access based on the role of the accessing party and the consent rules of the patient.</li> </ol>		
<b>Extensions</b>	-		

<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 8, 2012</i>	<i>ICOM</i>	<i>Initial version</i>

#### 8.6.4 UC-4.3.2 Find Contact Information from EMPOWER White pages

<b>UC-4.3.2</b>	<b>Find Contact Information from EMPOWER White Pages</b>
<b>Description</b>	<p>The Patient can find a contact in a list of available Medical Professionals from institutions, and self-help groups. E.g. for relating the treating Medical Professional to an appointment in the Action Plan.</p> <p>Process engine requires contact information and shares with applications.</p> <ul style="list-style-type: none"> <li>• Medical professionals MUST have associated group or institution</li> <li>• Personal info can include email, name, phone numbers EMPOWER user reference, EMPOWER terminology for role and other categorization</li> <li>• Group info can include name, contact person and email and phone, web site, and categorized with EMPOWER terminology for categorization</li> <li>• Dependent on Manage/Access Contact for institution or groups</li> <li>• For medical professionals, authority lists are needed for person and EMPOWER role.</li> </ul> <p>Required by Process engine models, Action Plan, PHR/PHRS, Security/Authentication and Authorization</p> <p>User or service can provide contact information. Contact information and role and institution should be validated for medical professionals</p>
<b>Parent</b>	-
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	-
<b>Scope</b>	Pathway Engine, Security, PHRS
<b>Actor(s)</b>	Patient, Medical Professional
<b>Goal</b>	To help the patient find contact information of medical professionals and groups supporting the patient.
<b>Trigger</b>	User selects option to look up.
<b>Frequency</b>	Not frequent, when patient updates their contact list
<b>Pre-conditions</b>	White pages directory of medical and group contacts is available for the particular pilot application or test/demo environment
<b>Post-conditions</b>	User receives overview of search status.
<b>Success</b>	A result list is present to the user. The user might select one.



<b>Post-conditions</b>			
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. User opens search option</li> <li>2. User views search form</li> <li>3. User submits form</li> <li>4. User receives result status and result list</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	For medical professionals, authority lists are needed for person and EMPOWER role. How can authority lists be created, certified and imported?		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 14,2012</i>	<i>SRFG</i>	<i>initial</i>

### 8.6.5 UC-4.3.3 Create EMPOWER User

<b>UC-4.3.3</b>	<b>Create EMPOWER User</b>
<b>Description</b>	This can be considered a federated user that is needed by the core system. This is required for the internal EMPOWER components especially the Pathway Engine. The EMPOWER user can be associated with many identities from EHRS, PHRS/PHAs. For the PHRS, the EMPOWER user should be associated with the PHRS user.
<b>Parent</b>	-
<b>Included sub-use cases</b>	UC-4.3.8 Send Audit Record
<b>Extended sub-use cases</b>	UC-4.3.4 Patient Inserts/Modifies Contact Info UC-4.3.5 Manage Patient Profile and Settings
<b>Scope</b>	Security, Pathway Engine, PHRS/PHA
<b>Actor(s)</b>	System Administrator
<b>Goal</b>	To create an EMPOWER user that is used by the EMPOWER system to associate the EMPOWER user identity to external identities, in particular: Medical identities for patient, medical professionals.
<b>Trigger</b>	<p>The triggers:</p> <ol style="list-style-type: none"> <li>1. Import of medical or patient from institutions via Identity Provider. The import trigger might be done manually or security: identity provider listens for changes to a data source of identities.</li> <li>2. A PHRS mechanism creates EMPOWER user with associated medical identity.</li> <li>3. A Test or Simulation triggers the creation and association of an identity.</li> <li>4. Trigger update of EMPOWER user if medical identity is removed from Identity provider.</li> </ol>
<b>Frequency</b>	Upon changes from identity provider
<b>Pre-conditions</b>	1. For medical professionals, their identities including role must be available and trustable.

	2. For patients, identity sources are preferable from PHRS, or other source.		
<b>Post-conditions</b>	User created and associated with appropriate EMPOWER Identity.		
<b>Success Post-conditions</b>	<ul style="list-style-type: none"> <li>- Create EMPOWER user with associated medical identity</li> <li>- Create EMPOWER user</li> <li>- Create default settings</li> <li>- Assign property to indicated status of associated medical identity or if identity removed.</li> <li>- Notify Pathway Engine of changes</li> <li>- Notify EMPOWER user inbox of changes</li> </ul>		
<b>Main Flow</b>	1) The PHRS access patient identity information as basic setup for creating an EMPOWER user. That info might be derived from the existing PHRS users, from a patient identity provider, from white pages or other source of medical professionals.		
<b>Extensions</b>	-		
<b>Open Issues</b>	<p>The architecture might include multiple identity providers. Should the PHRS also provide an identity provider?</p> <p>What is the relationship between the EMPOWER user and the PHRS user? How can we trigger import of patient identities? How can medical identity be assigned later to the EMPOWER user? Currently we need the identity provider.</p> <p>Deactivate EMPOWER user if identity is removed (missing), notify user and components.</p> <p>Creating a user from a PHRS requires that we associate the user to an identity provider supporting patients and medical.</p> <p>Consider a process model to handle creation of EMPOWER user. Create with or without medical identity or if identity removed, etc.</p>		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	June 4,2012	SRFG	initial

#### 8.6.6 UC-4.3.4 Patient Inserts/Modifies Contact Info

<b>UC-4.3.4</b>	<b>Patient inserts/modifies contact info</b>
<b>Description</b>	Patient contact information is used by Medical Professionals and hospitals in order to reach the patient. Social Security number or Diabetes passport number should be inserted as well in order to identify the patient.
<b>Parent</b>	-
<b>Included sub-use cases</b>	UC-4.3.2 Find Contact Information

<b>Extended sub-use cases</b>	UC-4.3.5 Manage Patient Profile and Settings		
<b>Scope</b>	PHA, PHR system		
<b>Actor(s)</b>	Patient		
<b>Goal</b>	The patient modifies or inserts contact information.		
<b>Trigger</b>	The patient triggers this use case.		
<b>Frequency</b>	This use case is used when the patient logs in to the PHA for the first time. She can also modify her contact information whenever she wishes. Typically, the Contact Info use case is rarely used.		
<b>Pre-conditions</b>	The patient logs in to the PHR/PHA.		
<b>Post-conditions</b>	The new information is created/updated and stored persistently.		
<b>Success Post-conditions</b>	The new information is stored persistently and is accessible to the Medical Professional through the PHR system		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The patient logs in to the PHA/PHR.</li> <li>2. The patient taps on the Contact Info.</li> <li>3. The patient is prompted to a form.</li> <li>4. If she hasn't previously inserted any Contact Info all fields are blank. In case stored information exist in the database they appear in the corresponding fields.</li> <li>5. The patient either updates her contact information or inserts new data. She hits the submit button.</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	June 8, 2012	ICOM	Initial version

### 8.6.7 UC-4.3.5 Manage Patient Profile and Settings

<b>UC-4.3.5</b>	<b>Manage Patient Profile and Settings</b>
<b>Description</b>	<p>The Patient will be able to manage the user profile and configure the settings for the EMPOWER system and related applications. This includes:</p> <ul style="list-style-type: none"> <li>• User profile – including contact information, emergency info</li> <li>• Language</li> <li>• Maturity level – e.g. beginner or advanced user</li> <li>• Settings for the Action Plan</li> <li>• Possibly ODL settings</li> <li>• Settings that affect alerts and or reminders</li> </ul>

	<ul style="list-style-type: none"> <li>Other settings that affect the process mode and rules associate with the Pathway or Action Plan process models</li> </ul>		
<b>Parent</b>	-		
<b>Included sub-use cases</b>	UC-4.3.5.1 Select User Interface Language		
<b>Extended sub-use cases</b>	-		
<b>Scope</b>	PHRS/PHA		
<b>Actor(s)</b>	Patient		
<b>Goal</b>	To manage the Patient profile and EMPOWER settings		
<b>Trigger</b>	The use case is triggered by the Patient. The system creates default settings when the EMPOWER User is created.		
<b>Frequency</b>	The use case is a rare use case.		
<b>Pre-conditions</b>	The Patient is logged in.		
<b>Post-conditions</b>	Changes to Patient profile and settings are stored persistently.		
<b>Success Post-conditions</b>	Changes to Patient profile and settings are stored persistently.		
<b>Main Flow</b>	(1) The Patient clicks the Patient Profile and Settings (2) The Patient updates his profile. (3) The Patient updates his settings.		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 4,2012</i>	<i>SRFG</i>	<i>initial</i>

## 8.6.7.1 UC-4.3.5.1 Select User Interface Language

<b>UC-4.3.5.1</b>	<b>Select User Interface Language</b>
<b>Description</b>	The EMPOWER user can select an Interface language to change the default language based on the web browser. This choice is recorded in the user application preferences. The language selection should be visible on the User interfaces and preferably part of the EMPOWER dashboard or appropriate for the device or application. Obviously, the EMPOWER user cannot change the language if the language selection option is under application settings
<b>Parent</b>	UC-4.3.5 Manage Patient Profile and Settings
<b>Included sub-use cases</b>	-

<b>Extended sub-use cases</b>	-		
<b>Scope</b>	PHRS/PHA		
<b>Actor(s)</b>	Patient, Medical Professional		
<b>Goal</b>	User selects User interface language, Applications can access language in the user application profile		
<b>Trigger</b>	Triggered by the user		
<b>Frequency</b>	Not frequent, the web browser normally detects the language		
<b>Pre-conditions</b>	-		
<b>Post-conditions</b>	-		
<b>Success Post-conditions</b>	Language preference is stored in the EMPOWER user settings and available for EMPOWER components and applications. The application will determine how to		
<b>Main Flow</b>	1. User selects language from User interface (EMPOWER dashboard, etc.)  Alternate: 1. EMPOWER User opens application and application updates the language setting from the EMPOWER user setting otherwise the browser setting is used. 2. EMPOWER User does not change the language		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 4, 2012</i>	<i>SRFG</i>	<i>initial</i>

### 8.6.8 UC-4.3.6 Manage Identifiers for User Identity

<b>UC-4.3.6</b>	<b>Manage identifiers for user identity</b>
<b>Description</b>	<p>In this use case the identifiers in the identity providers of EHR, PHR and PHA systems are managed by the system administrator.</p> <p>There will be at least three identity providers (EHR system, PHRS system, and to support the PHAs). For the EHR identity provider, it should be possible to add additional identifiers to the user identity or to access a user identities based on alternative identifier (namespace and identifier). For the PHRS Identity provider, this might also be needed.</p> <p>The identity provider will be used both medical professionals and patients (when the patients tries to retrieve their data from the hospital or PHAs). It should be noted that PHRS can retrieve data only from PHAs that provides data in XPHR form and that provides an Identity Provider.</p>

<b>Parent</b>	-		
<b>Included sub-use cases</b>	-		
<b>Extended sub-use cases</b>	-		
<b>Scope</b>	Security, Identity Provider		
<b>Actor(s)</b>	System Administrator		
<b>Goal</b>	To add additional identifiers to associate user to the EMPOWER User and system.		
<b>Trigger</b>	<ul style="list-style-type: none"> <li>• System Administrator or permitted process submits identity association for the application or service.</li> <li>• Alternatively additional properties are added or updated by an administrator or process.</li> </ul>		
<b>Frequency</b>	As needed, not frequent.		
<b>Pre-conditions</b>	Existing EMPOWER User. Identity provider for that service or application (PHA, PHRS)		
<b>Post-conditions</b>	Identifiers include namespaces to associate with EMPOWER identifier		
<b>Success Post-conditions</b>	EMPOWER user identity is updated with new association		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. Service submits request to Identity Manager. The service might derived from a PHRS web form where the user adds identifiers</li> <li>2. Service is validated (permitted to perform requested task)</li> <li>3. Validate whether the new identifier is unique across all identities from this Identity provider.</li> <li>4. Identity manager updates EMPOWER user identity</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 4,2012</i>	<i>SRFG</i>	<i>initial</i>

### 8.6.9 UC-4.3.7 Authenticate User

<b>UC-4.3.7</b>	<b>Authenticate User</b>
<b>Description</b>	<p>The used PHR System has its own way of authentication of their users. In addition to this authentication, the following authentications should be performed:</p> <ul style="list-style-type: none"> <li>- When a patient wants to retrieve his/her EHR data, the patient should be authenticated on the EHR side.</li> <li>- A registered user, who claims to be a medical professional, should</li> </ul>

	also be authenticated. - When a patient wants to retrieve his/her PHR data from a PHA application, the patient should be authenticated on the EHR side. - Additionally, the PHR System itself should provide an Identity Provider to other PHAs, when the patient using the PHA wants to upload/retrieve PHR data. Please note that the used PHR System can retrieve data only from PHAs that provides data in XPHR form and that provides an Identity Provider.		
<b>Parent</b>	-		
<b>Included sub-use cases</b>	UC-4.3.8 Send Audit Record		
<b>Extended sub-use cases</b>	-		
<b>Scope</b>	Security		
<b>Actor(s)</b>	Patient, Medical Professional		
<b>Goal</b>	Authenticate the user on the EHR Side.		
<b>Trigger</b>	-		
<b>Frequency</b>	This use case is a frequent use case.		
<b>Pre-conditions</b>	The user is already registered to the PHR system.		
<b>Post-conditions</b>	Authentication status is communicated to user.		
<b>Success Post-conditions</b>	User is authenticated.		
<b>Main Flow</b>	1. The user logs in to the PHR System. 2. In case of an attempt either to access to patient data by a medical professional or to access EHR data by a patient, the user is redirected to Identity Provider of the EHR. 3. The user enters the credentials. 4. The Identity Provider authenticates the user and returns the result to PHR System.		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 19,2012</i>	<i>SRDC</i>	<i>initial</i>

### 8.6.10 UC-4.3.8 Send Audit Record

<b>UC-4.3.7</b>	<b>Send Audit Record</b>
-----------------	--------------------------

<b>Description</b>	<p>Each data exchange in the EMPOWER system is audited to enhance security of the system. The audit logs are sent from a client to Audit Record Repository according to Integrating the Healthcare Enterprise's (IHE) Audit Trail and Node Authentication (ATNA)<sup>5</sup> profile.</p> <p>Basically the following activities are audited:</p> <ul style="list-style-type: none"> <li>- Transfer of EHR data to PHR</li> <li>- Transfer of PHR data from a PHA to PHR</li> <li>- Authentication of a user</li> <li>- Reading a PHR of a diabetes patient from another consented user</li> </ul>
<b>Parent</b>	<p>UC-4.2.1 Presentation of Trends and Visualization of Self-management Services</p> <p>UC-4.3.1.3 Grant or Deny Access to Patient Data based on Consent</p> <p>UC-4.3.1.1 Patient Gives Consent to Medical Professional Using the Consent Editor Tool</p> <p>UC-4.3.1.2 Patient Removes Medical Professional from the "Given Consent" List</p> <p>UC-4.3.7 Authenticate User</p> <p>UC-5.2.3 Execute and Monitor Diabetes Guideline</p> <p>UC-5.3.4 Manage Actions of the Running Action Plan</p> <p>UC-6.4.1 Import EHR Data using IHE XPHR</p> <p>UC-6.4.2 Import EHR Data through epSOS Network</p> <p>UC-6.4.3 Import PHR Data using IHE XPHR</p> <p>UC-6.4.4 Export Data from PHR</p>
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	-
<b>Scope</b>	Audit Record Repository, Audit Trail/Log Sender
<b>Actor(s)</b>	PHR, PHA, EHR
<b>Goal</b>	To enhance security by providing audit logging mechanism.
<b>Trigger</b>	This use case is triggered upon exchange of EHR/PHR data, authentication of a user or reading of PHR data of a diabetes patient from another consented user.
<b>Frequency</b>	This use case is frequent use case.
<b>Pre-conditions</b>	<p>The preconditions for this use case are as follows:</p> <ul style="list-style-type: none"> <li>- Transfer of EHR data to PHR</li> <li>- Transfer of PHR data from a PHA to PHR</li> <li>- Authentication of a user</li> <li>- Reading a PHR of a diabetes patient from another consented user</li> </ul>
<b>Post-conditions</b>	The audit log is sent from the parties in the activity to the Audit Record Repository.
<b>Success</b>	The audit log is sent from the parties in the activity to the Audit Record

<sup>5</sup> [http://wiki.ihe.net/index.php?title=Audit\\_Trail\\_and\\_Node\\_Authentication](http://wiki.ihe.net/index.php?title=Audit_Trail_and_Node_Authentication)



<b>Post-conditions</b>	Repository.		
<b>Main Flow</b>	<ul style="list-style-type: none"> <li>- Upon finishing of the activity both parties send audit log to the Audit Record Repository.</li> <li>- The Audit Record Repository receives the audit log.</li> <li>- The System Administrator can examine the logs from the GUI of the Audit Record Repository.</li> </ul>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	June 19,2012	SRDC	initial

### 8.6.11 UC-4.3.9 Authenticate EMPOWER Component (Node) for Secure Channel

<b>UC-4.3.9</b>	Authenticate EMPOWER Component (Node) for Secure Channel
<b>Description</b>	The communication between the EMPOWER and external systems (PHA, EHR) will be through Secure Socket Layer which ensures confidentiality, integrity and authentication. The UC-4.3.7 Authenticate User use case is for the authentication of the patients and medical professionals. On the other hand, this use case is for the software. Like in the previous use case, Audit Trail and Node Authentication (ATNA) <sup>6</sup> profile will be used.
<b>Parent</b>	UC-6.4.1 Import EHR Data using IHE XPHR UC-6.4.2 Import EHR Data through epSOS Network UC-6.4.3 Import PHR Data using IHE XPHR
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	-
<b>Scope</b>	EMPOWER System and External Components
<b>Actor(s)</b>	EHR, PHR, PHA
<b>Goal</b>	To achieve confidentiality, integrity and authentication.
<b>Trigger</b>	This use case is triggered in the communication with external systems.
<b>Frequency</b>	This use case is a frequent use case.
<b>Pre-conditions</b>	The public/private keys and certificates of the parties are generated and distributed.
<b>Post-conditions</b>	The communication among the parties is secure.

<sup>6</sup> [http://wiki.ihe.net/index.php?title=Audit\\_Trail\\_and\\_Node\\_Authentication](http://wiki.ihe.net/index.php?title=Audit_Trail_and_Node_Authentication)

<b>Success Post-conditions</b>	The communication among the parties is secure.		
<b>Main Flow</b>	In this use case, the parties communicate over a secure channel.		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	June 19,2012	SRDC	initial

## 8.7 Task 5.2 Use Cases “Diabetes based Personalised Adaptive Recommender Engine”

### 8.7.3 UC-5.2.1 Create Machine Processable Diabetes Guideline

<b>UC-5.2.1</b>	<b>Create Machine Processable Diabetes Guideline</b>
<b>Description</b>	The knowledge workers create a new machine processable diabetes guideline graphically and save this guideline persistently. The knowledge workers can also search for existing guidelines and update the existing ones. The difference between diabetes guideline and machine processable diabetes guideline (MP-DG) is that the diabetes guideline is a textual description of a best practice in the diagnosis/treatment/monitoring of diabetes disease. On the other hand, the MP-DG is the machine processable version of these textual descriptions. When a MP-DG is created, the user (knowledge workers) cross checks the textual description of the corresponding diabetes guideline frequently.
<b>Parent</b>	-
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	-
<b>Scope</b>	MP-DG System
<b>Actor(s)</b>	Knowledge Worker
<b>Goal</b>	To create/update a diabetes guideline.
<b>Trigger</b>	This use case is triggered by the knowledge workers.
<b>Frequency</b>	The use case is a rare use case. Both the creation and modification of the MP-DG will be realized rarely. The guidelines show best practices in the medical domain and most of them are mature enough. Most of the time, there will be one MP-DG for each diabetes guideline and these MP-DGs are usually modified according to either requirements of a medical setting they are used or the condition of a specific patient. At the extreme case, if the diabetes guideline is updated, the corresponding MP-DG will be updated too.

<b>Pre-conditions</b>	<p>The knowledge workers logins to the PHR system and opens the MP-DG System.</p> <p>If the aim is modification of an existing MP-DG, the existing MP-DGs should be displayed to the user.</p> <p>The PHR System needs to identify the role of the logged in user and accordingly display the MP-DG System link.</p>		
<b>Post-conditions</b>	The MP-DG is successfully created/updated and stored persistently.		
<b>Success Post-conditions</b>	The created/updated MP-DG is stored persistently.		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The knowledge worker logins to the PHRS.</li> <li>2. The knowledge worker clicks the MP-DG System.</li> <li>3. The knowledge worker is displayed the existing MP-DGs.</li> <li>4. The knowledge worker performs either creation of a new MP-DG or update of an existing one.</li> <li>5. The selected (or an empty) MP-DG is displayed to the medical professional.</li> <li>6. The knowledge worker creates/updates the MP-DG graphically.</li> <li>7. The knowledge worker creates/updates the metadata about the MP-DG.</li> <li>8. The knowledge worker saves the MP-DG persistently. <ul style="list-style-type: none"> <li>o The knowledge worker can also cancel the creation or update process.</li> <li>o The knowledge worker does not have to finish the process in a single session. S/he can save her/his work and re-open it afterwards.</li> </ul> </li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	May 29, 2012	SRDC	Initial version

#### 8.7.4 UC-5.2.2 Assign Diabetes Guideline to Patient

<b>UC-5.2.2</b>	<b>Assign Diabetes Guideline to Patient</b>
<b>Description</b>	<p>In this use case, the medical professional assigns a MP-DG to an already registered diabetes patient. As mentioned in UC-5.2.1 “Create Machine Processable Diabetes Guideline”, when the medical professional logins to the PHR System and clicks the MP-DG System, the available MP-DGs will be displayed to the user. In this screen, the user will be able to select to assign one of these MP-DGs to a diabetes patient. For this action, the MP-DG System needs to reach the available diabetes patients (who have already given consent to the logged in medical professional).</p>
<b>Parent</b>	-
<b>Included sub-use cases</b>	-

<b>Extended sub-use cases</b>	-		
<b>Scope</b>	MP-DG System		
<b>Actor(s)</b>	Medical Professional		
<b>Goal</b>	To assign a MP-DG to a diabetes patient.		
<b>Trigger</b>	This use case is triggered by the Medical Professional.		
<b>Frequency</b>	The use case is executed frequently.		
<b>Pre-conditions</b>	<p>The medical professional logs in to the PHR system and opens the MP-DG System.</p> <p>The PHR System needs to identify the role of the logged in user and accordingly display the MP-DG System link.</p> <p>Before retrieving the diabetes patient lists from PHR System, the PHR System needs to verify the consent of the patients. In other words, the PHR system will deliver only the patients who have already given consent to the logged in medical professional.</p>		
<b>Post-conditions</b>	The MP-DG should be assigned to the diabetes patient and this assignment should be stored persistently.		
<b>Success Post-conditions</b>	The MP-DG should be assigned to the diabetes patient and this assignment should be stored persistently.		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The medical professional logs in to the PHRS.</li> <li>2. The medical professional clicks the MP-DG System.</li> <li>3. The medical professional is displayed the existing MP-DGs.</li> <li>4. The medical professional selects one of these MP-DGs and clicks the assign button. <ul style="list-style-type: none"> <li>○ In the background the MP-DG System connects to the PHR System and retrieves the diabetes patients that gave consent to the logged in medical professional.</li> </ul> </li> <li>5. The medical professional selects one of the diabetes patients.</li> <li>6. The medical professional selects the assign button to finish the assignment.</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	May 29, 2012	SRDC	Initial version

### 8.7.5 UC-5.2.3 Execute and Monitor Diabetes Guideline

<b>UC-5.2.3</b>	<b>Execute and Monitor Diabetes Guideline</b>
<b>Description</b>	In this use case, the medical professional executes a MP-DG for a patient. The medical professional will also be able to monitor the execution. All the results of the executed steps will be displayed to the user. At each step the decision of the medical professional will be taken and necessary consulting

	<p>windows through which input can be retrieved from the medical professional will be displayed in a user friendly manner. It should be noted the MP-DGs are long running processes. Therefore, the medical professional will not have to wait for the ending of the execution in one session. S/he will be able to leave the execution in running state and continue the execution later. Furthermore, there may be more than one execution of the same MP-DG for different patients and more than one MP-DG can be executed for the same diabetes patient. At MP-DG System's Recommender Engine component, all the status of executing MP-DGs which are initiated by the logged in medical professional will be displayed to the user.</p> <p>In addition to these capabilities, the medical professional will be able to suspend or abort an executing MP-DGs. S/he will be able to see the results of the finished MP-DGs.</p> <p>During the execution, the Recommender Engine may need past PHR and EHR data of the diabetes patient. In case of EHR, the data will be retrieved through EHR/PHR Data Manager.</p>
<b>Parent</b>	-
<b>Included sub-use cases</b>	<p>UC-5.4.8 Retrieve PHR Data from the used PHR System for the EMPOWER Components</p> <p>UC-4.3.8 Send Audit Record</p>
<b>Extended sub-use cases</b>	<p>UC-5.3.1 Manage Goals for the Action Plan</p> <p>UC-5.3.2 Manage Actions for the Action Plan</p>
<b>Scope</b>	Recommender Engine, MP-DG system
<b>Actor(s)</b>	Medical Professional
<b>Goal</b>	To execute a long-running MP-DG for a diabetes patient and help the medical professionals on their monitoring of the patients.
<b>Trigger</b>	This use case is triggered by the medical professional.
<b>Frequency</b>	The use case is a frequent use case.
<b>Pre-conditions</b>	<p>The medical professional logs in to the PHR system and opens the MP-DG System.</p> <p>The PHR System needs to identify the role of the logged in user and accordingly display the MP-DG System link.</p> <p>Before retrieving the diabetes patient lists from PHR System, the PHR System needs to verify the consent of the patients. In other words, the PHR system will deliver only the patients who have already given consent to the logged in medical professional.</p> <p>The MP-DG should already be assigned to the diabetes patient.</p> <p>The EHR and/or PHR Data should be reachable.</p>
<b>Post-conditions</b>	The MP-DG should be executed and can be finished/aborted/suspended based on the medical professional preference.
<b>Success Post-</b>	The MP-DG is successfully finished by the medical professional.

<b>conditions</b>			
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The medical professional logs to the PHRS.</li> <li>2. The medical professional clicks the MP-DG System.</li> <li>3. The medical professional is displayed the existing MP-DGs.</li> <li>4. The medical professional clicks the Recommender Engine link.</li> <li>5. The medical professional is displayed already running MP-DG executions. <ul style="list-style-type: none"> <li>o S/he can resume one of these existing executions or</li> <li>o The medical professional selects one of the assignments and clicks the start button to initiate a new one.</li> </ul> </li> <li>6. The medical professional monitors the execution. <ul style="list-style-type: none"> <li>o S/he can suspend or abort the execution.</li> </ul> </li> <li>7. The MP-DG finishes (or aborts/suspends).</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>May 29, 2012</i>	<i>SRDC</i>	<i>Initial version</i>

#### 8.7.6 UC-5.2.4 Generate Recommendation about the Patient

<b>UC-5.2.4</b>	<b>Generate Recommendation about the Patient</b>
<b>Description</b>	<p>In addition to the long running MP-DGs, the Recommender Engine can provide the medical professionals with recommendation which can be derived from the current situation of the patient directly. These recommendations can be presented to the medical professionals (or to the patients) when they enter to the MP-DG system, when they go to the patient list panel and get recommendation about the patients or just before the MP-DG execution automatically.</p> <p>These types of recommendations can be defined in terms of rules (e.g. DROOLS rules<sup>7</sup>).</p>
<b>Parent</b>	-
<b>Included sub-use cases</b>	UC-5.4.8 Retrieve PHR Data from the used PHR System for the EMPOWER Components UC-4.3.8 Send Audit Record
<b>Extended sub-use cases</b>	UC-5.2.6 Approve/Update/Extend Recommendations by the Recommender Engine
<b>Scope</b>	Recommender Engine, MP-DG system
<b>Actor(s)</b>	Patient, Medical Professional
<b>Goal</b>	To present directly obtainable recommendations about a diabetes patient to

<sup>7</sup> <http://www.jboss.org/drools>

	the medical professional.		
<b>Trigger</b>	This use case is triggered by the medical professional or automatically when the patient enters an ODL value.		
<b>Frequency</b>	This use case is triggered frequently.		
<b>Pre-conditions</b>	<p>The medical professional logs in to the PHR system and opens the MP-DG System.</p> <p>The PHR System needs to identify the role of the logged in user and accordingly display the MP-DG System link.</p> <p>Before retrieving the diabetes patient lists from PHR System, the PHR System needs to verify the consent of the patients. In other words, the PHR system will deliver only the patients who have already given consent to the logged in medical professional.</p> <p>The EHR and/or PHR Data should be reachable.</p>		
<b>Post-conditions</b>	The recommendations about the diabetes patient are displayed to the medical professional.		
<b>Success Post-conditions</b>	The recommendations about the diabetes patient are displayed to the medical professional.		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The medical professional logs in to the PHRS.</li> <li>2. The medical professional clicks the MP-DG System.</li> <li>3. The medical professional is displayed the existing MP-DGs.</li> <li>4. The medical professional clicks the Patients List link.</li> <li>5. The medical professional is displayed the patients that gave consent to him/her (and the ones the medical professional approves).</li> <li>6. The medical professional selects one of the patients and click "get recommendation" button.</li> <li>7. The recommendations are displayed to the medical professional.</li> </ol> <p>As an alternative execution, the recommendations are obtained for each of the patients of the logged in medical professional and these recommendations can be displayed automatically.</p>		
<b>Extensions</b>	-		
<b>Open Issues</b>	The automatic presentation of the recommendations to the medical professionals may be time consuming, because in this case these recommendations will be gathered for each of his/her patients. In the implementation PHRS, if this causes a performance bottleneck, automatic display option will be removed.		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>May 29, 2012</i>	<i>SRDC</i>	<i>Initial version</i>

### 8.7.7 UC-5.2.5 Create Recommendation Rules for Diabetes Patients

<b>UC-5.2.5</b>	<b>Create Recommendation Rules for Diabetes Patients</b>
<b>Description</b>	As described in "UC-5.2.4 Generate Recommendation about the Patient (to be presented to Medical Professional)", the recommendations will be described in rules. In other words, if some criteria about a diabetes patient

	<p>hold, a recommendation will be generated. These rules can be generated manually, graphically or both of these mechanisms. To ease the generation of these rules a Recommendation Rule Editor will be provided. Through this editor, the medical professionals can define criteria graphically and if further detailed tailoring (at the code level) is required, expert user can edit them manually.</p> <p>There may be predefined rule templates. The medical professionals can adjust the values based on the patient requirements and/or conditions.</p>
<b>Parent</b>	-
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	-
<b>Scope</b>	Recommender Engine, Recommender Rule Editor
<b>Actor(s)</b>	Medical Professional
<b>Goal</b>	To define recommendation rules for the diabetes patients.
<b>Trigger</b>	The use case is triggered by the medical professional.
<b>Frequency</b>	This use case is triggered frequently.
<b>Pre-conditions</b>	<p>The medical professional logs in to the PHR system and opens the MP-DG System.</p> <p>The PHR System needs to identify the role of the logged in user and accordingly display the MP-DG System link.</p> <p>Before retrieving the diabetes patient lists from PHR System, the PHR System needs to verify the consent of the patients. In other words, the PHR system will deliver only the patients who have already given consent to the logged in medical professional.</p>
<b>Post-conditions</b>	The recommendations rules are defined and stored persistently.
<b>Success Post-conditions</b>	The recommendations rules are defined and stored persistently.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The medical professional logs in to the PHRS.</li> <li>2. The medical professional clicks the MP-DG System.</li> <li>3. The medical professional is displayed the existing MP-DGs.</li> <li>4. The medical professional clicks the Rule Editor link.</li> <li>5. The medical professional is displayed the Patient List and the rules associated with them. <ul style="list-style-type: none"> <li>o In another panel (or tab) the medical professional can see the existing rule templates.</li> </ul> </li> <li>6. The medical professional selects one of the patient and click "define rule" button.</li> <li>7. The template rules are displayed to the medical professional and s/he select one of them or click "new" button.</li> <li>8. The medical professional creates a recommendation rule graphically. <ul style="list-style-type: none"> <li>o S/he can save the rule as template if in the previous step,</li> </ul> </li> </ol>



	s/he selected “new” button. 9. In a separate window, the rule can be displayed to the medical professional in text view where s/he can edit the rule textually. 10. The medical professional saves the rule.		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	May 29, 2012	SRDC	Initial version

### 8.7.8 UC-5.2.6 Approve/Update/Extend Recommendations by the Recommender Engine

<b>UC-5.2.6</b>	<b>Approve/Update/Extend Recommendations by the Recommender Engine</b>
<b>Description</b>	After the Recommender Engine generates recommendation about the patient, the medical professionals can Approve/Update/Extend these recommendations.
<b>Parent</b>	-
<b>Included sub-use cases</b>	UC-4.3.8 Send Audit Record
<b>Extended sub-use cases</b>	-
<b>Scope</b>	Recommender Engine, MP-DG system
<b>Actor(s)</b>	Medical Professional
<b>Goal</b>	To Approve/Update/Extend the recommendations from the Recommender Engine.
<b>Trigger</b>	The medical professional, after receiving the recommendations from the Recommender Engine, will trigger this use case.
<b>Frequency</b>	This use case is triggered frequently.
<b>Pre-conditions</b>	The medical professional logs in to the PHR system and opens the MP-DG System. The PHR System needs to identify the role of the logged in user and accordingly display the MP-DG System link. There are some recommendations by the Recommender Engine for the patient.
<b>Post-conditions</b>	The recommendations about the diabetes patient are displayed to the medical professional.
<b>Success Post-conditions</b>	The recommendations about the diabetes patient are displayed to the medical professional.
<b>Main Flow</b>	1. The medical professional logs in to the PHRS.

	<ol style="list-style-type: none"> <li>2. The medical professional clicks the MP-DG System.</li> <li>3. The medical professional is displayed the existing MP-DGs.</li> <li>4. The medical professional clicks the Recommendations link.</li> <li>5. The medical professional is displayed the patients that gave consent to him/her (and the ones the medical professional approves) and for whom there are recommendations.</li> <li>6. The medical professional selects one of the patients and click “display recommendation” button.</li> <li>7. The recommendations are displayed to the medical professional.</li> <li>8. The medical professional Approve/Update/Extend the recommendations.</li> <li>9. The medical professional saves the recommendations.</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>			
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 27, 2012</i>	<i>SRDC</i>	<i>Initial version</i>

## 8.8 Task 5.3 Use Cases “Diabetes based Personalised Adaptive Action Plan”

### 8.8.3 UC-5.3.1 Manage Goals for the Action Plan

<b>UC-5.3.1</b>	<b>Manage Goals for the Action Plan</b>
<b>Description</b>	Goals of the Action Plan represent personalised long-term objectives of Patients and typically, they are based on recommendations of the treating Medical Professionals and the Patients needs and preferences. These diabetes-relevant goals aim at supporting diabetes care and changing behaviour patterns by integrating diabetes-relevant treatment aspects. Hence, these goals are the baseline for specifying the short-term activities specified in the Action Plan and the actions should be checked periodically to which degree they fulfil their goals. The Action Plan offers a list of predefined goals. Defined goals are either based on Medical Professional's recommendations and/or specified by the patients themselves.
<b>Parent</b>	-
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	-
<b>Scope</b>	Action Plan Engine
<b>Actor(s)</b>	Patient, Medical Professional
<b>Goal</b>	To create, update and delete goals for the Action Plan
<b>Trigger</b>	The use case is triggered by the Patient.
<b>Frequency</b>	Basically, two occasions can be identified:

	(1) As part of an appointment with a treating Medical Professional or another medical / care person recommendations or goals for diabetes treatment are specified. Based on that the Patient updates his goals in his Action Plan (2) The Patient wants to manage (additional) individual goals, e.g. leisure activities		
<b>Pre-conditions</b>	The Patient is logged in.		
<b>Post-conditions</b>	New/updated goals are stored persistently.		
<b>Success Post-conditions</b>	New/updated goals are stored persistently.		
<b>Main Flow</b>	(1) The Patient opens the Action Plan and selects “goals” (2) Option 1 – the Patient adds goals <ul style="list-style-type: none"> <li>a. By assigning a name for the goals. A name can be selected from a predefined list of goals.</li> <li>b. By referring the goal to a recommendation (if applicable)</li> <li>c. By indicating a description, date, etc.</li> </ul> (3) Option 2 – the Patients updates or deletes an existing goal (4) The Patient views the updated list of goals		
<b>Extensions</b>	<ul style="list-style-type: none"> <li>• Maybe a kind of wizard for beginners (low maturity level)</li> </ul>		
<b>Open Issues</b>	<ul style="list-style-type: none"> <li>• The use case should refer to Medical Professionals recommendations</li> <li>• Deleting a goal depends on existing tasks, e.g. if a goal is related to executed actions in the past the goal cannot be deleted for this period but will be not appear for future actions.</li> </ul>		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	June 4, 2012	SRFG	Initial version

#### 8.8.4 UC-5.3.2 Manage Actions for the Action Plan

<b>UC-5.3.2</b>	<b>Manage Actions for the Action Plan</b>
<b>Description</b>	<p>Actions of the Action Plan can be of different types such as monitoring and recording vital signs, executing physical activities, appointments or leisure activities. If an action is relevant for diabetes care (e.g. glucose monitoring) it should be related to a goal. An action is described by the following parameters:</p> <ul style="list-style-type: none"> <li>• Name (mandatory)</li> <li>• Date / time (mandatory)</li> <li>• Description</li> <li>• Associated to a goal</li> <li>• Activated reminders</li> <li>• Option - insert a contact (from the contact list)</li> <li>• Add annotations</li> <li>• Option for events such as an appointment - add questions as preparation for this event</li> <li>• Add comments</li> </ul>

	<p>When the patient is organising his/her activities based on the EMPOWER Action Plan it should be always clear which goals will be satisfied with an action (traceable relations between goals and actions). However, the Action Plan may not only include diabetes-related actions. It is also possible for the patient to include other activities, e.g. related to one of his/her hobbies, without an explicit diabetes-related goal, e.g. having a nice evening with friends.</p> <p>The Action Plan offers typically and frequently used calendar views, such as a week or event overview and will be available through Web and mobile.</p>
<b>Parent</b>	-
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	-
<b>Scope</b>	Action Plan Engine
<b>Actor(s)</b>	Patient, Medical Professional
<b>Goal</b>	To create, update and delete actions for the Action Plan
<b>Trigger</b>	The use case is triggered by the Patient.
<b>Frequency</b>	Basically whenever the actor wants to insert an action. Typically, this can be once a week when the actor updates the Action Plan or after an appointment with the treating Medical Professional or another medical person when the recommendation respectively the goals were changed and hence, actions have to be updated.
<b>Pre-conditions</b>	The Patient is logged in.
<b>Post-conditions</b>	The created/updated Action Plan is stored persistently.
<b>Success Post-conditions</b>	The created/updated Action Plan is stored persistently.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>(1) The Patient clicks the Action Plan main page from the EMPOWER dashboard menu item</li> <li>(2) Option 1 – the Patient creates an action: <ol style="list-style-type: none"> <li>a. The Patient insert the action into the Action Plan by indicating the action parameters</li> <li>b. If the action is diabetes-relevant, the patient relates it to a goal</li> </ol> </li> <li>(3) Option 2 – the Patient updates an action: <ol style="list-style-type: none"> <li>a. The Patient selects an action and modifies parameters (e.g. date) or deletes the action.</li> </ol> </li> <li>(4) Option 3 – the Patient deletes an action</li> <li>(5) Option 4 – the Patient views his actions by using the Action Plan calendar view</li> <li>(6) Option 5 – customize reminders, e.g. switching off reminders if a Patient is going on holidays</li> </ol>

<b>Extensions</b>	This use case supports maturity levels. There will be (more) reminders for beginners.		
<b>Remarks</b>	Actions can be defined based on goals or goals can be associated to actions		
<b>Open Issues</b>	How do we exchange information for an appointment (patient-Medical Professional)? Is there an encounter ID associated with the appointment that both parties are using when they are exchanging the information?		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	June 4, 2012	SRFG	Initial version

### 8.8.5 UC-5.3.3 Weekly View of Actions

<b>UC-5.3.3</b>	<b>Weekly View of Actions</b>
<b>Description</b>	<p>This use case aims at presenting an overview of the actions of a week and reveals why they are important by indicating how the actions are associated to goals. The Weekly View covers the time frame of one week and comprises</p> <ul style="list-style-type: none"> <li>• A calendar view with the actions of a week</li> <li>• A brief overview which actions of this week satisfies which goals</li> </ul>
<b>Parent</b>	-
<b>Included sub-use cases</b>	UC-5.3.8 View Calendar (includes visits, medications and exercises recommended by the Medical Professional)
<b>Extended sub-use cases</b>	-
<b>Scope</b>	Action Plan Engine
<b>Actor(s)</b>	Patient
<b>Goal</b>	<p>To present an overview about the actions of a week.</p> <p>The actions aim at supporting to change behaviour patterns. For patients it is important to understand and know why these actions are relevant for them. Presenting the actions associated to their goals will remind the patients why these actions are meaningful.</p>
<b>Trigger</b>	The use case is triggered by the Patient.
<b>Frequency</b>	Weekly or more often
<b>Pre-conditions</b>	The Patient is logged in.
<b>Post-conditions</b>	The actions are presented to the Patient.
<b>Success Post-conditions</b>	The actions are presented to the Patient.
<b>Main Flow</b>	<p>(1) The Patient opens the Action Plan and selects "Weekly View"</p> <p>(2) The PHRS or PHA presents the current week by default</p>

	(3) If the Patient wants to view another week he selects the required week (4) Option – the Patient prints the “Weekly View”		
<b>Extensions</b>	The “Weekly View” as mobile application An overview for a flexible time frame, e.g. for the last 3 months as input for the next periodical appointment with the Medical Professional.		
<b>Open Issues</b>	Maybe the weekly view is the front page of the EMPOWER dashboard.		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	June 4, 2012	SRFG	Initial version

### 8.8.6 UC-5.3.4 Manage Actions of the Running Action Plan

<b>UC-5.3.4</b>	<b>Manage Actions of the Running Action Plan</b>
<b>Description</b>	<p>Based on an action template process model, actions by the Patient active actions are managed by the Action Plan in several ways:</p> <ul style="list-style-type: none"> <li>• If a reminder is active the Action Plan reminds the Patient (web and/or mobile) timely about an upcoming action, e.g. about an appointment or the daily monitoring of the blood sugar level</li> <li>• The Action Plan Engine communicates with the Pathway Engine and checks for notifications from ODL services (e.g. from a glucose monitor device) and Patient results (e.g. manually results from the Patient about medication compliance). When the inbox is updated, the Action Plan knows whether and when an action was performed.</li> <li>• The Patient is notified of updates via the inbox and the Action Plan user interface.</li> </ul>
<b>Parent</b>	UC-4.1.2 Manage EMPOWER Inbox
<b>Included sub-use cases</b>	UC-4.1.6 Patient Receives Messages UC-5.3.5 System Reminds Patient to Take Medications or for Upcoming Visits and Tests UC-6.1.1 Collection of UC-5.4.8 Retrieve PHR Data from the used PHR System for the EMPOWER Components UC-6.2.2 Food Diary recording Eating Behaviours UC-6.2.7 Manage Observations of Daily Living UC-4.3.8 Send Audit Record
<b>Extended sub-use cases</b>	-
<b>Scope</b>	Action Plan Engine, ODL Collector
<b>Actor(s)</b>	Patient
<b>Goal</b>	To remind the Patient about upcoming events and to collect the results of executed actions.
<b>Trigger</b>	The use case is triggered by the PHRS.
<b>Frequency</b>	This is a very frequent use case and relevant for each action in the Action Plan.

<b>Pre-conditions</b>	There has to be activated actions in the Action Plan. The Patient is logged in.		
<b>Post-conditions</b>	The statuses of executed actions are changed. Upcoming alerts are sent to the Patient.		
<b>Success Post-conditions</b>	The statuses of executed actions are changed. Upcoming alerts are sent to the Patient.		
<b>Main Flow</b>	(1) The Action Plan checks periodically whether there are reminders for upcoming events. If yes, the Action Plan reminds the Patient about the upcoming event. Depending on the Patient's configuration the reminder is either via Web or mobile (2) Option question list – the Action Plan asks the Patient whether he wants to print out the list of questions or to update it or to send it to somebody (e.g. to the Medical Professional) (3) Option – ODL services updates the inbox with ODL results (4) Option – the Patient updates the inbox with ODL results (5) The Action Plan checks the inbox for results. If there are results for one-time action the Action Plan changes the status to executed (6) If an ODL result is approaching or exceeding a threshold the Action Plan informs the Patient (Alert)		
<b>Extensions</b>	-		
<b>Open Issues</b>	ODL results have to be stored in the inbox based on interoperability standards		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	June 4, 2012	SRFG	Initial version

### 8.8.7 UC-5.3.5 System Reminds Patient to Take Medications or for Upcoming Visits and Tests

<b>UC-5.3.5</b>	<b>System reminds patient to take medications or for upcoming visits and tests</b>
<b>Description</b>	The Medical Professional sets an Action Plan and the patient has to follow it thoroughly. The Reminders help the patient keep up with her treatment effectively. The system reminds the patient when is time to take a drug or when she has a new arranged visit to the hospital. The reminder is triggered a little before the predefined date is due.
<b>Parent</b>	UC-5.3.4 Manage Actions of the Running Action Plan
<b>Included sub-use cases</b>	UC-4.1.6 Patient Receives Messages
<b>Extended sub-use cases</b>	-
<b>Scope</b>	PHA, PHR, Action Plan Engine Module
<b>Actor(s)</b>	Patient

<b>Goal</b>	The patient is reminded when to take her medications and the medications' units, also for a new hospital visit or when she has to take a new medical test.		
<b>Trigger</b>	A new event from the Action Plan Engine triggers the Reminders		
<b>Frequency</b>	Diabetic patients usually take several medications on a daily basis. On top of that, they are bound to take medical tests quite frequently. Thus, the reminders are used several times a day.		
<b>Pre-conditions</b>	The patient logs in to the PHA or PHR. The Medical Professional has set an Action Plan for the patient.		
<b>Post-conditions</b>	The application pops up a new reminder on the patient's screen.		
<b>Success Post-conditions</b>	The patient reads the new reminder and takes action.		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The patient logs in to the PHR/PHA.</li> <li>2. When a new event is triggered, a popup is shown on the screen.</li> <li>3. The patient taps on the popup.</li> <li>4. More information about the upcoming event is displayed.</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 8, 2012</i>	<i>ICOM</i>	<i>Initial version</i>

### 8.8.8 UC-5.3.6 Weekly Feedback and Evaluation

<b>UC-5.3.6</b>	<b>Weekly Feedback and Evaluation</b>
<b>Description</b>	<p>Once a week the Patient should review and validate how successful he has performed his actions in the last week, how compliant he was to his goals, whether there were any problems and how he could cope better with them the next time. A visualisation of evaluated action results and trends may support the Patient to get a clearer picture.</p> <p>Based on this review the Patient updates the actions for the upcoming week if applicable.</p>
<b>Parent</b>	-
<b>Included sub-use cases</b>	UC-5.3.2 Manage Actions for the Action Plan UC-4.2.1 Presentation of Trends and Visualization of Self-management Services
<b>Extended sub-use cases</b>	UC-5.3.3 Weekly View of Actions
<b>Scope</b>	Action Plan Engine, Reporting Module
<b>Actor(s)</b>	Patient, Medical Professional



<b>Goal</b>	To review weekly the compliance according goals and planned actions		
<b>Trigger</b>	The use case is triggered by the Patient.		
<b>Frequency</b>	Once a week		
<b>Pre-conditions</b>	Goals and actions are specified. The Action Plan can access available ODL results. The Patient is logged in.		
<b>Post-conditions</b>	None		
<b>Success Post-conditions</b>	Still missing results of the past week are stored. The Action Plan for the next week is updated.		
<b>Main Flow</b>	(1) The Patient clicks the "Weekly View" (2) The Patient checks and completes the results of the last week, e.g. <ul style="list-style-type: none"> <li>- The Patient inserts comments and/or additional information (e.g. medication compliance, the appointment with the medical professional in the last week)</li> <li>- The Patient views ODL results and trends</li> <li>- The Patient adds ideas, problems, etc. to a diary</li> <li>- The Patient indicate his mood</li> </ul> (3) Option – if an ODL result is approaching or exceeding a threshold the Action Plan informs the Patient (Alert) (4) The Patient updated the action list for the next week		
<b>Extensions</b>	<ul style="list-style-type: none"> <li>• The Patient may also update goals</li> <li>• Beginners will be reminded about doing the weekly evaluation</li> <li>• The Patient can visualize suggested information materials based on the relationships to EMPOWER terminologies</li> <li>• The Patient may also indicate his mood or stress level or insert comments regarding sleep disturbances.</li> </ul>		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	June 4, 2012	SRFG	Initial version

### 8.8.9 UC-5.3.7 Manage Action Plan Process Model

<b>UC-5.3.7</b>	<b>Manage Action Plan Process Model</b>
<b>Description</b>	<p>A knowledge worker can manage the Action Plan knowledge model using an appropriate IDE (Interactive development Environment)</p> <p>There will be one default Action Plan process model for EMPOWER created by a Knowledge Worker. This process model can be adapted according to the needs of the EMPOWER provider (pilot application user requirements), or for testing and demonstration.</p> <p>For more information, please read the description of the parent Use Case</p>

<b>Parent</b>	-		
<b>Included sub-use cases</b>	-		
<b>Extended sub-use cases</b>	-		
<b>Scope</b>	Action Plan Engine, IDE Modeling Tool		
<b>Actor(s)</b>	Knowledge Worker		
<b>Goal</b>	To manage Action Plan Knowledge Models		
<b>Trigger</b>	Knowledge worker opens IDE for modeling activities		
<b>Frequency</b>	<ul style="list-style-type: none"> <li>High frequency during implementation phase for EMPOWER knowledge models or when EMPOWER software is customized for a new health provider.</li> <li>Application pilots phase: there should be little or no managing of models during the pilot phase</li> </ul>		
<b>Pre-conditions</b>	Appropriate tools (IDE with modeling plugin, configuration for rule base) -Software source control tool -Knowledge work with appropriate expertise		
<b>Post-conditions</b>	Process model is saved. Process model is committed to the software repository when ready.		
<b>Success Post-conditions</b>	Process model is saved. Process model is committed to the software repository when ready.		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. Knowledge Worker opens modeling tool</li> <li>2. Open appropriate folder of knowledge model in pre-production state or choose other test folder.</li> <li>3. Manage (create, remove, update) a rule based BPMN2 based process model</li> <li>4. Decide whether to replace production model with pre-production model.</li> <li>5. Decide whether to commit changes to software repository</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-Must have naming conventions for file names (action plan process models) -Must have convention for organizing the collection of action plan process models by knowledge model identifier, status (production, pre-production, for unit/integration test), -EMPOWER configuration uses the "production" folder, the default knowledge model folder should be named "default"		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 4, 2012</i>	<i>SRFG</i>	<i>initial</i>

#### 8.8.10 UC-5.3.8 View Calendar (includes visits, medications and exercises recommended by the Medical Professional)

<b>UC-5.3.8</b>	<b>View Calendar (Patient views calendar)</b>
-----------------	---

<b>Description</b>	The patient views upcoming events and activities in a calendar. Calendar also includes visits, medications and exercises recommended by the Medical Professional. The Medical Professional sets an Action Plan for the patient which includes taking medications, tests, doing daily exercises and attending visits. Different event groups appear on the Calendar with a different colour. Each event takes place on a predefined date. The Calendar application includes all events set by Medical Professionals. Those events will appear as reminders a little before the date is due.		
<b>Parent</b>	UC-5.3.3 Weekly View of Actions		
<b>Included sub-use cases</b>	UC-4.3.8 Send Audit Record		
<b>Extended sub-use cases</b>	UC-5.3.9 Extract Printable Calendar		
<b>Scope</b>	PHA, PHR		
<b>Actor(s)</b>	Patient		
<b>Goal</b>	The patient sets upcoming events or creates new events		
<b>Trigger</b>	The patient triggers the Calendar		
<b>Frequency</b>	This use case is a frequent use case.		
<b>Pre-conditions</b>	The patient logs in to the PHR/PHA.		
<b>Post-conditions</b>	The patient browses through the Calendar and views all the forthcoming events		
<b>Success Post-conditions</b>	All the forthcoming events concerning the logged in patient are displayed.		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The patient logs in to the PHR/PHA.</li> <li>2. The patient taps on the Calendar.</li> <li>3. The first screen of the Calendar is the current month's events.</li> <li>4. The patient taps on a day on the Calendar.</li> <li>5. The full description of the tapped day's event is displayed.</li> <li>6. Patient goes back to Calendar.</li> <li>7. She can jump to another month by tapping on the arrow next to the displayed month.</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 8, 2012</i>	<i>ICOM</i>	<i>Initial version</i>

**8.8.11 UC-5.3.9 Extract Printable Calendar**

<b>UC-5.3.9</b>	<b>Extract Printable Calendar (Patient extracts calendar in printable version)</b>		
<b>Description</b>	The calendar application contains useful information about upcoming events concerning the patient's treatment. By extracting the Calendar in a printable form the patient can print and share it with his carers or add notes on the printed form of the Calendar.		
<b>Parent</b>	-		
<b>Included sub-use cases</b>	-		
<b>Extended sub-use cases</b>	-		
<b>Scope</b>	PHA, PHR		
<b>Actor(s)</b>	Patient		
<b>Goal</b>	The patient extracts the current Calendar in a file which is stored in the smartphone's memory. The extracted file contains a version that is printable.		
<b>Trigger</b>	The patient triggers the Extract Calendar.		
<b>Frequency</b>	Several times a month		
<b>Pre-conditions</b>	The patient logs in to the PHA.		
<b>Post-conditions</b>	The Calendar is extracted and stored in the smartphone's memory		
<b>Success Post-conditions</b>	The Calendar and all of the included events are successfully stored in the smartphone's memory in a printer friendly version.		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The patient logs in to the PHR or PHA.</li> <li>2. The patient taps on the Calendar.</li> <li>3. The first screen of the Calendar is the current month's events.</li> <li>4. The patient taps on the extract icon.</li> <li>5. The current Calendar is stored in the smart phone's memory in a printable form.</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 8, 2012</i>	<i>ICOM</i>	<i>Initial version</i>

## 8.9 Task 5.4 Use Cases “Integration into an accompanying PHRS”

### 8.9.3 UC-5.4.1 Manage Information Material

<b>UC-5.4.1</b>	<b>Manage Information Material</b>
<b>Description</b>	<p>The Content Administrator manages the information material, particular</p> <ul style="list-style-type: none"> <li>• insert new, modifies and deletes content</li> <li>• semantically index content based on the EMPOWER terminology</li> </ul> <p>A Content management system will be used for organising the information material</p>
<b>Parent</b>	-
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	-
<b>Scope</b>	PHRS
<b>Actor(s)</b>	Content Administrator
<b>Goal</b>	To administrate the information material of the PHR system.
<b>Trigger</b>	By the PHR Content Administrator.
<b>Frequency</b>	This use case is a rare use case. Typically, the information material will be provided before or when the system is deployed. When the system is running it is expected that the information material is only updated occasionally.
<b>Pre-conditions</b>	The Content Administrator is logged in.
<b>Post-conditions</b>	Information material is updated, tagged based on the EMPOWER terminology and stored persistently.
<b>Success Post-conditions</b>	Information material is updated, tagged based on the EMPOWER terminology and stored persistently.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The PHR Content Administrator logs in to the PHRS content management system (e.g. a wiki)</li> <li>2. The PHR Content Administrator updates the content <ol style="list-style-type: none"> <li>a. insert new content or</li> <li>b. modify existing content</li> <li>c. delete existing content</li> </ol> </li> <li>3. The PHR Content Administrator indexes the content</li> </ol>
<b>Extensions</b>	<ul style="list-style-type: none"> <li>• Decision making material will be presented as decision aids</li> <li>• The Content Administrator should tag the information material by using the EMPOWER terminology. This will be used for semantic searching for information material suggesting to the Patient.</li> </ul>
<b>Open Issues</b>	

Version	Date	Author	Changes
0.1	June 4, 2012	SRFG	Initial version

#### 8.9.4 UC-5.4.2 Assess Information Material

<b>UC-5.4.2</b>	<b>Assess Information Material</b>
<b>Description</b>	<p>Often the quality of information material is not transparent for patients. This use case offers several possibilities to assess information material by sharing experiences with other users, e.g.:</p> <ul style="list-style-type: none"> <li>• Tagging using EMPOWER Terminology, annotating material</li> <li>• Rating material based on quality criteria such as usefulness, understandability, completeness of information</li> </ul> <p>Rating material is restricted to EMPOWER information material. The user can rate material e.g. by tags as quality criteria (such as “easy to understand”). Additionally, users can add links with a comment (e.g. a brief description) to a section of the information material.</p> <p>Information material can be assessed by different types of users with different medical and diabetes expertise, e.g. by a Patient, a Medical Professional or other Medical Persons. Each user will be related to a role (e.g. diabetes patient, Medical Professional, family member, etc.) to make the background of the user clear.</p>
<b>Parent</b>	-
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	-
<b>Scope</b>	PHRS, Community and Information Module
<b>Actor(s)</b>	Patient, Medical Professional
<b>Goal</b>	The use case offers a possibility that material of unpredictable quality can be rated by a community and in this way, the quality becomes more transparent.
<b>Trigger</b>	The use case is triggered by the Patient or Medical Professional.
<b>Frequency</b>	Depends on the Patient. Some patients like to comment and assess. Other patients may be more reluctant.
<b>Pre-conditions</b>	Information material to be assessed.
<b>Post-conditions</b>	The information material (metadata or reference metadata) is updated with a rating, semantic annotation (EMPOWER terminology), or other annotation.
<b>Success Post-conditions</b>	The information material (metadata or reference metadata) is updated with a rating, semantic annotation (EMPOWER terminology), or other annotation.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>(1) The Patient logs in to the PHRS</li> <li>(2) The Patient clicks PHRS information CMS (e.g. wiki)</li> </ol>

	(3) The Patient selects an information material (4) The Patient adds one or more tags (EMPOWER Terminology?) to this page (5) Option – the Patient adds comments to the tags		
<b>Extensions</b>	-		
<b>Open Issues</b>	The quality criteria for rating information material have to be specified.		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	<i>June 4, 2012</i>	SRFG	Initial version

### 8.9.5 UC-5.4.3 Explore Patient Information Material

<b>UC-5.4.3</b>	Explore Patient Information Material
<b>Description</b>	The user can navigate in the EMPOWER dashboard and opens a link or User interface component to visualize information material in the PHRS content management system. The user can explore in different ways, e.g. open a link, open a list of suggest information materials or open a list of saved references.
<b>Parent</b>	-
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	-
<b>Scope</b>	Community and Information Module, PHRS
<b>Actor(s)</b>	Patient
<b>Goal</b>	To provide one or more entry points for users to explore patient materials and provide user with the means to explore information materials. If applications provide links to information materials, then provide a menu item or option to open this module
<b>Trigger</b>	Triggered by patient
<b>Frequency</b>	Often by the user
<b>Pre-conditions</b>	-
<b>Post-conditions</b>	System status or content availability indicated in Dashboard
<b>Success Post-conditions</b>	The default view of the patient information materials is visualized
<b>Main Flow</b>	User selects menu item in dashboard Default view is displayed for the patient information materials
<b>Extensions</b>	-

<b>Open Issues</b>	Integration of CMS How does EMPOWER user in PHRS access the PHRS content mgmt. system (CMS)? EMPOWER USER as federated user that is known to the CMS used by the PHRS?		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 4, 2012</i>	<i>SRFG</i>	<i>initial</i>

### 8.9.6 UC-5.4.4 Communication with Persons Sharing Similar Situations

<b>UC-5.4.4</b>	<b>Communication with Persons Sharing Similar Situations</b>
<b>Description</b>	Exchanging information and experiences with person sharing similar situations is both an additional source for information and a source for motivation based on social support. Supporting these aspects EMPOWER offers web-based social tools such as a self-help group forum moderated by a medical person. Following a holistic approach this online self-help group is accompanied by an offline self-help group. Additionally, The PHRS includes useful links to already existing forums and websites for diabetes patients.
<b>Parent</b>	-
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	-
<b>Scope</b>	Community and Information
<b>Actor(s)</b>	Patient, Medical Professional
<b>Goal</b>	To support the exchange of information and experiences
<b>Trigger</b>	Patient, Family Member, Medical Professional
<b>Frequency</b>	The usage depends of the communication behaviour of the users. An online self-help group (similar to an offline self-help group) needs somebody (a moderator) who stimulates the discussion and possibly answers questions.
<b>Pre-conditions</b>	A forum for an EMPOWER self-help group and a moderator with diabetes background. Patients have to be logged in into the PHRS.
<b>Post-conditions</b>	None
<b>Success Post-conditions</b>	None
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>(1) The moderator creates the self-help group forum</li> <li>(2) The Patient registers to the forum</li> <li>(3) The Patient and the moderator contributes to the self-help group by asking questions, putting comments, sharing experiences and information ad replying to other contributions</li> </ol>



	(4) Option - the moderator posts upcoming events, e.g. about diabetes workshops or a date for an offline self-help group		
<b>Extensions</b>	<ul style="list-style-type: none"> <li>- The topics in the forum might be organised based on the categories by the Action Plan goals.</li> <li>- If a link (e.g. forum, website) is included it should be tagged based on the EMPOWER terminology</li> </ul>		
<b>Open Issues</b>	<ul style="list-style-type: none"> <li>- Do users want to submit questionnaires to the forum?</li> <li>- Is there a need for a structured overview about answers?</li> </ul>		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	June 5, 2012	SRFG	Initial version

### 8.9.7 UC-5.4.5 Provide help information

<b>UC-5.4.5</b>	<b>Provide help information</b>
<b>Description</b>	<p>User can access short and detailed Help info from the User interfaces (PHRS, PHRS) The help should be part of the patient information materials, therefore the patient information materials should be structured appropriately.</p> <p>Help info refers to EMPOWER services and functions. Examples are info about action goals, about creating or using the Action Plan, about managing goal or action, etc.</p> <p>Patient information materials should be provided where necessary by lookup of EMPOWER terminologies. Help info can be also semantically annotated to facilitate lookup of relevant help materials</p>
<b>Parent</b>	-
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	-
<b>Scope</b>	PHRS, PHA
<b>Actor(s)</b>	Patient, Medical Professional
<b>Goal</b>	
<b>Trigger</b>	User selects help icon, tool tips, etc.
<b>Frequency</b>	Often, as needed by patient
<b>Pre-conditions</b>	Information materials are available for language or there is default CMS of PHRS is available
<b>Post-conditions</b>	Status reported – success or failures to access CMS, material missing e.g. broken links

<b>Success Post-conditions</b>	The system displays the help information		
<b>Main Flow</b>	1 User selects help icon or link 2 The system displays the help information		
<b>Extensions</b>			
<b>Remark</b>	Help Info should to be part of the information material		
<b>Open Issues</b>	There is a conflict with resource bundles for health related tool tips and other short help fragments. Often these are part of resource bundles for each language. A means to use the patient materials as the main source for health related tool tips should be investigated.		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	June 5, 2012	SRFG	initial

### 8.9.8 UC-5.4.6 Patient views information material about diabetes-specific nutrition

<b>UC-5.4.6</b>	<b>Patient views information material about diabetes-specific nutrition</b>		
<b>Description</b>	The Nutritional Facts includes nutritional facts and tips, as well as articles on nutrition. A healthy diet can help the diabetic patient to control her glucose level and improve daily quality of life. The system provides a new tip every day. Patient can browse through different articles on nutrition and diabetes found in the database.		
<b>Parent</b>	-		
<b>Included sub-use cases</b>	-		
<b>Extended sub-use cases</b>	-		
<b>Scope</b>	PHRS/PHA, Community and Information Module		
<b>Actor(s)</b>	Patient		
<b>Goal</b>	Provide material to diabetic patient which will aid in controlling the glucose level.		
<b>Trigger</b>	The patient triggers the Nutritional Facts		
<b>Frequency</b>	Nutrition plays a very important role in diabetic treatment. This use case can be used daily by viewing the daily pieces of advice that diabetic patients could apply in their diet and lower insulin levels.		
<b>Pre-conditions</b>	The patient logs in to the PHRS/PHA successfully.		
<b>Post-conditions</b>	The system presents nutritional facts and tips.		

<b>Success Post-conditions</b>	The patient finds useful nutritional facts and tips.		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The patient logs in to the PHRS/PHA.</li> <li>2. Then she selects the Nutritional Facts.</li> <li>3. The daily nutritional tip is displayed.</li> <li>4. The patient chooses to view an article from the list of articles.</li> <li>5. The patient reads the chosen article.</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 8, 2012</i>	<i>ICOM</i>	<i>Initial version</i>

### 8.9.9 UC-5.4.7 Import EHR and/or PHR Data to the used PHR System

<b>UC-5.4.7</b>	<b>Import EHR and/or PHR Data to the used PHR System</b>
<b>Description</b>	<p>EMPOWER imports and store diabetes-relevant patient data from different sources. This comprise</p> <ol style="list-style-type: none"> <li>1. EHR data and recommendations necessary from the periodic appointments with the Medical Professional.</li> <li>2. Patient data collected by EMPOWER ODL &amp; activities services</li> <li>3. Other application services for PHRS (external to EMPOWER)</li> </ol> <p>This use case is used to load EHR/PHR data from external systems to the used PHR. The mechanism will be based on Integrating the Healthcare Enterprise's<sup>8</sup> Exchange of Personal Health Record Content Profile (XPHR)<sup>9</sup>.</p>
<b>Parent</b>	<p>UC-6.2.7 Manage Observations of Daily Living</p> <p>UC-5.3.4 Manage Actions of the Running Action Plan</p> <p>UC-6.1.4 Synchronize PHR Data with PHRS</p>
<b>Included sub-use cases</b>	<p>UC-6.4.1 Import EHR Data using IHE XPHR</p> <p>UC-6.4.2 Import EHR Data through epSOS Network</p> <p>UC-6.4.3 Import PHR Data using IHE XPHR</p> <p>UC-4.3.7 Authenticate User</p> <p>UC-4.3.8 Send Audit Record</p> <p>UC-4.3.9 Authenticate EMPOWER Component (Node) for Secure Channel</p> <p>UC-4.3.1.3 Grant or Deny Access to Patient Data based on Consent</p>
<b>Extended sub-use cases</b>	-
<b>Scope</b>	PHRS
<b>Actor(s)</b>	Patient

<sup>8</sup> <http://www.ihe.net/>

<sup>9</sup> [http://wiki.ihe.net/index.php?title=Exchange\\_of\\_Personal\\_Health\\_Record\\_Content\\_Profile](http://wiki.ihe.net/index.php?title=Exchange_of_Personal_Health_Record_Content_Profile)

<b>Goal</b>	To store EHR/PHR data from different source in the PHRS		
<b>Trigger</b>	<ul style="list-style-type: none"> <li>• The Action Plan when new ODL results are available</li> <li>• The Patient when he adds, modifies or deletes patient data</li> </ul>		
<b>Frequency</b>	The use case is frequently used whenever new patient data are available		
<b>Pre-conditions</b>	EHR or PHR data are available		
<b>Post-conditions</b>	The Patient's EHR and PHR data are stored and made available to EMPOWER components or PHRS.		
<b>Success Post-conditions</b>	The Patient's EHR data are stored and made available to EMPOWER components or PHRS.		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. If the import is automatic. The PHRS imports EHR or PHR data from other components.</li> <li>2. In the case of a manual import the Patient views the list of EHR and PHR data to be imported, selects those data which should be imported and starts the import.</li> <li>3. The Patient can view his EHR and PHR data.</li> </ol>		
<b>Extensions</b>	<ul style="list-style-type: none"> <li>- For the Pilot Application I in Germany the EHR data covers the Diabetes-Passport</li> <li>- For the Pilot Application II in Turkey the EHR data covers the National Health Data Dictionary – Diabetes Transmission Schema.</li> <li>- There will be reminders for newly imported EHR/PHR data, e.g. recommendations</li> </ul>		
<b>Open Issues</b>	- -		
<b>Remark</b>	<ul style="list-style-type: none"> <li>- The Patient will view his EHR/PHR data through the PHRS. For the German Pilot Application this will be the SRFG PHRS, for the Turkish Pilot Application this will be the PHRS from SRDC.</li> <li>- In EMPOWER the patient data are stored in the PHRS</li> <li>- Once the EHR data are imported can the patient cannot change them</li> <li>- The imported data should be available to other EMPOWER components besides the PHRS.</li> <li>- In the Consent Editor the Patient can specify which patient data should be imported and whether the import should be performed automatically or manually.</li> </ul>		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	June 5, 2012	SRFG	Initial version

#### 8.9.10 UC-5.4.8 Retrieve PHR Data from the used PHR System for the EMPOWER Components

<b>UC-5.4.8</b>	<b>Retrieve PHR Data from the used PHR System for the EMPOWER Components</b>
-----------------	--

<b>Description</b>	During the operation of the EMPOWER system, the data (both EHR and PHR) will reside in the database of the used PHR system. These data will be available to the EMPOWER components through this use case. In this exchange, necessary HL7 and or IHE templates will be used.		
<b>Parent</b>	UC-4.2.1 Presentation of Trends and Visualization of Self-management Services UC-5.2.3 Execute and Monitor Diabetes Guideline UC-5.3.4 Manage Actions of the Running Action Plan UC-4.2.3 Present ODL Graphs UC-6.4.4 Export Data from PHR		
<b>Included sub-use cases</b>	UC-4.3.7 Authenticate User UC-4.3.8 Send Audit Record UC-4.3.9 Authenticate EMPOWER Component (Node) for Secure Channel UC-4.3.1.3 Grant or Deny Access to Patient Data based on Consent		
<b>Extended sub-use cases</b>	-		
<b>Scope</b>	EHR/PHR Data Manager		
<b>Actor(s)</b>	All of the EMPOWER Components		
<b>Goal</b>	To retrieve PHR/EHR data of the diabetes patient from the database of the used PHR system.		
<b>Trigger</b>	This use case is triggered upon request of PHR/EHR data by an EMPOWER Component.		
<b>Frequency</b>	This use case is a frequent use case.		
<b>Pre-conditions</b>	The data is available in the PHR Database. The request for the data is granted.		
<b>Post-conditions</b>	The data is delivered to the requested party.		
<b>Success Post-conditions</b>	The data is delivered to the requested party.		
<b>Main Flow</b>	<ul style="list-style-type: none"> <li>- The component makes its request for data.</li> <li>- The data is gathered from the PHR Database.</li> <li>- The data is formed into a standard format such as HL7 or IHE template.</li> <li>- The data is delivered to the requesting component.</li> </ul>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	June 19, 2012	SRDC	Initial version

## 8.10 Task 6.1 Use Cases “Monitoring Vital, Physical and Mental Parameters”

### 8.10.3 UC-6.1.1 Collection of ODLs

<b>UC-6.1.1</b>	<b>Collection of ODLs (Patient inserts Glucose Level, Weight, Pulse and Blood Pressure )</b>
<b>Description</b>	The measurements related to Glucose Level, weight, pulse and blood pressure are inserted manually or automatically in the measurements database. The patient takes the above measurements using medical devices (e.g. glucometer, sphygmomanometer) as frequently as the Medical Professional indicated.
<b>Parent</b>	UC-6.2.7 Manage Observations of Daily Living
<b>Included sub-use cases</b>	UC-4.3.8 Send Audit Record
<b>Extended sub-use cases</b>	UC-4.2.3 Present ODL Graphs UC-6.1.4 Synchronize PHR Data with PHRS UC-6.1.1.2 Collect ODLs Automatically
<b>Scope</b>	ODL Collector Module
<b>Actor(s)</b>	Patient
<b>Goal</b>	To store glucose level, weight, pulse or blood pressure measurements in the database.
<b>Trigger</b>	This UC is triggered by the patient herself (human patient) or automatically when the smartphone detects a measuring device within a small distance.
<b>Frequency</b>	The Medical Professional recommends the collection of measurements of vital and physical data. Possibly measurements should have different frequencies according to the severity of the patient's situation. Usually different measurements are taken several times a day. The patient collects the measurements using the medical equipment as previously shown by the Medical Professional.
<b>Pre-conditions</b>	The patient takes a new measurement following the Medical Professional's guidelines.
<b>Post-conditions</b>	The new Measurements are stored persistently.
<b>Success Post-conditions</b>	The created Measurements are successfully stored persistently.
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The patient takes a new measurement using a medical device (e.g. glucometer, blood pressure monitor)</li> <li>2. The measuring device attempts to connect to the smartphone and sends the new measurement automatically as described in UC-6.1.1.2 Collect ODLs Automatically.</li> </ol>

	3. In case, the connection fails or the medical device doesn't support connection with the smartphone, the user has to enter the measurement manually as described in UC-6.1.1.1 Collect ODLs Manually 4. The new measurement is added to the existing measurements. 5. In case the new measurement is either a glucose or a pulse measurement, the user is prompted by the smartphone to a screen to fill in her mood as described by the UC-6.1.2.1 Assess Mood		
<b>Extensions</b>	-		
<b>Open Issues</b>	Correlation between clinician's or system recommendations about measurements and measurement entries		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.3</b>	<i>August 10, 2012</i>	<i>ICOM</i>	<i>Modification of the description, extended sub-use cases, trigger main flow</i>

## 8.10.3.1 UC-6.1.1.1 Collect ODLs Manually

<b>UC-6.1.1.1</b>	<b>Collect ODLs Manually</b>
<b>Description</b>	In this use case the patient logs the measurements into the PHA through a submit form. The patient inserts a new measurement by first selecting its type from a predefined drop down list, then editing the value and date fields, and finally pressing the submit button.
<b>Parent</b>	UC-6.1.1 Collection of ODLs
<b>Included sub-use cases</b>	UC-4.3.8 Send Audit Record
<b>Extended sub-use cases</b>	-
<b>Scope</b>	PHR/PHA, ODL Collector Module (Vital/Physical/Mental Parameter Collector Module)
<b>Actor(s)</b>	Patient
<b>Goal</b>	Manual Collection and local storage of Glucose Level, Weight, Pulse and Blood Pressure.
<b>Trigger</b>	The patient triggers this use case.
<b>Frequency</b>	Whenever the patient uses a measuring device which failed to connect with the patient's smartphone or doesn't support connectivity with the smartphone.
<b>Pre-conditions</b>	A new measurement is available in the measuring device (or even a list of measurements).
<b>Post-conditions</b>	The patient submits a new measurement.
<b>Success Post-</b>	New measurement(s) stored in the smartphone application database

<b>conditions</b>			
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The patient logs in to the PHR/PHA.</li> <li>2. The patient taps on the Measurements option from the application's menu.</li> <li>3. The patient selects the type of measurements from a predefined list.</li> <li>4. The patient views existing measurements of the selected type.</li> <li>5. The patient presses a "New measurement" button.</li> <li>6. The patient inserts the date that the measurement was taken and the measurement's value.</li> <li>7. The patient hits the submit button in order to store the new measurement.</li> <li>8. The new measurement is added to the existing measurements.</li> <li>9. In case the new measurement is either a glucose or a pulse measurement, the user is prompted by the smartphone to a screen to fill in her mood as described by the UC-6.1.2.1 Assess Mood.</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	The exact flow of this UC depends on the communication capabilities of the glucose measuring device		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>August 10, 2012</i>	<i>ICOM</i>	<i>Initial version</i>

## 8.10.3.1 UC-6.1.1.2 Collect ODLs Automatically

<b>UC-6.1.1.2</b>	Collect ODLs Automatically
<b>Description</b>	In this use case the PHA connects to a medical device which measures vital parameters and retrieves the recorded value automatically.
<b>Parent</b>	UC-6.1.1 Collection of ODLs
<b>Included sub-use cases</b>	UC-4.3.8 Send Audit Record
<b>Extended sub-use cases</b>	-
<b>Scope</b>	PHR/PHA, ODL Collector Module (Vital/Physical/Mental Parameter Collector Module)
<b>Actor(s)</b>	Patient
<b>Goal</b>	Automatic Collection and local storage of Glucose Level, Weight, Pulse and Blood Pressure.
<b>Trigger</b>	The medical device triggers this UC.
<b>Frequency</b>	Whenever the patient uses a measuring device, or whenever this device is in the proximity of the smartphone and therefore the application running on it can pull the information from the measuring device.
<b>Pre-conditions</b>	A new measurement is available in the measuring device (or even a list of measurements).



<b>Post-conditions</b>	Smartphone communication port (e.g. Bluetooth) paired with the measuring device and smartphone app pulls the list of available measurements from it.		
<b>Success Post-conditions</b>	New measurement(s) stored in the smartphone application database		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The patient logs in to the PHR/PHA.</li> <li>2. From the configuration menu of the application, the patient pairs the smartphone with the measuring device (this step is executed only the first time the patient uses the application and the device. Then the pairing information is permanently stored in the app)</li> <li>3. From the configuration menu of the app the patient sets the app to automatically pull measurements from the device, once it exists in its proximity.</li> <li>4. If automatic pull feature is not supported, then the patient should press a "Connect" button to manually connect to the glucose device and pull information.</li> <li>5. In case the new measurement is either a glucose or a pulse measurement, the user is prompted by the smartphone to a screen to fill in her mood as described by the UC-6.1.2.1 Assess Mood</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	The exact flow of this UC depends on the communication capabilities of the glucose measuring device		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>August 10, 2012</i>	<i>ICOM</i>	<i>Initial version</i>

#### 8.10.4 UC-6.1.2 Provide Mental Health Support

<b>UC-6.1.2</b>	<b>Provide Mental Health Support (The system provides mental health support for depression and stress related issues)</b>		
<b>Description</b>	Diabetes is linked to high risk of depression disorder. Stress and sleep disorders may come along as well. Mental illnesses could hamper self-care and diabetes treatment. Help and support should be accessible anytime.		
<b>Parent</b>	-		
<b>Included sub-use cases</b>	-		
<b>Extended sub-use cases</b>	UC-6.1.2.1 Assess Mood UC-6.1.2.2 Provide Stress Control Support UC-6.1.2.3 Provide Sleep Support		
<b>Scope</b>	PHR/PHA, ODL Collector Module		
<b>Actor(s)</b>	Patient		
<b>Goal</b>	To monitor patient's mental health condition and aid patient to improve quality of life		
<b>Trigger</b>	The patient triggers this UC		

<b>Frequency</b>	Whenever the patient feels the need to seek help on mental health related problems. The frequency of using this use case varies according to the mental state the patient is in. It could be on a daily basis or never if the patient is a good state of mental health.		
<b>Pre-conditions</b>	Pre-conditions are related to the mental status of the patient and not to technical aspects (the patient feels the need to seek support when feeling down, stressed or needs help to sleep).		
<b>Post-conditions</b>	To help patients control depression, stress and sleep problems.		
<b>Success Post-conditions</b>	Amelioration of patient's mental health and support whenever needed		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The patient logs in to the PHR/PHA.</li> <li>2. The patient taps on the Mental Health option from the application's menu.</li> <li>3. The patient selects one of the sub-subsequent options related to mental health aides, e.g.: <ul style="list-style-type: none"> <li>○ Indicate Mood</li> <li>○ Stress Relief</li> <li>○ Fall to Sleep</li> </ul> </li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	Functionality related to the options mentioned in the <i>Main Flow</i> section is yet to be defined		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 8, 2012</i>	<i>ICOM</i>	<i>Initial version</i>

## 8.10.4.1 UC-6.1.2.1 Assess Mood

<b>UC-6.1.2.1</b>	<b>Assess Mood (The system provides support for depression )</b>		
<b>Description</b>	Helps patients record information on their mood. Indications of bad mood are also abnormally high glucose or pulse values. The patient has to enter a mood rating after every glucose or pulse measurement.		
<b>Parent</b>	UC-6.1.2 Provide Mental Health Support		
<b>Included sub-use cases</b>	-		
<b>Extended sub-use cases</b>	-		
<b>Scope</b>	PHR/PHA, ODL Collector Module		
<b>Actor(s)</b>	Patient, PHA		
<b>Goal</b>	To aid patient record mood variations		
<b>Trigger</b>	The patient triggers the Assess Mood UC or the smartphone triggers it automatically after a new glucose or pulse measurement is stored		

<b>Frequency</b>	Either whenever the patient feels the need to insert her mood or every time a new pulse or glucose measurement is stored in the smartphone (both automatically and manually). The frequency of using this use case varies according to the state the patient is in and the frequency the patient has to take glucose and pulse measurements. Usually the Assess Mood could occur several times a day.		
<b>Pre-conditions</b>	Pre-conditions are related to the mental status of the patient (the patient feels the need to record her mood) or a new measurement is stored on the smartphone.		
<b>Post-conditions</b>	The mood rating is stored in the smartphone.		
<b>Success Post-conditions</b>	The new mood rating is successfully stored in the smartphone.		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. Execute UC-6.1.6 Provide Mental Health Support</li> <li>2. Select the Assess Mood Control option</li> <li>3. The Assess Mood form is triggered and the patient selects a mood rating on a scale between 0 and 10.</li> </ol> Or <ol style="list-style-type: none"> <li>1. A new pulse or glucose rating is stored (manually or automatically) as described in UC-6.1.1.1 Collect ODLs Manually, and UC-6.1.1.2 Collect ODLs Automatically</li> <li>2. The Assess Mood form is triggered and the patient selects a mood rating on a scale between 0 and 10.</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.2</b>	<i>August 10, 2012</i>	<i>ICOM</i>	<i>Modification of title, description, goal, trigger, frequency and main flow</i>

## 8.10.4.2 UC-6.1.2.2 Provide Stress Control Support

<b>UC-6.1.2.2</b>	<b>Provide Stress Control Support (The system provides mental health support for controlling stress )</b>		
<b>Description</b>	The patient enters her stress level. When either the stress rating or the patient's pulse is above normal levels she is reminded to breathe right by keeping a low breath tempo. This UC can be used before falling to sleep for a better quality of sleep.		
<b>Parent</b>	UC-6.1.2 Provide Mental Health Support		
<b>Included sub-use cases</b>	-		
<b>Extended sub-use cases</b>	-		
<b>Scope</b>	PHR/PHA, ODL Collector Module		

<b>Actor(s)</b>	Patient		
<b>Goal</b>	To record stress levels and help patients relax and rest.		
<b>Trigger</b>	The patient triggers the Provide Stress Control Support UC		
<b>Frequency</b>	Whenever the patient feels the need to enter her stress level or seek help on controlling stress related issues. The frequency of using this use case varies according to the state the patient is in. It could be on a daily basis or never if the patient does not have stress related problems.		
<b>Pre-conditions</b>	Pre-conditions are related to the stress status of the patient and not to technical aspects (the patient feels the need to seek support when stressed).		
<b>Post-conditions</b>	Non-technical.		
<b>Success Post-conditions</b>	Non-technical		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. Execute UC-6.1.2 Provide Mental Health Support</li> <li>2. Select the Stress Control option</li> <li>3. The Stress Control form is triggered and the patient selects a stress rating on a scale between 0 and 10.</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.2</b>	<i>August 10, 2012</i>	<i>ICOM</i>	<i>Modification of description, goal, frequency and main flow</i>

## 8.10.4.3 UC-6.1.2.3 Provide Sleep Support

<b>UC-6.1.2.3</b>	<b>Provide Sleep Support (The system helps patient to sleep)</b>		
<b>Description</b>	The sleeping time of the patient is recorded either manually or automatically. The automatic collection of the sleeping time is realized using the sensors of the smartphone and depends on its capabilities. The patient is also able to enter her sleeping habits, manually, through a submit form. On top of that, this UC provides relaxing sounds and information on light therapy which will help the patient to relax and fall asleep quicker than usual. There is a sleep diary option where she can take notes on when she has problems to fall asleep and why.		
<b>Parent</b>	UC-6.1.2 Provide Mental Health Support		
<b>Included sub-use cases</b>	-		
<b>Extended sub-use cases</b>	-		
<b>Scope</b>	PHR/PHA, ODL Collector Module		

<b>Actor(s)</b>	Patient, PHA		
<b>Goal</b>	A better quality of sleep with less insomnia.		
<b>Trigger</b>	The patient triggers the Fall to Sleep or the Fall to Sleep is automatically triggered by the smartphone device.		
<b>Frequency</b>	Every night the sleeping time and date are recorded automatically by the patient's smartphone device (in case the patient's smartphone supports such a functionality) or manually by the patient herself. In every case, this UC is used whenever the patient wants to record her sleeping habits or feels the need to seek help in falling asleep. The frequency with which the patient is using this UC varies according to the state the patient is in. It could be on an everyday basis or never if the patient does not have sleep related problems.		
<b>Pre-conditions</b>	Pre-conditions are related to the status of the patient and not to technical aspects (the patient feels the need to seek support when she needs help to sleep).		
<b>Post-conditions</b>	The patient's sleeping habits are stored automatically or manually and a series of relaxing tunes is loaded in the bundled media player		
<b>Success Post-conditions</b>	Amelioration of patient's quality of sleep whenever needed		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. Execute UC-6.1.2 Provide Mental Health Support</li> <li>2. Select the Fall to Sleep option</li> <li>3. Select a music play list from a drop down list</li> <li>4. The media player bundled with the application starts playing the play list</li> </ol> <p>Or</p> <ol style="list-style-type: none"> <li>1. Execute UC-6.1.2 Provide Mental Health Support</li> <li>2. Select the Fall to Sleep option</li> <li>3. Select the Sleep Diary option</li> <li>4. Enter the date, sleep time and wake up time in the form. Also write comments about the sleep quality and the reason the sleep didn't last long enough.</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.3</b>	August 10, 2012	ICOM	Modification of the description, trigger, frequency, Post-conditions and the main flow

### 8.10.5 UC-6.1.4 Synchronize PHR Data with PHRS

<b>UC-6.1.4</b>	<b>Synchronize PHR Data with PHRS</b>
<b>Description</b>	In this use case the PHA connects to the PHR database to store ODLs

<b>Parent</b>	-		
<b>Included sub-use cases</b>	UC-5.4.7 Import EHR and/or PHR Data to the used PHR System UC-4.3.7 Authenticate User UC-4.3.8 Send Audit Record UC-4.3.9 Authenticate EMPOWER Component (Node) for Secure Channel UC-4.3.1.3 Grant or Deny Access to Patient Data based on Consent		
<b>Extended sub-use cases</b>	-		
<b>Scope</b>	PHA, PHR		
<b>Actor(s)</b>	PHA, PHR		
<b>Goal</b>	Remote storage of the ODLs to the PHR database		
<b>Trigger</b>	The application automatically triggers this use case whenever network connectivity and the appropriate service is available from the server side		
<b>Frequency</b>	It could be once per day or more frequently. It depends on network availability and server robustness		
<b>Pre-conditions</b>	The patient has logged in to the PHA and connection to the server is possible (network availability and server is up and running)		
<b>Post-conditions</b>	Smartphone application pushes new ODLs to the PHR database.		
<b>Success Post-conditions</b>	New measurement(s) transferred to the PHR database and can be presented by third party PHR applications		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The patient logs in to the PHA.</li> <li>2. A dedicated service running in the background connects to the server and stores new ODLs to the database</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 15, 2012</i>	<i>ICOM</i>	<i>Initial version</i>

### 8.10.6 UC-6.1.5 Record Medication Changes

<b>UC-6.1.5</b>	<b>Record Medication Changes</b>
<b>Description</b>	<p>This ODL service aims to record medication changes such as a change of the dosage or frequency of current prescribed drugs, change of drugs (e.g. new drugs, drugs stopped). The service will be available as Web service and as a mobile-based service. The description will include detailed information such as</p> <ul style="list-style-type: none"> <li>• Drug name</li> <li>• Taking, e.g. oral, inhalation, rectal, etc.</li> <li>• Dosage and time</li> <li>• Date</li> </ul>

	<ul style="list-style-type: none"> <li>Comments – this field may also include questions for the next appointment with the Medical Professional</li> </ul> <p>Basically, the service presents the current/actual view of the prescribed medication plus non-prescribed medication the patient additionally takes.</p>		
<b>Parent</b>	-		
<b>Included sub-use cases</b>	UC-4.3.8 Send Audit Record		
<b>Extended sub-use cases</b>	-		
<b>Scope</b>	ODL Collector		
<b>Actor(s)</b>	Patient		
<b>Goal</b>	To record medication compliance		
<b>Trigger</b>	By the Patient		
<b>Frequency</b>	Whenever needed		
<b>Pre-conditions</b>	The Patient is logged into PHRS.		
<b>Post-conditions</b>	-		
<b>Success Post-conditions</b>	Medication change is stored persistently		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>The Patient selects the medication services</li> <li>The Patient updates the medication list. This mean either <ul style="list-style-type: none"> <li>To insert a new medication or</li> <li>To change one or more parameters of an existing medication, e.g. dosage, frequency, stop / reactivate a medication or</li> <li>To delete a medication</li> </ul> </li> </ol>		
<b>Extensions</b>	<p>A log file presents the medication compliance as a historical view and could be an informative input for an appointment with the treating Medical Professional.</p> <p>Option – a bar chart representing each drug in a time frame</p>		
<b>Open Issues</b>	<ul style="list-style-type: none"> <li>Should the patient also record upcoming problems that may possibly be a drug side-effects or a drug interaction?</li> <li>If the patient information leaflets for drugs are available via Internet, this could be includes as information material for drugs.</li> </ul> <p>Prerequisite is an unique identifier (e.g. ATC<sup>10</sup> Code)</p> <p>Language issues for the Pilot Applications have also been considered. Maybe only an English version is available.</p>		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>

<sup>10</sup> The Anatomical Therapeutic Chemical (ATC) Classification System is used for the classification of drugs

0.1	June 5, 2012	SRFG	Initial version
-----	--------------	------	-----------------

## 8.11 Task 6.2 Use Cases “Monitoring Physical and Lifestyle Activities”

### 8.11.3 UC-6.2.1 Manage Physical Activities

<b>UC-6.2.1</b>	<b>Manage Physical Activities</b>
<b>Description</b>	<p>The Patient records details about his physical activities by collecting data either via Web or through mobile devices. These data are stored as results in the inbox of the Action Plan. Depending on the type of activity the data may comprise</p> <ul style="list-style-type: none"> <li>● Type of activity</li> <li>● Date</li> <li>● Duration of activity</li> <li>● Comments</li> <li>● etc.</li> </ul> <p>The collection of the ODL results will be done manually by the Patient, basically by selecting the ODL action in the Action Plan and inserting the result data.</p> <p>Inbox notifications – A user might receive messages regarding their activities (reminders, alerts, request to complete something) Depending on the process model or activity, a user might be notified to perform a task related to the activity, or be notified that they can create activities (new user)</p>
<b>Parent</b>	-
<b>Included sub-use cases</b>	UC-5.4.1 Manage Information Material UC-4.3.8 Send Audit Record UC-6.2.1.1 Record Physical Activity
<b>Extended sub-use cases</b>	-
<b>Scope</b>	ODL Collector
<b>Actor(s)</b>	Patient
<b>Goal</b>	To record ODL results about physical activities
<b>Trigger</b>	The use case is triggered by the Patient who is performing a physical activity.
<b>Frequency</b>	Basically, this is a frequent use case but it depends on the number of planned physical activities.
<b>Pre-conditions</b>	-
<b>Post-</b>	-



<b>conditions</b>			
<b>Success Post-conditions</b>	The results are stored.		
<b>Main Flow</b>	(1) The Patient executes the ODL action (not supported by EMPOWER) (2) The Patient logs into the mobile application. (3) The Patient taps on the Physical Activities ODL (4) The Patient selects the executed ODL action in the Action Plan, confirms the execution and if applicable, inserts additional data.		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	June 5, 2012	SRFG	Initial version

#### 8.11.4 UC-6.2.1.1 Record Physical Activity

<b>UC-6.2.1.1</b>	<b>Record Physical Activity</b>
<b>Description</b>	The Patient uses her smartphone device to record details about her physical activity.
<b>Parent</b>	UC-6.2.1 Manage Physical Activities
<b>Included sub-use cases</b>	UC-5.4.1 Manage Information Material UC-4.3.8 Send Audit Record
<b>Extended sub-use cases</b>	-
<b>Scope</b>	ODL Collector
<b>Actor(s)</b>	Patient
<b>Goal</b>	To store persistently physical activity parameters measured by the patient's smartphone
<b>Trigger</b>	The use case is triggered by the Patient when using the smartphone to record a physical activity.
<b>Frequency</b>	It is triggered whenever the patient uses her smartphone to record a physical activity. This frequency depends on how often the patient executes the types of activities supported by the smartphone application.
<b>Pre-conditions</b>	-
<b>Post-conditions</b>	-
<b>Success Post-</b>	The physical activity parameters measured by the smartphone are stored.

<b>conditions</b>			
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. Login into the mobile application.</li> <li>2. Tap on the Physical Activities ODL</li> <li>3. Select the ODL action to be executed from the Action Plan.</li> <li>4. Tap on the “Start Recording” button</li> <li>5. A timer starts and the application makes use of the mobile device sensors (proximity sensor, 3-axis accelerometer, compass) to record activity related raw data.</li> <li>6. When the execution of the physical activity has been completed tap on the “Stop Recording” button.</li> <li>7. Depending on the type of activity the application presents a summary of the recorded activity. Either in the form of a graph of the route followed, using the Google Maps API or present a summary of the activity, e.g. average speed, number of repetitions, duration of activity etc.</li> <li>8. Tap on the finish Activity and then select a mood rating in the submit form in a scale from 1 to 10.</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	August 10, 2012	ICOM	Initial version

### 8.11.5 UC-6.2.2 Food Diary recording Eating Behaviours

<b>UC-6.2.2</b>	<b>Food Diary recording Eating Behaviours</b>
<b>Description</b>	<p>The Patient inserts everything he is eating during a day (meals and foods in between) in the Food Diary. He selects food from a database of common foods. This food database includes the diabetes-relevant food ingredients such as good carbohydrates, proteins, fat, dietary fibers for all food stored in the food database. The Patient inserts per meal</p> <ul style="list-style-type: none"> <li>• Name of the food (e.g. potatoes, Spaghetti) including beverage from the food database</li> <li>• Quantity of the food</li> <li>• Date and time</li> </ul> <p>The Patient can also insert types of foods not found in the food database but has additionally to indicate the food ingredients.</p> <p>The Food Diary aims to record eating behaviour of diabetes patients for a period of time (e.g. a week). Based on that the Patient become aware what he is really eating and can analyse whether his eating behaviour are in line with nutrition recommendations for diabetes patients.</p>
<b>Parent</b>	-
<b>Included sub-use cases</b>	UC-5.4.7 Import EHR and/or PHR Data to the used PHR System UC-4.3.8 Send Audit Record
<b>Extended sub-use</b>	-

<b>cases</b>			
<b>Scope</b>	ODL Collector Module		
<b>Actor(s)</b>	Patient		
<b>Goal</b>	The Patient records food on a daily basis		
<b>Trigger</b>	The use case is triggered by the Patient who records food on a daily basis.		
<b>Frequency</b>	<p>The Food Diary can be used for two purposes:</p> <ol style="list-style-type: none"> <li>(1) For Patients to whom diabetes is new and who wants to analyse their eating behaviour</li> <li>(2) For Patients who already live a longer time with diabetes and who wants to check whether their eating behaviour are still in line with nutrition recommendations for diabetes patients</li> </ol> <p>The approach for both is to record eating behaviour for several days (e.g. a week) occasionally. Hence, this is a rare use case.</p>		
<b>Pre-conditions</b>	The patient logs in to the PHR/PHA successfully.		
<b>Post-conditions</b>	The patient submits a new meal.		
<b>Success Post-conditions</b>	The new meal is stored persistently.		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The Patient logs in to EMPOWER (Web or mobile)</li> <li>2. The Patient clicks the Food Diary</li> <li>3. The Patient indicates the food and the quantity for each component of the meal – either by selecting the food from the food database or by inserting the food name and the food ingredients</li> <li>4. The Patient insert date and time of the meal</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 8, 2012</i>	<i>ICOM</i>	<i>Initial version</i>
<b>0.2</b>	<i>July 31, 2012</i>	<i>SRFG</i>	<i>Update</i>

### 8.11.6 UC-6.2.3 Evaluating Food Diary

<b>UC-6.2.3</b>	<b>Evaluating Food Diary</b>
<b>Description</b>	<p>The Food Diary will be evaluated based on diabetes relevant nutrition recommendations, such as:</p> <ul style="list-style-type: none"> <li>• Evaluating the appropriate distributions of nutrients (good carbohydrates, proteins and fat)</li> <li>• Do the meals of a day include sufficient dietary fiber?</li> <li>• Does the Patient drink enough?</li> </ul> <p>The evaluation will be done on a daily basis and will also include the recorded daily glucose value.</p>
<b>Parent</b>	-

<b>Included sub-use cases</b>	-		
<b>Extended sub-use cases</b>	-		
<b>Scope</b>	ODL Collector Module		
<b>Actor(s)</b>	Patient		
<b>Goal</b>	The Patient evaluated the Food Diary		
<b>Trigger</b>	The use case is triggered by the Patient who evaluates the Food Diary		
<b>Frequency</b>	This is a rare use cases based on the Food Diary.		
<b>Pre-conditions</b>	The Patient logs in to the PHR/PHA successfully.		
<b>Post-conditions</b>	The patient submits a new meal.		
<b>Success Post-conditions</b>	The new meal is stored persistently.		
<b>Main Flow</b>	(1) The Patient logs in to EMPOWER (Web or mobile) (2) The Patient clicks the Food Diary. (3) The Patient selects the period to be evaluated (4) The Patient presses the evaluation button.		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	July 31, 2012	SRFG	Initial version

### 8.11.7 UC-6.2.4 Calculate Nutrients Distribution

<b>UC-6.2.4</b>	<b>Calculate Nutrients Distribution</b>
<b>Description</b>	The Patient selects food from the food database. Based on that EMPOWER presents an overview of the included and still missing food ingredients (e.g. carbohydrates, proteins, fat, dietary fiber). Additionally, it will be checked whether these nutrients are included in an optimal distribution.
<b>Parent</b>	-
<b>Included sub-use cases</b>	-
<b>Extended sub-use</b>	-

<b>cases</b>			
<b>Scope</b>	ODL Collector Module		
<b>Actor(s)</b>	Patient		
<b>Goal</b>	The Patient can check whether all diabetes-relevant nutrients are included in an optimal distribution		
<b>Trigger</b>	The use case is triggered by the Patient who wants to check his meal		
<b>Frequency</b>	Depending on the Patient this can be a frequent or rare use case		
<b>Pre-conditions</b>	The Patient logs in to the PHR/PHA successfully.		
<b>Post-conditions</b>	The patient submits a new meal.		
<b>Success Post-conditions</b>	The new meal is stored persistently.		
<b>Main Flow</b>	(1) The Patient logs in to EMPOWER (Web or mobile) (2) The Patient clicks the Nutrients Distribution (3) The Patient indicates the food and the quantity for each component of the meal – either by selecting the food from the food database or by inserting the food name and the food ingredients (4) The Patient presses the evaluation button.		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>July 31, 2012</i>	<i>SRFG</i>	<i>Initial version</i>

### 8.11.8 UC-6.2.5 Nutritional Information Material

<b>UC-6.2.5</b>	Nutritional Information Material
<b>Description</b>	This UC includes nutritional information on different types of foods, nutritional tips for a healthy living and examples of meals with well-balanced distribution of nutrients, tasty recipes and meal plans.
<b>Parent</b>	UC-6.2.2 Food Diary recording Eating Behaviours
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	-
<b>Scope</b>	PHR/PHA
<b>Actor(s)</b>	Patient
<b>Goal</b>	The patient browses through information material on diabetic friendly foods.

<b>Trigger</b>	The patient triggers the Nutritional Information Material		
<b>Frequency</b>	Every diabetes patient is recommended to eat several times a day in order to keep her insulin levels at the desired levels. The number of meals consumed daily is recommended by the Medical Professional. The patient is asked to insert the type and amounts of foods consumed after every meal.		
<b>Pre-conditions</b>	The patient logs in to the PHR/PHA successfully.		
<b>Post-conditions</b>	-		
<b>Success Post-conditions</b>	-		
<b>Main Flow</b>	<p>The patient logs in to the PHR/PHA.  The patient taps on the Food Diary.  She then selects the Nutritional Information  She is prompted to a menu including the following options:</p> <ul style="list-style-type: none"> <li>○ Meal Plan</li> <li>○ Nutritional Tips</li> <li>○ Meal Examples</li> <li>○ Recipes</li> </ul>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.2</b>	<i>August 10, 2012</i>	<i>ICOM</i>	<i>Initial Version</i>

### 8.11.9 UC-6.2.6 Insulin Reminder

UC-6.2.6	Insulin Reminder
<b>Description</b>	The diabetic patient has to take his insulin dosage 15 – 45 minutes before she eats depending on the medication, the carbohydrates in the meal and the glucose value of the patient.
<b>Parent</b>	UC-6.2.2 Food Diary recording Eating Behaviours
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	-
<b>Scope</b>	PHR/PHA
<b>Actor(s)</b>	Patient
<b>Goal</b>	The patient is being reminded to take insulin before a meal.
<b>Trigger</b>	The smartphone application triggers this UC.
<b>Frequency</b>	Diabetic patients have to consume several meals a day in order to keep

	insulin levels low. Patient is reminded to take insulin before a meal, so this UC is triggered several times a day.		
<b>Pre-conditions</b>	The patient logs in to the PHR/PHA successfully.		
<b>Post-conditions</b>	The patient remembers to take insulin.		
<b>Success Post-conditions</b>	Patient takes insulin.		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The patient logs in to the PHR/PHA.</li> <li>2. A reminder flashes at the patient's smartphone screen.</li> <li>3. The patient taps on the reminder.</li> <li>4. The patient reads the reminder's message.</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.2</b>	<i>August 10, 2012</i>	<i>ICOM</i>	<i>Initial Version</i>

#### 8.11.10 UC-6.2.7 Manage Observations of Daily Living

<b>UC-6.2.7</b>	<b>Manage Observations of Daily Living</b>		
<b>Description</b>	<p>The EMPOWER user can navigate to ODL User management User Interface from EMPOWER dashboard to manage their ODLs and perform actions upon them (add, delete, edit if appropriate) Once an action is completed, Action Plan process engine is notified.</p> <p>The EMPOWER User also might receive messages in their EMPOWER inbox informing the EMPOWER user to complete a task, such as reporting an ODL. The appropriate web form (or link) is provided so that the user can complete the task. Once completed, the process engine is notified.</p>		
<b>Parent</b>	-		
<b>Included sub-use cases</b>	UC-5.4.7 Import EHR and/or PHR Data to the used PHR System UC-4.3.8 Send Audit Record UC-6.1.1 Collection of		
<b>Extended sub-use cases</b>	-		
<b>Scope</b>	PHRS, Action Plan Engine, Security, ODL Collector		
<b>Actor(s)</b>	Patient		
<b>Goal</b>	To manage Observations of Daily Living		
<b>Trigger</b>	The user can select the ODL management option in the dashboard or the		

	user opens a message in their inbox that directs them to perform a particular action involving an OLD e.g. enter blood pressure.		
<b>Frequency</b>	-		
<b>Pre-conditions</b>	EMPOWER user with appropriate permissions to perform ODL actions or actions associated with the patient inbox		
<b>Post-conditions</b>	-		
<b>Success Post-conditions</b>	The default main ODL Management User interface is displayed appropriate for device or application (PHRS)		
<b>Main Flow</b>	User selects ODL management menu item from the Dashboard System displays the default main ODL Management User interface		
<b>Extensions</b>	-		
<b>Open Issues</b>	PHRS integration into PHRS		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 5, 2012</i>	<i>SRFG</i>	<i>initial</i>

## 8.12 Task 6.3 Use Cases “Providing Multimodal Services and Interfaces”

### 8.12.3 UC-6.3.1 Select User Interface Modality

<b>UC-6.3.1</b>	<b>Select user interface modality</b>
<b>Description</b>	The patient selects the desired user interface modality, from a list of available options. This depends on the device (s)he uses. For example, when considering a smartphone an option would be to have audio guidance in the application. Haptic enabled user interface is considered as the default for such devices.
<b>Parent</b>	-
<b>Included sub-use cases</b>	UC-6.3.1.1 Voice Input UC-6.3.1.2 Speech Command
<b>Extended sub-use cases</b>	-
<b>Scope</b>	PHA
<b>Actor(s)</b>	Patient
<b>Goal</b>	To select preferable modality of the user interface.
<b>Trigger</b>	This use case is triggered by the diabetes patient.
<b>Frequency</b>	Seldom.
<b>Pre-</b>	The patient logs in to the PHA and opens the configuration settings.



<b>conditions</b>			
<b>Post-conditions</b>	The desired selection is stored in the PHA settings.		
<b>Success Post-conditions</b>	The patient navigates in the PHA, experiencing the desired modality.		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The patient logs into the PHA.</li> <li>2. The patient clicks the Configuration button.</li> <li>3. The patient determines the desired modality of the application</li> <li>4. The selection is stored in the application settings</li> <li>5. The patient can continue navigating in the PHA, experiencing the desired modality.</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	For the time being we have identified audio navigation as a possible modality. We need to investigate what more could be necessary		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 12, 2012</i>	<i>ICOM</i>	<i>Initial version</i>

## 8.12.3.1 UC-6.3.1.1 Voice Input

<b>UC-6.3.1.1</b>	<b>Voice Input</b>
<b>Description</b>	The patient uses the smartphone built in microphone to speak instead of typing a word or phrase.
<b>Parent</b>	UC-6.3.1 Select User Interface Modality
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	-
<b>Scope</b>	PHA
<b>Actor(s)</b>	Patient
<b>Goal</b>	To provide input to the smartphone application using a microphone, instead of the keyboard.
<b>Trigger</b>	This use case is triggered by the diabetes patient.
<b>Frequency</b>	Whenever needed
<b>Pre-conditions</b>	The patient has enabled the voice search option from the configuration menu.
<b>Post-conditions</b>	The desired text is input in the application
<b>Success Post-conditions</b>	The application operates in the exact same manner is if the patient has entered text using the keyboard and pressed the Enter button.

<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The patient logs into the PHA.</li> <li>2. Wherever the application supports Voice Input, the patient presses an appropriate button (which enables the device to start capturing speech from the microphone) and pronounces the desired word or phrase</li> <li>3. The application executes the same processes as if the enter button was pressed after typing in the smartphone keyboard</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	To define in which parts of the PHA would be interesting to have Voice Input		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>June 12, 2012</i>	<i>ICOM</i>	<i>Initial version</i>

## 8.12.3.2 UC-6.3.1.2 Speech Command

<b>UC-6.3.1.2</b>	<b>Speech Command</b>
<b>Description</b>	The patient navigates in the smart phone user interfaces and/or administrates commands using her speech instead of typing or tapping in the screen of the smartphone.
<b>Parent</b>	UC-6.3.1 Select User Interface Modality
<b>Included sub-use cases</b>	-
<b>Extended sub-use cases</b>	-
<b>Scope</b>	PHA
<b>Actor(s)</b>	Patient
<b>Goal</b>	To navigate in the PHA using speech commands
<b>Trigger</b>	This use case is triggered by the diabetes patient.
<b>Frequency</b>	Whenever needed
<b>Pre-conditions</b>	The patient has enabled the speech command option from the configuration menu.
<b>Post-conditions</b>	The desired page is presented in the user upon speech request
<b>Success Post-conditions</b>	The application operates in the exact same manner is if the patient has tapped in the corresponding place in the smartphone monitor
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The patient logs into the PHA.</li> <li>2. The patient addresses speech commands in the application (e.g. "Open Calendar"</li> <li>3. The application executes the same processes as if the user has tapped on a specific area in the smartphone monitor (e.g. it opens the Calendar, as if the Calendar icon was tapped)</li> </ol>

<b>Extensions</b>	-		
<b>Open Issues</b>	To what extent this use case is fully applicable in the PHA is a matter of the exact functionality that end users expect.		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	June 12, 2012	ICOM	Initial version

## 8.13 Task 6.4 Use Cases “EHR/PHR Interoperability with Health Applications”

### 8.13.3 UC-6.4.1 Import EHR Data using IHE XPHR

<b>UC-6.4.1</b>	<b>Import EHR Data using IHE XPHR</b>
<b>Description</b>	In the EMPOWER framework, there are three types of ODL and one of them is the past Electronic Health Record data. During the execution of the both MP-DGs and Action Plans, the availability of the EHR is crucial. In other words, after logging into their PHR, the patients will be able to import their existing EHR data from hospital information systems or even from other countries (this case will be described in the next use case UC-6.4.2. The most well-known mechanism to gather data from EHR to PHR is Integrating the Healthcare Enterprise’s <sup>11</sup> Exchange of Personal Health Record Content Profile (XPHR) <sup>12</sup> . This profile describes the content and format of summary information extracted from a PHR System for import into an EHR System, and vice versa. The purpose of this profile is to support interoperability between PHR systems used by patients and EHR systems used by healthcare providers. An important point in this use case is the authentication of the patient. In other words, before importing the data from the EHR, the patient should be authenticated on the EHR side.
<b>Parent</b>	UC-5.4.7 Import EHR and/or PHR Data to the used PHR System
<b>Included sub-use cases</b>	UC-4.3.7 Authenticate User UC-4.3.8 Send Audit Record UC-4.3.9 Authenticate EMPOWER Component (Node) for Secure Channel UC-4.3.1.3 Grant or Deny Access to Patient Data based on Consent
<b>Extended sub-use cases</b>	-
<b>Scope</b>	EHR/PHR Data Manager
<b>Actor(s)</b>	Patient
<b>Goal</b>	To retrieve data from an EHR system to PHR.
<b>Trigger</b>	This use case is triggered by the diabetes patient.
<b>Frequency</b>	This use case is a frequent use case.

<sup>11</sup> <http://www.ihe.net/>

<sup>12</sup> [http://wiki.ihe.net/index.php?title=Exchange\\_of\\_Personal\\_Health\\_Record\\_Content\\_Profile](http://wiki.ihe.net/index.php?title=Exchange_of_Personal_Health_Record_Content_Profile)

<b>Pre-conditions</b>	The patient logs in to the PHR system and opens the EHR/PHR Data Manager. The PHR System needs to identify the role of the logged in user and accordingly display the EHR/PHR Data Manager.		
<b>Post-conditions</b>	The clinical data is retrieved from the EHR system and stored persistently in the databases of the PHR System.		
<b>Success Post-conditions</b>	The clinical data is retrieved from the EHR system and stored persistently in the databases of the PHR System.		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The patient logs into the PHR System.</li> <li>2. The patient clicks the EHR/PHR Data Manager.</li> <li>3. The patient determines the target EHR System from which his/her data will be retrieved.</li> <li>4. The patient enters required information (such as necessary identifiers, protocol numbers, etc.). This information is necessary for authentication on the EHR Side.</li> <li>5. The data is transferred from the EHR System to PHR through IHE XPHR Profile.</li> <li>6. The data is stored to the databases of PHR.</li> <li>7. The patient can examine the data through the PHR GUI.</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>May 29, 2012</i>	<i>SRDC</i>	<i>Initial version</i>

#### 8.13.4 UC-6.4.2 Import EHR Data through epSOS Network

<b>UC-6.4.2</b>	<b>Import EHR Data through epSOS Network</b>
<b>Description</b>	In the EMPOWER framework, there are three types of ODL and one of them is the past Electronic Health Record data. During the execution of the both MP-DGs and Action Plans, the availability of the EHR is crucial. In other words, considering the European county's requirements, after logging into their PHR, the patients will be able to import their existing EHR data from other countries if there is such data. For this purpose, the epSOS Network <sup>13</sup> will be used. epSOS is a European Commission supported project for the sharing of EHR across EU countries.
<b>Parent</b>	UC-5.4.7 Import EHR and/or PHR Data to the used PHR System
<b>Included sub-use cases</b>	UC-4.3.7 Authenticate User UC-4.3.8 Send Audit Record UC-4.3.9 Authenticate EMPOWER Component (Node) for Secure Channel UC-4.3.1.3 Grant or Deny Access to Patient Data based on Consent
<b>Extended sub-use</b>	-

<sup>13</sup> <http://www.epsos.eu/>

<b>cases</b>			
<b>Scope</b>	EHR/PHR Data Manager		
<b>Actor(s)</b>	Patient		
<b>Goal</b>	To retrieve data from another country to PHR.		
<b>Trigger</b>	This use case is triggered by the diabetes patient.		
<b>Frequency</b>	This use case is a rare use case.		
<b>Pre-conditions</b>	The patient logs in to the PHR system and opens the EHR/PHR Data Manager. The PHR System needs to identify the role of the logged in user and accordingly display the EHR/PHR Data Manager.		
<b>Post-conditions</b>	The clinical data is retrieved from the other country and stored persistently in the databases of the PHR System.		
<b>Success Post-conditions</b>	The clinical data is retrieved from the other country and stored persistently in the databases of the PHR System.		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The patient logs into the PHR System.</li> <li>2. The patient clicks the EHR/PHR Data Manager.</li> <li>3. The patient determines the target EU country from which his/her data will be retrieved.</li> <li>4. The patient enters required information (such as necessary identifiers, protocol numbers, etc.). This information is used for authentication on the epSOS network side.</li> <li>5. The data is transferred from the specified country to PHR through epSOS network.</li> <li>6. The data is stored to the databases of PHR.</li> <li>7. The patient can examine the data through the PHR GUI.</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>May 29, 2012</i>	<i>SRDC</i>	<i>Initial version</i>

### 8.13.5 UC-6.4.3 Import PHR Data using IHE XPHR

<b>UC-6.4.3</b>	<b>Import PHR Data using IHE XPHR</b>
<b>Description</b>	Through this use case, PHR Data from either other PHR Systems or PHA applications will be imported to the PHR System's databases through IHE XPHR.
<b>Parent</b>	UC-5.4.7 Import EHR and/or PHR Data to the used PHR System
<b>Included sub-use cases</b>	UC-4.3.7 Authenticate User UC-4.3.8 Send Audit Record UC-4.3.9 Authenticate EMPOWER Component (Node) for Secure Channel UC-4.3.1.3 Grant or Deny Access to Patient Data based on Consent

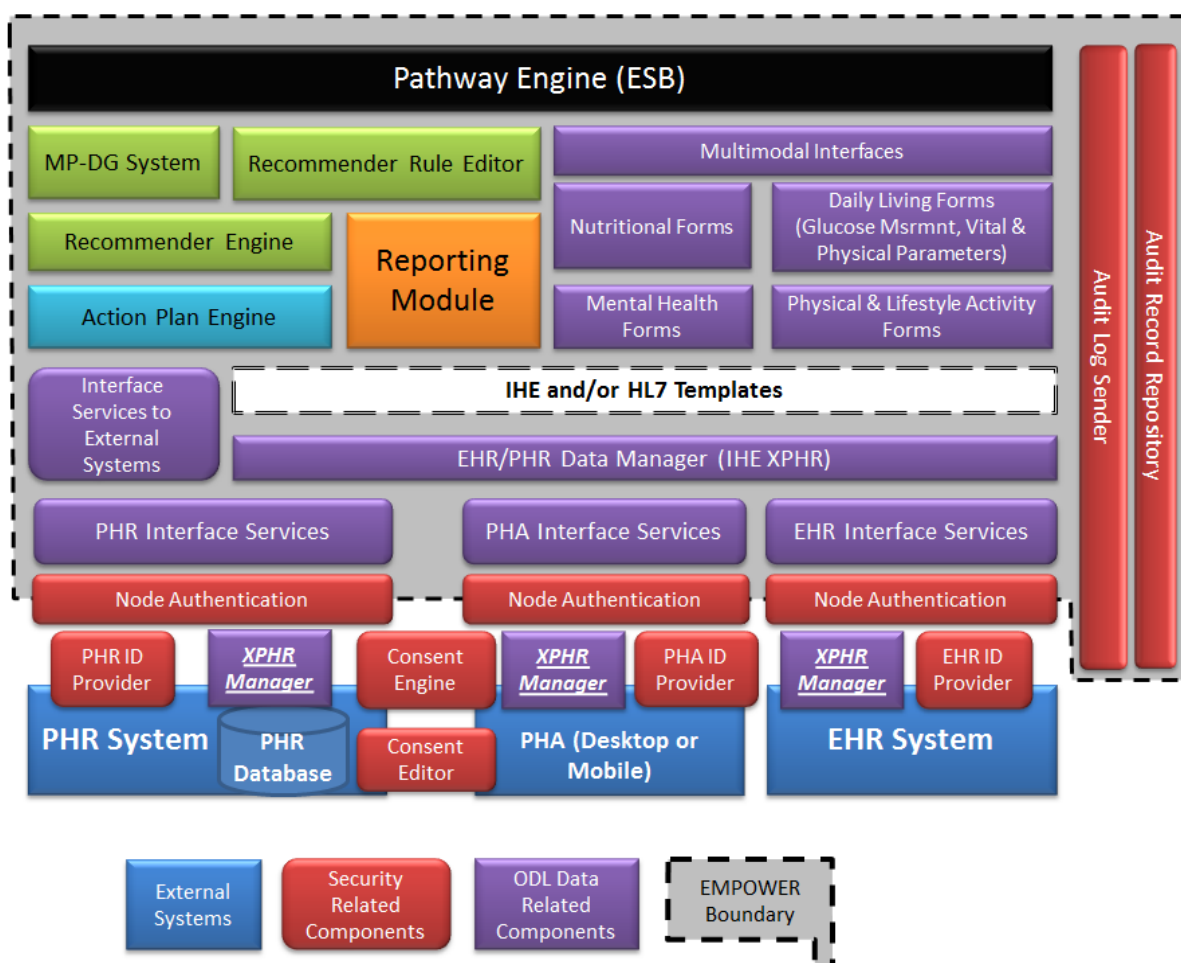
<b>Extended sub-use cases</b>	-		
<b>Scope</b>	EHR/PHR Data Manager		
<b>Actor(s)</b>	Patient		
<b>Goal</b>	To retrieve PHR data from another PHR System and/or PHA.		
<b>Trigger</b>	This use case is triggered by the diabetes patient.		
<b>Frequency</b>	This use case is a frequent use case.		
<b>Pre-conditions</b>	The patient logs in to the PHR system and opens the EHR/PHR Data Manager. The PHR System needs to identify the role of the logged in user and accordingly display the EHR/PHR Data Manager.		
<b>Post-conditions</b>	The clinical data is retrieved from the EHR system and stored persistently in the databases of the PHR System.		
<b>Success Post-conditions</b>	The clinical data is retrieved from the EHR system and stored persistently in the databases of the PHR System.		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The patient logs into the PHR System.</li> <li>2. The patient clicks the EHR/PHR Data Manager.</li> <li>3. The patient determines the target PHR System/PHA from which his/her data will be retrieved.</li> <li>4. The patient enters required information (such as necessary identifiers, protocol numbers, etc.). This information is used to authenticate the user on the PHR/PHA side.</li> <li>5. The data is transferred from the PHR System to PHR through IHE XPHR Profile.</li> <li>6. The data is stored to the databases of PHR.</li> <li>7. The patient can examine the data through the PHR GUI.</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
0.1	May 29, 2012	SRDC	Initial version

### 8.13.6 UC-6.4.4 Export Data from PHR

<b>UC-6.4.4</b>	<b>Export Data from PHR</b>
<b>Description</b>	In use case 6.4.1, the medical data is transferred from EHR to PHR. This case is in the reverse direction: From PHR to EHR (or from PHR to PHA) As mentioned in use case 6.4.1, the prominent standard in this case is also IHE XPHR. One different issue in this use case is that most of the EHR Systems do not trust the patient entered data and therefore do not accept the data from PHRs directly. In between, intervention by a medical professional may be required.
<b>Parent</b>	-

<b>Included sub-use cases</b>	-		
<b>Extended sub-use cases</b>	-		
<b>Scope</b>	EHR/PHR Data Manager		
<b>Actor(s)</b>	Patient		
<b>Goal</b>	To insert data from PHR to EHR.		
<b>Trigger</b>	This use case is triggered by the diabetes patient.		
<b>Frequency</b>	This use case is a rare use case.		
<b>Pre-conditions</b>	The patient logs in to the PHR system and opens the EHR/PHR Data Manager. The PHR System needs to identify the role of the logged in user and accordingly display the EHR/PHR Data Manager.		
<b>Post-conditions</b>	The clinical data is inserted from the PHR to EHR.		
<b>Success Post-conditions</b>	The clinical data is inserted from the PHR to EHR.		
<b>Main Flow</b>	<ol style="list-style-type: none"> <li>1. The patient logs into the PHR System.</li> <li>2. The patient clicks the EHR/PHR Data Manager.</li> <li>3. The patient determines the target EHR system/PHA to which his/her data will be inserted.</li> <li>4. The patient enters required information (such as necessary identifiers, protocol numbers, etc.).</li> <li>5. The data is transferred from the PHR to EHR/PHA through IHE XPHR.</li> </ol>		
<b>Extensions</b>	-		
<b>Open Issues</b>	-		
<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Changes</b>
<b>0.1</b>	<i>May 29, 2012</i>	<i>SRDC</i>	<i>Initial version</i>

## 9 Description of requirements



**Figure 9 Coarse-grained Components of EMPOWER Architecture**

The identified components of the EMPOWER Architecture are shown in Figure 9.

- Pathway Engine: This component will orchestrate the rest of the components and will run the self-management process for the Patients.
- Recommender Engine: The Recommender Engine component will provide recommendation to the Medical Professionals by examining the EHR/PHR data and well-known clinical guidelines.
  - o MP-DG System: This user interface components will allow to manage machine processable diabetes guidelines.
  - o Recommender Rule Editor: Through this rule editor, the Medical Professionals will create recommendation rules for their patients graphically.
- Reporting Module: The Reporting Module will present the progress in the self-management process of the Patients through user-friendly and focused reports.
- Action Plan Engine: The Action Plan Engine will allow the Patients to define their goals and actions. In addition to that the Action Plan Engine will send necessary reminders to the Patients for the execution of the actions.
- Multimodal Interfaces: Through these modules, the Patients will be able to give voice/speech commands to their Personal Health Applications.
  - o Nutritional Forms: Through these forms, the Patients will enter their daily nutritional information.



- Daily Living Forms: These forms will allow the Patients to enter their Glucose Measurement, Vital and Physical Parameters.
- Mental Health Forms: These forms will allow the Patients to enter their daily mental statuses.
- Physical & Lifestyle Activity Forms: These forms will allow the Patients to enter their daily physical and life style activities.
- EHR/PHR Data Manager: The component will be responsible for the communication with the external systems (PHR, EHR, and PHA) through standards based data formats.
- XPHR Data Manager: This component will allow the external components to send their data to the EMPOWER system in a standard based (IHE XPHR) mechanism if the external component does not support this standard.
- Interface Services: The EMPOWER system will communicate with PHR Systems, EHR Systems and PHA systems during the course of self-management process. As shown in the figure, the EMPOWER components are external to the PHR, PHA and EHR systems. According to the requirements, the EMPOWER system will provide standards based interfaces to be interoperable with any type of PHR, PHA and EHR systems. These interface services will establish this communication. There will be three types of interface:
  - PHR Interfaces
  - PHA Interfaces
  - EHR Interfaces
- Security Related Components: The security of the EMPOWER System will be established based on the IHE standards. The following components will be used:
  - Node Authentication: This component will establish the confidentiality, integrity, non-repudiation and authentication of the communicating systems.
  - ID Providers: Each of the party will provide an ID Provider and before a data exchange the data requesting party will be authenticated by the target system by using the ID Provider.
  - Consent Editor: Through this graphical tool, the Patient will create their consent rules.
  - Consent Engine: The Consent Manager will either grant or deny the access for the patient data based on the consent rules defined by the Patient.
  - Audit Log Sender: All of the activities in the EMPOWER system will be audited. This client will provide necessary audit records.
  - Audit Record Repository: This repository is a central repository to keep the audit records.

Each of the components is described in detail in the following subsections.

## 9.10WP4 requirements.

### 9.10.3 Task 4.1 requirements. Knowledge-based Pathway Engine

#### 9.10.3.1 Pathway Engine

Version	Date	Changes	From	Review
0.1	June 05, 2012	Initial version	SRFG	All Partners

<b>Description</b>	This components handles the management and execution of pathway process model(s) for the EMPOWER system and patients.
--------------------	---

	<p>This component provides central access to many services especially to store data. In this way, relevant data can be extracted for the process engine.</p> <p>There can be more than one pathway model for diabetes patients, however, there is a default model and there can be models primarily for testing, demonstration or simulation (simulate user interaction). The choice of pathway model might be also depend on the requirements of the PHRS, country or institution.</p> <p>Utilizes a Rule based Process Engine that supports RESTful Services or Java API. Restful services might include SAML statements</p> <p>During process model execution, communicates with User via user Inbox. It might communicate with other applications or services via listeners. Applications can use the patient mailbox to facilitate communication between process engine or between other applications (named message queues)</p>
<b>Related use case</b>	<p>Pathway Engine related use cases</p> <p>UC-4.1.1 Manage Pathways Knowledge Model</p>
<b>General function</b>	<p>Handles Pathway process models, and listens to (is notified) interactions between EMPOWER components and Users.</p> <p>It provides common services to exchange info between patient or medical professional and EMPOWER components.</p>
<b>User characteristics</b>	<p>EMPOWER users interact with the Pathway engine via EMPOWER components and the particular knowledge model (Pathway engine or Action plan)</p>
	<p>PHRSs/PHR might use process models and include in these models. Alternative, any application can embed a lightweight process engine so that the models are transparent and modular.</p>

### Functional Requirements

1. The Pathway engine shall also provide RESTful services to consumers for monitoring processes and process tasks.
2. The Pathway engine and its process engine will communicate and interact with EMPOWER user via the EMPOWER inbox
3. The Pathway engine shall provide the means to load and execute Knowledge models
4. It is desired to load and run knowledge models or BPM process models from EMPOWER components e.g. from the Action Plan Engine or a PHRS.
5. Pathway engine shall provide the necessary data to the process engine relevant to a particular process model
6. Pathways engine shall access registered user data form metadata used in EMPOWER to support process models, interoperability, and persistence.
7. Interactions with users (devices, sensors) shall provide the process engine with required data based on requirements of the process models. For example, an ODL is submitted and the required data is stored
8. Process engine shall provide common services to exchange information between patient (or medical professional) and EMPOWER components e.g. Inbox related to patient or medical patient processes and tasks
9. Security authentication and authorization shall be integrated and observed.
10. If messages for the Action Plan Engine are received, it shall attempt to process them, otherwise, it shall forward to the Action Plan engine for processing.

**Data requirements**

1. Pathways engine shall access registered user data form metadata used in EMPOWER to support process models, interoperability, and persistence. This information can be registered by and accessed by the configuration component. The data form registry includes form metadata, unique form identifier, form properties and interoperability mapping.
2. Persistence of form data must include a unique form identifiers include namespace, patient identifier, property identifiers that are registered in the configuration. Components storing form data provide unique form IDs in all form transactions and a unique form submission identifier

**Non-functional Requirements**

1. It is proposed to use an ESB – Enterprise Service Bus infrastructure to support Pathway Engine, EMPOWER modules and services, support messaging (EIP patterns Enterprise Integration Patterns), and services
2. It is expected to use a BPM Process Engine with rule support. Separate Process engines might also be integrated into Action Plan engine Module or PHRS (or PHA integrated into the PHRS) Additional Process engines can also be embedded where needed in supporting applications and these may or may not communicate with the Pathway Engine.

**Assumptions and dependencies**

- A rule-based process engine is used

**Open Issues**

- The Action plan engine (APE) might use the Pathway engine to run the relevant Action plan knowledge models, therefore the APE might only load their models to the Pathway engine and wrap process engine services needed. Also, a standalone APE might utilize its own process engine.

**9.10.3.2 EMPOWER Inbox Engine**

Version	Date	Changes	From	Review
0.1	June 05, 2012	Initial version	SRFG	All Partners

<b>User characteristics</b>	The patients use this component.
-----------------------------	----------------------------------

<b>Description</b>	<p>The EMPOWER inbox component provides services used by EMPOWER components including front-end client components to visualize and support user interactions with other users and with the Pathway Engine and Action Plan Engine.</p> <p>The EMPOWER inbox handles the messaging between EMPOWER components and the EMPOWER User. It provides services for the implementation/integration into PHRS or PHA clients. One demo client should be provided with User interfaces. The Inbox is normally available from the PHRS/PHA EMPOWER dash board menu</p>
--------------------	--

	This component is also responsible for sending messages to the patient's inbox sent by the EMPOWER users such as patients or Medical Professionals. The patient can read and delete, messages received from other EMPOWER Users..
<b>Related use case</b>	UC-4.1.2 Manage EMPOWER Inbox UC-4.1.3 Open Inbox Message UC-4.1.6 Patient Receives Messages
<b>General function</b>	The EMPOWER inbox handles the messaging between EMPOWER components and the EMPOWER User. EMPOWER users can send one another messages e.g. Medical professional can send message to Patient.
<b>User characteristics</b>	The EMPOWER users use this component.

### Functional requirements

1. The provide services for PHRS client implementations, and to support the extension of existing PHRS inbox functionalities
2. It shall allow reading messages from Inbox.
3. It shall allow removing read and unread messages from Inbox.
4. It shall allow classification of read messages as unread.
5. It shall offer classification of messages using EMPOWER terminologies
6. It shall include classification of messages using EMPOWER terminologies from other sources (system or other user)
7. It shall offer organization of messages according to the classifications
8. It shall allow deletion of an incoming message
9. It shall allow the system to perform housekeeping on messages sent by system to reduce information load on the user.
10. It shall provide services for status and metrics of inbox for total messages and by classification category, unread messages.
11. It shall provide services to create or extend PHRS/PHA client inbox applications.

### Interface requirements

1. It shall provide a basic simple overview and an optional detailed overview depending on the settings of the application. For example, if the action plan context is active, the inbox view might be customized according to the action plan context. The complex detailed overview emphasizes the action plan related messages.
2. It shall show a list of the messages, both read and unread, totals for unread/total, and by classification category
3. The list of messages will include subject, received date and sender name.
4. The patient will be allowed to select messages from the list and delete them.
5. The patient will be able to read the content of an incoming message.
6. The message's content will be shown in a separate screen than the message's list screen.
7. Along with the message's content the patient will be shown the sender's information
8. The category list and metrics can be viewed and category can be selected to display messages The inbox views can be customized based on the device type or other PHA requirements or constraints

### Constraints

There is no constraint for this component.

### Open Issues

There is no open issue.

## 9.10.4 Task 4.2 requirements. Trends and Visualisation of Self-management Services

### 9.10.4.1 Reporting Module

Version	Date	Changes	From	Review
0.1	June 05, 2012	Initial version	HMGU	All Partners

<b>Description</b>	<p>Reporting module provides presentation layer for the medical data. The main goal of the module is to provide requested information and to present it in the most efficient form considering different users' perspective and different media. The module supports the following tasks:</p> <ul style="list-style-type: none"> <li>• <b>Feedback supporting self-control</b> <ul style="list-style-type: none"> <li>○ The analysis and the evaluation of the patients recorded activities should foster the patient's motivation regarding his/her diabetes treatment. If possible the evaluation should also give useful hints.</li> <li>○ Where applicable hints should be based on the Medical Professionals recommendation</li> </ul> </li> <li>• <b>Evaluation reports for Medical Professionals</b> <ul style="list-style-type: none"> <li>○ Evaluation reports based on the patient's self-management activities should be an additional information source for the Medical Professionals next appointment with the patient.</li> <li>○ It has to be clarified whether Medical Professionals need a more detailed and/or additional evaluations reports</li> <li>○ The data and reports accessible for Medical Professionals have to be in accordance with the patients' privacy.</li> </ul> </li> </ul>
<b>Related use case</b>	UC-4.2.1 Presentation of Trends and Visualization of Self-management Services
<b>General function</b>	The module provides medical data to the user on the screen of personal computer, mobile device or information kiosk
<b>User characteristics</b>	Patients and doctors use this component

### Functional requirements

1. It provides medical data to the user on the screen of personal computer, mobile device or information kiosk.
2. It processes PHR data that is stored conforming to a standard format.
3. It provides printing functionality for the desktop version.
4. It allows users to set up the interface (scale, data to be displayed, font size, color schema) and to save the settings.

5. It provides template modeling functionality for the knowledge worker in order to define new graphical representations to support user specific views.

### Data requirements

1. Module retrieve data form the PHR in a standard format
2. Archetypes definitions are available that provide a formal description of the data model

### Interface requirements

The visualization module must provide an interface that allows its services to be consumed by other system components

### Non-functional requirements

1. The retrieval of data from the other components should conform to Integrating the Healthcare Enterprise's Audit Trail and Node Authentication<sup>1</sup> Profile.
2. The EHR data retrieval from the EHR/PHR Data Manager component should not take more than 1 minute.
3. The graphical user interfaces should be user friendly and subject to improvement after validation through Pilot Applications.

### Constraints

1. The visualization service has to be embedded into different user applications (PHA, PHR) and system components (like the Recommender Engine and the Dashboard) in a seamless way.
2. A unified solution to Identification and Access Control has to be provided in order to enable that the several components of the system can work together.

### Assumptions and dependencies

There are no specific assumptions.

### Open Issues

There is no open issue.

## 9.10.5 Task 4.3 requirements. Patient Consent Management and Security

### 9.10.5.1 Security Module

Version	Date	Changes	From	Review
0.1	June 05, 2012	Initial version	SRFG	All Partners

<b>Description</b>	Security related services and configuration for Authorization, Authentication and secure communications
--------------------	---

	Authorization and authentication services include integration of those services provided by the PHRS and configured Identity Provider. The EMPOWER security can determine if the EMPOWER is authenticated (authentication status), possibly from an EMPOWER session. Audit logging by EMPOWER components is supported by typed message templates. Open Source tools provide services and reporting tools e.g. OpenATNA, OpenAM, OpenDJ. Security related configurations are accessible including whether secure communications are in effect. All components should check whether secure communications are in effect in the case that test or demo profiles are in effect.
<b>Related use case</b>	UC-4.3.1 Manage Patient Consent UC-4.3.1.1 Patient Gives Consent to Medical Professional Using the Consent Editor Tool UC-4.3.1.2 Patient Removes Medical Professional from the "Given Consent" List UC-4.3.1.3 Grant or Deny Access to Patient Data based on Consent
<b>General function</b>	This component provides security related services authorization audit logging, authentication, authorization and secure communications It accesses the configuration component for its configuration
<b>User characteristics</b>	The User will use a web client to manage consent rules

### Functional requirements

1. It shall provide access to security related configuration
2. It shall provide authorization services
3. It shall provide configuration option to override secure communications during simulation or testing. The configuration component provides access to this configuration.
4. There shall be support for IHE ATNA. OpenATNA software provides auditing with IHE profile support, application for visualization. This application shall be secured and available to particular authenticated users
5. It shall provide a service to for components to send Audit log messages. EMPOWER Services must be assigned identifiers in the EMPOWER configuration.

### Data requirements

- EMPOWER Services must be assigned identifiers in the EMPOWER configuration
- Provide configuration in configuration component

### Assumptions and dependencies

- Open source tools for ATNA e.g. OpenATNA
- Use of Open source tools for authentication and authorization are desired: EMPOWER SOTA OpenAM, OpenDJ, etc.

### Open Issues

1. Authentication services – Identity provider and EMPOWER or PHRS session.
2. Should use Identity mapper services be provided? E.g. to shield user identifiers in user interfaces.
3. Identity services:
  - Create static identity provider sources into LDAP?
  - Application pilots providers might need to provide static data sources for medical and patient identities from institutions. Also needed are user roles and institutional identifiers/metadata.

- Adaptors would be the configured for static as described previously or direct connections to institutional identity providers.
- Can we also assign Medical Professionals to patients?
- LDAP for also White page directory -institution, roles, medical, patient support groups, patients, patients also in this structure?

#### 9.10.5.2 Consent Editor

Version	Date	Changes	From	Review
0.1	June 11, 2012	Initial version	ICOM	All Partners

<b>Description</b>	The Consent Editor is a submodule of the Consent Management Module and is responsible for managing the consents the patient gives to Medical Professionals. With the Consent Editor the patient is able to give consent to Medical Professionals, remove Medical Professionals from the “Given Consent” list and view contact details of the Medical Professionals she has previously given consent.
<b>Related use case</b>	UC-6.1.10 Patient Gives Consent to Medical Professional(s) Using the Consent Editor Tool UC-6.1.11 Patient Views Contact Info of Medical Professional(s) she has Given Consent UC-6.1.12 Patient Removes Medical Professional(s) from the “Given Consent” List
<b>General function</b>	The Consent Editor is responsible for managing the patient’s consents.
<b>User characteristics</b>	The patients use this component.

#### Functional requirements

The following functionalities shall be provided by the Consent Editor:

1. It shall allow multiple executions of different Consent Editors for the same patient.
2. It shall allow to display the available hospitals.
3. It shall allow to choose a hospital among the available.
4. It shall allow to display the available Medical Professionals of the selected hospital
5. It shall allow to add Medical Professionals in the “Given Consent” list.
6. It shall allow to display the list of the Medical Professional(s) the patient has given consent.
7. It shall allow deleting multiple Medical Professionals from the “Given Consent” list.
8. It shall allow to view contact information of the Medical Professionals in the “Given Consent” list.

#### Data requirements

All the consent data will be available in OASIS eXtensible Access Control Markup Language (XACML)<sup>14</sup> format.

<sup>14</sup> [https://www.oasis-open.org/committees/tc\\_home.php?wg\\_abbrev=xacml](https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=xacml)



**Interface requirements**

1. It will show the list of Medical Professionals included in the “Given Consent” list.
2. The patient will be able to view the contact information of Medical Professionals she has given consent.
3. It shall provide GUIs to the patient for inserting and removing Medical Professionals from the “Given Consent” list.

**Non-functional requirements**

1. The patients will be able to define their consent in a user friendly way.

**Constraints**

There is no constraint for this component.

**Assumptions and dependencies**

This component will be a part of the PHR system.

**Open Issues**

There is no open issue.

**9.10.5.3 Consent Engine**

Version	Date	Changes	From	Review
0.1	June 05, 2012	Initial version	SRFG SRDC	All Partners

<b>Description</b>	Consent Engine
<b>Related use case</b>	Security Related Use Cases
<b>General function</b>	<p>Interfaces with the Security services and access control records created by the Consent Editor. Provides authorization services to EMPOWER modules via EMPOWER Security services</p> <p>Includes configuration options (Configuration services) loading test files to support configuration of test and simulation scenarios.</p>
<b>User characteristics</b>	The EMPOWER components use this module.

**Functional requirements**

1. It shall either grant or deny a data access attempt based on the consent of the patient.
2. This component will be accessed by the EMPOWER components. Therefore, this component can be reachable by Web service calls.

**Data requirements**

All the consent data will be available in OASIS eXtensible Access Control Markup Language (XACML)<sup>15</sup> format.

### Interface requirements

1. This component needs to access the patient's consent rules defined by the patient through Consent Editor.
2. This component shall be accessible through Web Services.

### Non-functional requirements

1. The component should respond in less than 10 seconds.

### Constraints

There is no constraint.

### Assumptions and dependencies

1. Use of Open source tools desired: EMPOWER SOTA OpenAM, OpenDJ, etc.

### Open Issues

1. Address lower level security use cases

Add/remove Access record	Add or remove access record stating access rights for a service/app, user, role on a resource or service about an action
Get Permitted Actions	Issue: by User and Role Role & Resource & Action Role & Service/application & Action
Grant Permission	
Get ATNA template message	Get appropriate string template
Audit an activity	Prepare and send audit message Resource, resource type, accessed by, outcome
View Audit records	Existing web application for OpenATNA

#### 9.10.5.4 Configuration Module

<b>Description</b>	This component provides configuration related services for EMPOWER.  Includes endpoints of services (interoperability, test/demo modes, etc.) Location of EMPOWER terminologies and localization resources
<b>Related use case</b>	-
<b>General function</b>	Components should have access to common configurations, defined Endpoints, interoperability related settings, etc. Settings for test or demonstration modes, Security related settings. Secure communications can be overridden for testing or demonstration.
<b>User characteristics</b>	All of the EMPOWER components will use this module.
<b>Open Issues</b>	Apache Commons Configuration supports both XML or property/value

<sup>15</sup> [https://www.oasis-open.org/committees/tc\\_home.php?wg\\_abbrev=xacml](https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=xacml)

	type files
--	------------

## Functional requirements

1. Configuration tool shall provide services to EMPOWER components to access configuration properties either using simple property and/or XML based configuration.
2. EMPOWER Services must be assigned identifiers in the EMPOWER configuration. This is used by the consent manager and audit trail log services
3. Configuration shall provide configurations relating to particular profiles e.g. relevant for a particular deployment e.g. pilot application
4. Configuration tool shall configure the Pathway Engine, Action plan engine configuration, terminologies. Where feasible, updates to the configuration can be performed when the system is running.
5. Configuration tool shall provide services to access resource bundles for localization.
6. Configuration tools shall provide services for localization of terminologies. This can use the resource bundles for localization of properties.
7. Configuration tools shall provide access to common EMPOWER sources.
  - 7.1. CSS, java script files for use by components
  - 7.2. Terminologies lookup by namespace & code, filter list by category, and localization support
8. Configuration tool should provide services for handling web form metadata by the pathway engine and interoperability components. The services include access and registration of data form metadata.
9. Configuration shall define services and applications that are permitted to participate in the particular EMPOWER deployment These should also be coordinated with the security components
10. Configuration tool provides access to configurations for EMPOWER components included (but not exclusive):
  - 10.1. Secure communication
  - 10.2. Security related
  - 10.3. Identity provider
  - 10.4. Testing related.
  - 10.5. Interoperability
  - 10.6. Endpoints of EMPOWER services and supporting components
  - 10.7. templates e.g. including named query templates, perhaps visualization (results lists)
  - 10.8. Configurations for using Information materials and social software e.g. named query templates, content search templates, end points for EMPOWER info materials, forums, etc.

## Data requirements

1. EMPOWER Terminologies (set of terminologies used by EMPOWER)
  - 1.1. Domain specific to EMPOWER (UI support, component support)
  - 1.2. Standard codes from medical terminologies
2. Provide resource bundles for localized Code properties. Codes include namespace, code and categorization for accessing lists of codes
3. The services provide access and registration of data form metadata. The configuration should be initialized by components or possibly updated by components during runtime
4. Data form registration: Data form metadata, property name, property type and localization labels and interoperability mappings. System should be able to extract what is necessary to create an interoperability message or to store data in EMPOWER. Pathway engine might need all or part of the data.
5. Persistence of form data must include a unique form identifiers include namespace, patient identifier, property identifiers that are registered in the configuration. Components

storing form data provide unique form IDs in all form transactions and a unique form submission identifier. The data form registry includes form metadata, unique form identifier, form properties, value types, interoperability mapping, and interoperability converter classes.

### Interface requirements

There will be no user interface support

### Constraints

There is no constraint.

### Assumptions and dependencies

1. Use of Open source tools desired: Apache Commons Configuration or ESB based tool to support access to the EMPOWER configuration
2. To run configuration changes can be associated with a software build tool and deployment tool e.g. Maven & Cargo Gradle

### Open Issues

Consider providing custom Java annotation interface to annotate relevant form properties for persistence and interoperability mappings. Java annotations could then be used to facilitate the read/write of interoperability messages based on the annotated classes

#### 9.10.5.5 Identity Manager Module

<b>Description</b>	<p>Provides identity services to support</p> <ul style="list-style-type: none"> <li>• Identity lookup (namespace &amp; ID) and management</li> <li>• Identity includes role (original, mapped to EMPOWER role), institution identifiers, Demographic data</li> <li>• Connects to Identity provider (adaptors)</li> <li>• EMPOWER default adaptor accesses static data sources (LDAP) rather than directly to institutions (supports pilot app and test scenarios)</li> <li>• Medical professionals and patients, institutions, groups</li> <li>• Identifiers should connect namespace and patient identifier in electronic health records, EHR or other sources</li> <li>• Supports Authentication and authorization regarding roles or identifiers</li> <li>• Roles should be mapped to common EMPOWER roles</li> <li>• Identities for test users, non-medical related such as administrators are provided in the LDAP configuration and assigned appropriate roles</li> </ul> <p>Provides identity mapping services to support</p> <ul style="list-style-type: none"> <li>• Enables applications to use a temporary user identifier in order to obscure patient identifiers on User interfaces or in applications</li> </ul>
<b>Related use case</b>	<p>Security related Use cases:</p> <p>UC-4.3.3 Create EMPOWER User</p> <p>UC-4.3.6 Manage Identifiers for User Identity</p> <p>UC-4.3.7 Authenticate User</p>

<b>General function</b>	Provides Identity Services primarily for patients and medical professionals
<b>User characteristics</b>	

### Functional requirements

Provides identity services to support

- Identity lookup (namespace & ID) and management
- Identity includes role (original, mapped to EMPOWER role), institution identifiers, Demographic data
- Should connects to Identity provider (adaptors)
- EMPOWER default adaptor should access static data sources (LDAP) rather than directly to institutions (supports pilot app and test scenarios)
- Identifiers should connect namespace and patient identifier in electronic health records, EHR or other sources
- Roles in other systems or PHRS should be mapped to common EMPOWER roles
- Identities for test users, non-medical related such as administrators, etc are provided in the LDAP configuration and assigned appropriate roles
- It is desired to offer identity mapping service to obscure patient identifiers on User interfaces or in applications
- Shall provide default configurations for the pilot applications. The configuration component provides a selector for the particular profile
- Shall provide default configuration for demo and testing configurations. The configuration component provides a selector for the particular profile

### Assumptions and dependencies

1. Use of Open source tools desired, see EMPOWER SOTA OpenAM, OpenDJ, etc.

### Open Issues

Determine the open source tools to use.

#### 9.10.5.6 Identity Provider Module

EMPOWER can access one or more Identity providers that support the association between an EMPOWER user (EMPOWER identity) known to system components and external identities such as associated with EHR, PHR or other PHA services An identity provider can provide patient identities, Medical professional identities, or PHA services user identities or PHRS user identities.

<b>Description</b>	<p>EMPOWER must utilize the existing identities information of institution or groups, medical professionals and patients. Data includes contact information, certified roles (medical professionals), identifiers, other demographic data. Roles will be mapped to standard EMPOWER roles. Additional information can be added to the EMPOWER contact list</p> <p>EMPOWER users can be created from this information and users can be informed regarding their account status. EMPOWER white pages for medical professional can be created from this list and supplemented (add email, phone). For patients, the identity information is the default information in their contact information that also can be supplanted. The open issue is how medical professionals can access updated patient contact information in EMPOWER.</p>
--------------------	---

	<p>This module:</p> <ul style="list-style-type: none"> <li>• Supports the access of clinical identity providers via adaptors with institutions or test institutions</li> <li>• Supports association of EMPOWER User</li> </ul> <p>Configurable adaptors provide the means to import identity profiles including roles, identifiers, names, etc.</p> <p>The following should be realized</p> <ul style="list-style-type: none"> <li>• A test data source to simulate the connection to institutions</li> <li>• An EMPOWER medical identity data source (e.g. LDAP) containing medical professionals and patients.</li> <li>• To be discussed. It is desired that there are established relationships between Medical Professionals and patients. If relationships change, this source should be updated</li> </ul>
<b>Related use case</b>	<p>Security related Use case</p> <p>UC-4.3.3 Create EMPOWER User</p> <p>UC-4.3.7 Authenticate User</p> <p>UC-4.3.6 Manage Identifiers for User Identity</p> <p>UC-4.3.1 Manage Patient Consent</p>
<b>General function</b>	Provides access to EMPOWER Identity providers for applications or medical institutions
<b>User characteristics</b>	The user has multiple accounts or identities across multiple systems. The goal is to associate the EMPOWER user with one or more identities. The user might interact and authenticate with EHR or other services in the Consent Manager or other PHRS component.

### Data requirements

1. A test data source to simulate the connection to institution
2. Secure Interface requirements

### Assumptions and dependencies

1. Use of Open source tools desired: EMPOWER SOTA OpenAM, OpenDJ, etc.  
Also for secure LDAP and services

### Open Issues

1. An identity provider can provide patient identities, Medical professional identities, or PHA services user identities or PHRS user identities. How do we connect a PHRS to an EMPOWER user? How EHR patient to EMPOWER user? To PHRS? Currently we require that the medical identity exists first, then we create an EMPOWER user. If the medical entity is removed from the provider, then we deactivate the EMPOWER user. Other options?

#### 9.10.5.7 Audit Record Repository

Version	Date	Changes	From	Review
0.1	August 8, 2012	Initial version	SRDC	All Partners

<b>Description</b>	The Audit Record Repository (ARR) component collects all the logs sent from EMPOWER components and allows the System Administrator to monitor the system operation on who sends which type of information to whom, who saw which type of information of whom, etc. In this way, the security of the EMPOWER framework is enhanced.
<b>Related use case</b>	UC-4.3.8 Send Audit Record
<b>General function</b>	To collect the audit logs from the EMPOWER Components.
<b>User characteristics</b>	The EMPOWER components use this ARR.

### Functional requirements

The following functionalities shall be provided by the ARR:

- It shall allow the EMPOWER components to send audit logs conforming to IHE ATNA Profile.
- It shall provide a GUI to System Administrators.
- It shall allow the System Administrators to monitor EMPOWER system operation.

### Data requirements

- The audit logging data shall conform to IHE ATNA Profile.

### Interface requirements

- There will be a GUI for this component.

### Non-functional requirements

- The GUI shall provide sufficient details.
- The GUI shall be user friendly.

### Constraints

There is no constraint for this component.

### Assumptions and dependencies

For this component, OpenATNA implementation can be used.

### Open Issues

There is no open issue.

#### 9.10.5.8 Audit Trail/Log Sender

Version	Date	Changes	From	Review
0.1	August 8, 2012	Initial version	SRDC	All Partners

<b>Description</b>	Through this component, the EMPOWER components will be able to send audit logs to ARR through IHE ATNA profile to enhance traceability of the system execution.
<b>Related use case</b>	UC-4.3.8 Send Audit Record

<b>General function</b>	To send audit logs to ARR.
<b>User characteristics</b>	The EMPOWER components use this component.

### Functional requirements

The following functionalities shall be provided by the Audit Trail/Log Sender:

- It shall allow the EMPOWER components to send audit logs to ARR.
- It shall allow the EMPOWER components to conform to IHE ATNA Profile.

### Data requirements

- The audit logging data shall conform to IHE ATNA Profile.

### Interface requirements

- There will be no GUI for this component.

### Constraints

There is no constraint for this component.

### Assumptions and dependencies

For this component, OpenATNA implementation can be used.

### Open Issues

There is no open issue.

#### 9.10.5.9 Node Authentication Submodule

Version	Date	Changes	From	Review
0.1	August 8, 2012	Initial version	SRDC	All Partners

<b>Description</b>	This component will establish secure communication among the EMPOWER components through TLS by conforming to IHE ATNA Profile.
<b>Related use case</b>	UC-4.3.9 Authenticate EMPOWER Component (Node) for Secure Channel
<b>General function</b>	To provide confidentiality and integrity of the communication among the EMPOWER components, and provide authentication of these components.
<b>User characteristics</b>	The EMPOWER components use this component.

### Functional requirements

The following functionalities shall be provided by the Node Authentication Submodule:

- It shall provide confidentiality and integrity of the communication.
- It shall provide authentication of the EMPOWER components.
- It shall provide these functionalities by conforming to IHE ATNA Profile.



**Data requirements**

- The communication line among the EMPOWER components will be secured by TLS. Therefore, the infrastructure will be based on Public/Private Keys and X509 certificates.

**Interface requirements**

- There will be no GUI for this component.

**Non-functional requirements**

- The certificates shall be easily producible and distributable.

**Constraints**

There is no constraint for this component.

**Assumptions and dependencies**

There are no assumptions.

**Open Issues**

There is no open issue.

**9.11 WP5 requirements.****9.11.3 Task 5.2 requirements. Diabetes based Personalised Adaptive Recommender Engine****9.11.3.1 Recommender Engine Module**

Version	Date	Changes	From	Review
0.1	June 05, 2012	Initial version	SRDC	All Partners

<b>Description</b>	The Recommender Engine is responsible for executing long-running Machine Processable Diabetes Guidelines on behalf of the medical professionals. In addition to the long-running MP-DGs, the Recommender Engine also provides direct recommendations based on the condition of the patient. Accordingly, the medical professionals can specify goals and develop action plans for the diabetes patients.
<b>Related use case</b>	UC-5.2.3 Execute and Monitor Diabetes Guideline UC-5.2.4 Generate Recommendation about the Patient UC-5.2.5 Create Recommendation Rules for Diabetes Patients
<b>General function</b>	The Recommender Engine is responsible for execution Machine Processable Diabetes Guidelines.
<b>User characteristics</b>	The medical professionals use this component.

**Functional requirements**

The following functionalities shall be provided by the Recommender Engine:

1. It shall allow multiple executions of one MP-DG for different patients.
2. It shall allow multiple executions of different MP-DGs for the same diabetes patient.
3. It shall allow to suspend an execution.
4. It shall allow to resume a suspended execution.
5. It shall allow to abort an execution.
6. It shall allow to view the results of previous MP-DG executions.
7. It shall show all the executing MP-DGs and their statuses.
8. It shall execute Recommendation Rules specified about the diabetes patient and shall provide direct recommendations to the medical professionals.

#### **Data requirements**

1. During the MP-DG execution, the Recommender Engine retrieves data from the “EHR/PHR Data Manager”.
2. During the MP-DG execution, the Recommender Engine shall provide forms to the logged in medical professional to get data about the treatment/monitoring of the diabetes patient.
3. During the MP-DG execution, the Recommender Engine shall retrieve data from PHR System about the patient.

#### **Interface requirements**

1. It shall show the patient data on a separate place than the MP-DG execution.
2. It shall show the status of the executions.

#### **Non-functional requirements**

1. The retrieval of data from the other components should conform to Integrating the Healthcare Enterprise’s Audit Trail and Node Authentication<sup>16</sup> Profile.
2. The EHR data retrieval from the EHR/PHR Data Manager component should not take more than 1 minute.
3. The graphical user interfaces should be user friendly and subject to improvement after validation through Pilot Applications.

#### **Constraints**

There is no constraint for this component.

#### **Assumptions and dependencies**

For deriving direct recommendations, the Recommender Engine will use a rule engine. It is envisaged that an open-source solution, e.g. Drools, will be used for this purpose.

#### **Open Issues**

There is no open issue.

#### **9.11.3.2 MP-DG System**

Version	Date	Changes	From	Review
---------	------	---------	------	--------

<sup>16</sup> [http://wiki.ihe.net/index.php?title=Audit\\_Trail\\_and\\_Node\\_Authentication](http://wiki.ihe.net/index.php?title=Audit_Trail_and_Node_Authentication)

0.1	June 05, 2012	Initial version	SRDC	All Partners
-----	---------------	-----------------	------	--------------

<b>Description</b>	The MD-DG System is a submodule of Recommender Engine Module and it is responsible for the management of Machine Processable Diabetes Guidelines. The management task includes creation, update, deletion and assignment to a diabetes patient.
<b>Related use case</b>	UC-5.2.1 Create Machine Processable Diabetes Guideline UC-5.2.2 Assign Diabetes Guideline to Patient UC-5.2.3 Execute and Monitor Diabetes Guideline
<b>General function</b>	The MP-DG System is responsible for the management of MP-DGs.
<b>User characteristics</b>	The medical professionals use this component.

### Functional requirements

1. The MP-DG System shall allow to create Machine Processable Diabetes Guidelines both graphically and manually.
2. The MP-DG System shall allow to assign a MP-DG to a diabetes patient.
3. The MP-DG System shall display the already existing MP-DGs to the medical professional.
4. The MP-DG System shall display the recommendations to the medical professionals and allow them to edit the recommendations.

### Data requirements

1. The MP-DG System shall retrieve available diabetes patient list from the PHR System.
2. The MP-DG System shall store the MP-DG instances persistently.
3. The MP-DG System shall store patient assignment information persistently.

### Interface requirements

1. The MP-DG System will show the existing MP-DGs in a list.
2. The MP-DG System will provide GUIs to create MP-DGs.

### Non-functional requirements

1. The MP-DG System when retrieving the patient list from the PHR System shall conform to Integrating the Healthcare Enterprise's Audit Trail and Node Authentication<sup>17</sup> Profile.

### Constraints

There is no constraint in this component.

### Assumptions and dependencies

It is assumed that the PHR System will return the list of patients who already gave consent to the logged in medical professional.

<sup>17</sup> [http://wiki.ihe.net/index.php?title=Audit\\_Trail\\_and\\_Node\\_Authentication](http://wiki.ihe.net/index.php?title=Audit_Trail_and_Node_Authentication)

**Open Issues**

There is no open issue.

## 9.11.3.3 Recommender Rule Editor

Version	Date	Changes	From	Review
0.1	June 05, 2012	Initial version	SRDC	All Partners

<b>Description</b>	The Recommender Rule Editor is responsible for creating recommendation rules graphically. The recommendation rules, in contrast to long lived MP-DGs, provide recommendations to the medical professionals on the condition of the patient. The rules will access both the PHR and EHR data of the patient. Furthermore, there may be rule templates which can be personalized to a certain diabetes patient.
<b>Related use case</b>	UC-5.2.5 Create Recommendation Rules for Diabetes Patients
<b>General function</b>	The main function of this component is to help the medical professionals to create recommendation rules for the diabetes patients.
<b>User characteristics</b>	The medical professionals use this component.

**Functional requirements**

1. The Recommender Rule Editor shall provide a GUI to help the medical professional to create recommendation rules.
2. This component shall allow the user to delete an existing rule.
3. This component shall allow the user to assign a rule to a diabetes patient.
4. This component shall allow to personalize a rule/rule template to a diabetes patient.

**Data requirements**

1. The Recommender Rule Editor shall retrieve available diabetes patient list from the PHR System.
2. This component shall store the rules persistently.

**Interface requirements**

1. The Recommender Rule Editor shall display the rule templates in a list.
2. This component shall display the available diabetes patients in a list.
3. This component shall display the rules assigned to a patient.

**Non-functional requirements**

1. The Recommender Rule Editor when retrieving the patient list from the PHR System shall conform to Integrating the Healthcare Enterprise's Audit Trail and Node Authentication<sup>18</sup> Profile.

**Constraints**

There is no constraint for this component.

**Assumptions and dependencies**

<sup>18</sup> [http://wiki.ihe.net/index.php?title=Audit\\_Trail\\_and\\_Node\\_Authentication](http://wiki.ihe.net/index.php?title=Audit_Trail_and_Node_Authentication)

It is assumed that the PHR System will return the list of patients who already gave consent to the logged in medical professional.

### Open Issues

There is no open issue.

## 9.11.4 Task 5.3 requirements. Diabetes based Personalised Adaptive Action Plan

### 9.11.4.1 Action Plan Engine Module

Version	Date	Changes	From	Review
0.1	June 05, 2012	Initial version	SRFG	All Partners

<b>Description</b>	<p>Handles the execution of Action plan Knowledge model for patients.</p> <p>Supports RESTful Services or Java API. Restful services might include SAML statements</p> <p>This provides services and engine to support the Action Plan Personal health application (PHRS)</p> <p>Utilizes a rule based process engine to support the execution of a particular Action Plan knowledge model.</p> <p>It also communicates with the Pathway Engine</p> <p>The PHA integrates into a PHRS. This PHA supports the collection, management and visualization of a patient's Action Plan</p>
<b>Related use case</b>	Action Plan Use Cases
<b>General function</b>	Handles the management and execution of Action Plan Knowledge Model and interacts with EMPOWER modules
<b>User characteristics</b>	User uses an a PHRS Action Plan client application

### Functional requirements

1. The Action Plan Engine (APE): Shall provide Action plan services to support PHRS Action Plan client application
2. Shall provide communications with the EMPOWER inbox via the Pathway engine
3. Shall access the configuration from configuration component
4. Shall share the process engine from the Pathway engine or utilize its own.
5. Shall coordinate a patient's action plan with the Action plan knowledge model executed by the process engine

### Data requirements

- EMPOWER terminologies should include standardize terminologies and accessible by the configuration component.

**Interface requirements**

- Shall provide default a Dashboard that includes options to view basic and detail views for EMPOWER inbox
- Shall provide calendaring functionalities

**9.11.5 Task 5.4 requirements. Integration into an accompanying PHRS**

## 9.11.5.1 PHR system

Version	Date	Changes	From	Review
0.1	June 05, 2012	Initial version	SRFG	All Partners

<b>Description</b>	PHRS
<b>Related use case</b>	-
<b>General function</b>	All the EMPOWER Components will be integrated into an existing PHR System. There will be two PHRs, eSaglikKaydim from SRDC and the PHR system of SRFG.
<b>User characteristics</b>	All the users use this component.
<b>Open Issues</b>	PHRS application integration requirements.

**Functional requirements**

1. PHRS shall utilize EMPOWER services to support client applications.
2. PHRS shall provide Identity provider to support user authentication from EMPOWER PHAs.
3. PHRS shall integrate inbox or extend an existing inbox with EMPOWER services
4. PHRS shall integrate the EMPOWER Dashboard includes navigation features to:
5. EMPOWER Inbox - facilitate messages between the executing processes/tasks of the Knowledge models (business process models) from the Pathways engine and Action Plan Engine
6. PHRS applications (PHAs) for capturing and managing ODLs: physical/lifestyle activities, Vital Physical Mental parameters
7. PHRS for importing and managing Patient information from heterogeneous data sources
8. PHRS for Consent management where patient controls access to health info by services, applications and users
9. PHRS for managing Patient Action Plan
10. PHRS for exploring Patient Information materials and integration of materials with other PHRSs
11. ALL PHRSs and PHRs: Shared CSS style/themes Shared UI resource bundles and localization and Terminologies
12. Integration of patient materials, EMPOWER terminologies (standard and domain specific)
13. This PHRS supports the collection, management and visualization of a patient's Physical and Lifestyle parameters

## 9.11.5.2 Community and Information Module

<b>Description</b>	Community and Information Module
<b>Related use case</b>	Use cases related to patient materials
<b>General function</b>	<p>Provides services for searching and retrieving patient materials, help information, accessing the EMPOWER patient forums and other community related information pages.</p> <p>EMPOWER terminologies can be associated with materials using the CMS semantic indexing tools. Also EMPOWER terminologies should include help and education related concepts for cross indexing materials or supporting User interfaces.</p> <p>Patient materials should be structured and organized also to support User interface help materials (help icons and tool tips) and health related topics.</p> <p>RESTFul services could wrap RESTFul services offered by CMS</p> <p>Supports PHRS person health application for exploring Patient materials in a PHRS</p>
<b>User characteristics</b>	Patients and Medical Professionals use this component.
<b>Open Issues</b>	Requires CMS that integrates Apache Stanbol Restful Services

## 9.11.5.3 Nutritional Information Submodule

Version	Date	Changes	From	Review
0.1	June 11, 2012	Initial version	ICOM	All Partners

<b>Description</b>	Nutritional Information is responsible for helping the diabetic patient to control glucose level through a well-balanced diet. The patient can browse through different articles on nutrition and diabetes.
<b>Related use case</b>	Information Material related use cases.
<b>General function</b>	The Nutritional Information is responsible for providing patient with useful pieces of advice and articles on nutrition.
<b>User characteristics</b>	The patients use this component.

**Functional requirements**

The following functionalities shall be provided by the Nutritional Information:

1. It shall allow reading articles on nutrition.
2. It shall allow reading pieces of advice on nutrition and diabetic diet.

3. It shall allow reading articles on diabetes in general.

### Data requirements

1. The Nutritional Information will provide a list of the available articles on diabetes and nutrition from the Recommender Engine Module.
2. The Nutritional Information component will retrieve pieces of advice addressed to the logged in patient.

### Interface requirements

1. It shall show the patient a list of available articles related to diabetic diet and diabetes in general.
2. The patient will be able to read a selected article.
3. It shall show dietary pieces of advice.

### Constraints

There is no constraint for this component.

### Open Issues

There is no open issue.

#### 9.11.5.4 Diabetes Social Network

Version	Date	Changes	From	Review
0.1	June 11, 2012	Initial version	ICOM	All Partners

<b>Description</b>	This component allows the patients to communicate with persons sharing similar situations.
<b>Related use case</b>	UC-5.4.4 Communication with Persons Sharing Similar Situations
<b>General function</b>	This component allows the patients to communicate with persons sharing similar situations.
<b>User characteristics</b>	The patients use this component.

### Functional requirements

The following functionalities shall be provided by the Diabetes Social Network:

1. It shall allow the patient to add new friends in the Diabetes Social Network by sending requests to other participants.
2. It shall allow posting pieces of advice on personal profile.
3. It shall allow reading pieces of advice of friends' profiles.
4. It shall allow adding personal information.
5. It shall allow the patient to create a new group and invite friends to participate.
6. It shall allow the patient to create a new event and invite friends to attend.
7. It shall allow participating in a group a friend has created.
8. It shall allow attending an event a friend has created.



**Data requirements**

1. When the patient browses into the Diabetes Social Network the Community and Information Module retrieves data about her friends, the groups she participates and the events she is going to attend.
2. When the patient browses into the Diabetes Social Network the Community and Information Module retrieves data about the groups her friends are in and the events they are going to attend.

**Interface requirements**

1. It shall show the patient data on a separate place than the MP-DG execution.
2. It shall show a list of the patient's friends.
3. The patient will be allowed to view her friends' personal information.
4. It shall show a list of the patient's groups.
5. The patient will be able to read information on the groups she participates.
6. It shall show a list of the patient's upcoming events.
7. The patient will view details on the upcoming events she will be going to attend.

**Constraints**

There is no constraint for this component.

**Open Issues**

There is no open issue.

**9.12WP6 requirements.****9.12.3 Task 6.1 requirements. Monitoring Vital, Physical and Mental Parameters****9.12.3.1 Daily Living Forms**

Version	Date	Changes	From	Review
0.1	June 11, 2012	Initial version	ICOM	All Partners

<b>Description</b>	Daily Living Forms are responsible for gathering information of a patient's daily life and are inserted by the patient. If the form of the daily living data allows it, the system can export graphical representations. The graphs will help the patient to monitor her progress on a daily basis. Moreover the Daily Living forms present the patient's Action Plan (as provided by the Action Plan Engine component).
<b>Related use case</b>	UC-6.1.1 Collection of UC-6.1.5 Record Medication Changes UC-6.2.2 Food Diary recording Eating Behaviours
<b>General function</b>	Daily Living Forms are responsible for gathering information of a patient's daily life
<b>User</b>	The patients use this component.

<b>characteristics</b>	
------------------------	--

**Functional requirements**

The following functionalities shall be provided by the Daily Living Forms:

1. It shall allow multiple insertions in the Daily Living Forms for the same patient.
2. It shall provide the patient with upcoming events in respect to their diabetes treatment based on their health condition. This includes actions and goals to be achieved by the patient. This info will originate from the Action Plan Engine component. Related to this, the following detailed functional requirements are applicable:
  - a. It shall allow viewing a list of the goals the Medical Professionals have set for the patient.
  - b. It shall allow reading details of the goals.
  - c. It shall allow reading a list of the reminders.
  - d. It shall allow popping up a message reminding the patient of an upcoming visit or test or to take a medication.
  - e. It shall allow viewing the calendar
  - f. It shall allow reading details of the events included in the calendar.
  - g. It shall allow extracting the Calendar in a printable version.
3. It shall allow storing the Calendar in a printable version on the patient's smartphone
4. It shall allow the patient to view graphical representations of the Daily Living data.
5. It shall allow limiting the graphical representation in a specific time interval.
6. It shall allow viewing past meals consumed.
7. It shall allow sending the graphical representations of the glucose level, weight and exercise results to the Medical Professional

**Data requirements**

1. During the insertion of medical compliance the medication list is retrieved from the PHR system.
2. The component shall store the Daily Living data persistently.
3. The retrieved data will be sent to the PHR system for storage.
4. During the execution of the Daily Living Forms, the Recommender Engine Module is being fed with ODLs from the Vital/Physical/Mental Parameter Collector submodule and feeds the Daily Living Forms with appropriate recommendations for the patient
5. The Action Plan Events module feeds the Daily Living Forms with a list of upcoming events and goals from the Action Plane Knowledge Model
6. During the viewing of the graphical representation of the Daily Living data the Reporting Module retrieves data from the EHR/PHR Data Manager submodule.
7. During the viewing of the graphical representation of the Daily Living data the Reporting Module retrieves the contact information of the patient's Medical Professionals from the Pathway Engine Module.

**Interface requirements**

1. The Daily Living Forms shall provide forms to the logged in diabetes patient to log data about the Glucose Level, Weight, Blood Pressure and the foods she eats every day.
2. It shall provide screens for viewing graphical reports of the Glucose Level, Weight and Blood Pressure.
3. Each graphical report will include values of one of the aforementioned measurements.
4. The Daily Living Forms shall provide a list of meals and a list of medication compliances that have been stored.

5. The list of meals and the list of medication compliance shall be shown in different screens.
6. The patient shall be able to examine information on past meals.
7. The patient shall be able to examine information on medication compliance she has previously entered.

### Non-functional requirements

1. The graphical representation should be loaded in less than a minute on the screen.

### Constraints

There is no constraint for this component.

### Assumptions and dependencies

It is assumed that a communication channel between the Daily Living Forms and the Recommendations Engine / Action Plan Engine components exist, so as the former to feed the later with ODLs and the later to feed the former with recommendations

### Open Issues

There is no open issue.

#### 9.12.3.2 Mental Health Collector

Version	Date	Changes	From	Review
0.1	June 11, 2012	Initial version	ICOM	All Partners

<b>Description</b>	Mental Health Collector is a subsystem of the ODL Collector Module. It is in charge of collecting mental health parameters and especially the ones that are related to depression, stress and quality of sleep.
<b>Related use case</b>	UC-6.1.2 Provide Mental Health Support UC-6.1.2.1 Assess Mood UC-6.1.2.2 Provide Stress Control Support UC-6.1.2.3 Provide Sleep Support
<b>General function</b>	The Mental Health Collector is responsible for gathering information about the patient's mental health status.
<b>User characteristics</b>	The patients use this component.

### Functional requirements

The following functionalities shall be provided by the Mental Health Collector:

1. It shall allow writing notes in a diary form about depression, stress and insomnia symptoms.
2. It shall allow reading past diary entries.
3. It shall allow reading articles on depression, stress and insomnia.
4. It shall allow reading pieces of advice on depression, stress and insomnia.

5. It shall allow listening to music for relaxation.
6. It shall allow listening to instructions on how to keep a normal breathing tempo.

#### Data requirements

3. During the Mental Health Collector execution, the ODL Collector Module shall retrieve data from the Recommender Engine Module in order to provide pieces of advice to the patient.
4. During the Mental Health Collector execution, the ODL Collector Module shall provide forms, so that the patient can write notes on her mental health status.
5. The component shall store the patient's notes persistently.

#### Interface requirements

1. The Mental Health Collector will show a list of patient's previous notes.
2. It will provide forms to insert notes on her mental health status.
3. It will show a list of available articles on mental health.
4. It will allow listening to music which will help the patient to relax.
5. It will allow listening to instructions which will help the patient to breathe right.

#### Constraints

There is no constraint for this component.

#### Open Issues

There is no open issue.

### 9.12.4 Task 6.2 requirements. Monitoring Physical and Lifestyle Activities

#### 9.12.4.1 Physical/Lifestyle Activity Data Collector Submodule

Version	Date	Changes	From	Review
0.1	June 05, 2012	Initial version	SRFG	All Partners

<b>Description</b>	Physical/Lifestyle Activity Data Collector Submodule
<b>Related use case</b>	UC-6.1.1 Collection of ODLs UC-6.2.2 Food Diary recording Eating Behaviours UC-6.2.3 Evaluating Food Diary UC-6.2.4 Calculate Nutrients Distribution UC-6.2.7 Manage Observations of Daily Living
<b>General function</b>	This provides a Personal health application (PHRS) for integration into a PHRS. This PHRS supports the collection, management and visualization of a patient's Physical and Lifestyle parameters
<b>User characteristics</b>	User interacts with the PHRS or PHA to record or visualize the information.
<b>Open Issues</b>	

**Functional requirements**

1. It shall allow the user to add, remove or update entries
2. It shall allow the patient to view graphical representations of the Daily Living data.
3. It shall allow the view of a single entry
4. It shall allow viewing of history and sorting of information by column title.
5. It shall help the user build a report for either download or to send to a medical professional. The report builder provides choices for the temporal range and types of information to include or exclude. Also, the builder provides options to include or exclude identifiers such patient name, EMPOWER user email identifiers, etc

**Data requirements**

1. It shall provide interoperability related mapping information for the configuration component and use standard EMPOWER or medical terminologies.
2. The data is persisted and is accessible by EMPOWER components and PHRS components.

**Interface requirements**

1. It shall allow the user to add, remove or update entries
2. It shall allow the patient to view graphical representations of the history and the user can filter by time range
3. It shall allow the view of a single entry
4. It shall allow viewing of history and sorting of information by column title and time range
5. It shall help the user build a report for either download or to send to a medical professional. The report builder provides choices for the temporal range and types of information to include or exclude. Also, the builder provides options to include or exclude identifiers such patient name, EMPOWER user email identifiers.

### 9.12.5 Task 6.4 requirements. EHR/PHR Interoperability with Health Applications

#### 9.12.5.1 EHR/PHR Data Manager Submodule

Version	Date	Changes	From	Review
0.1	June 05, 2012	Initial version	SRDC	All Partners

<b>Description</b>	In the EMPOWER framework, there are three types of ODL and one of them is the past Electronic Health Record data. During the execution of the both MP-DGs and Action Plans, the availability of the EHR is crucial. In other words, after logging into their PHR, the patients will be able to import their existing EHR data from hospital information systems or even from other countries. The most well-known mechanism to
--------------------	--

	<p>gather data from EHR to PHR is Integrating the Healthcare Enterprise's<sup>19</sup> Exchange of Personal Health Record Content Profile (XPHR)<sup>20</sup>. This profile describes the content and format of summary information extracted from a PHR System for import into an EHR System, and vice versa. The purpose of this profile is to support interoperability between PHR systems used by patients and EHR systems used by healthcare providers.</p> <p>Furthermore, considering the European country's requirements, after logging into their PHR, the patients will be able to import their existing EHR data from other countries if there is such data. For this purpose, the epSOS Network<sup>21</sup> will be used. epSOS is a European Commission supported project for the sharing of EHR across EU countries.</p>
<b>Related use case</b>	<p>UC-6.4.1 Import EHR Data using IHE XPHR</p> <p>UC-6.4.2 Import EHR Data through epSOS Network</p> <p>UC-6.4.3 Import PHR Data using IHE XPHR</p> <p>UC-6.4.4 Export Data from PHR</p>
<b>General function</b>	The EHR/PHR Data Manager Submodule shall gather EHR/PHR data from external medical data sources.
<b>User characteristics</b>	The patients will execute this tool.

### Functional requirements

1. The EHR/PHR Data Manager Submodule shall allow to connect epSOS Network.
2. This tool shall allow the patients to gather data from Hospital Information System through IHE XPHR.
3. This tool shall allow the patient to send their medical data from PHR to EHR system through XPHR.
4. This tool shall allow the patients to gather data from external PHR and PHAs through IHE XPHR.

### Data requirements

1. The EHR/PHR Data Manager Submodule will connect to epSOS Network or Hospital Information Systems and gather EHR Data of the logged in diabetes patient.
2. The retrieved EHR Data will be sent to PHR System for storage.

### Interface requirements

1. The submodule will provide necessary form to enter patient and system configuration data for EHR retrieval.
2. The patient shall be able to examine the retrieved data and shall be able to select from them for storage.

### Non-functional requirements

<sup>19</sup> <http://www.ihe.net/>

<sup>20</sup> [http://wiki.ihe.net/index.php?title=Exchange\\_of\\_Personal\\_Health\\_Record\\_Content\\_Profile](http://wiki.ihe.net/index.php?title=Exchange_of_Personal_Health_Record_Content_Profile)

<sup>21</sup> <http://www.epsos.eu/>

1. When retrieving the EHR Data, the submodule shall conform to Integrating the Healthcare Enterprise's Audit Trail and Node Authentication<sup>22</sup> Profile.

### Constraints

There is no constraint for this submodule.

### Assumptions and dependencies

It is assumed that the target hospital information system will provide necessary XPHR endpoint for EHR data retrieval.

### Open Issue

Some of the hospitals may not want the patients to enter data to their databases. In any case, the EHR/PHR Data Manager tool shall generate the XPHR data and it will be up to the hospital to insert this XPHR data to its databases.

#### 9.12.5.2 XPHR Manager

<b>Description</b>	This component allows the external PHA and PHR systems to send/receive data to/from EMPOWER through IHE XPHR Profile.
<b>Related use case</b>	UC-6.4.1 Import EHR Data using IHE XPHR UC-6.4.3 Import PHR Data using IHE XPHR
<b>General function</b>	To exchange data through IHE XPHR Profile.
<b>User characteristics</b>	The external systems use this component.

### Functional requirements

The following functionalities shall be provided by the XPHR Manager:

1. It shall allow to exchange data through IHE XPHR.
2. It shall provide mechanisms to insert the received data to the PHR's databases.

### Data requirements

1. The XPHR Manager will access the external PHA/PHR's databases to format the data according to XPHR Profile requirements.
2. The XPHR Manager will access the database of the used PHR system to insert received PHR data.

### Interface requirements

1. There will be no GUI for this component.

### Non-functional requirements

1. The consent of the patient should be checked.
2. The authentication of the patient should be performed on the data source side.

### Constraints

<sup>22</sup> [http://wiki.ihe.net/index.php?title=Audit\\_Trail\\_and\\_Node\\_Authentication](http://wiki.ihe.net/index.php?title=Audit_Trail_and_Node_Authentication)

There is no constraint for this component.

**Assumptions and dependencies**

There are no assumptions.

**Open Issues**

There is no open issue.