# IHE Work Item Proposal (Detailed)

## 1. Proposed Work Item: Cross Enterprise TeleHomeMonitoring Workflow Definition Profile

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Date: November 4th, 2011

Version: 1.0

Domain: Patient Care Coordination

## Summary

At the moment, in the management of chronic patients followed by telemonitoring services, it is difficult, for every actor involved (e.g. hospital specialist, general practitioner, telemonitoring center's staff), to manage and share the complete clinical history of the patient, from the monitored data to the events incurring during the process (e.g. visits, changes of therapy).

XDW profile has the technical features to allow the management of the telemonitoring process, giving the structure to build a cross-enterprise workflow where each event and the related status and documents are tracked and shared between each actor involved.

The specific application of the XDW profile in the context of a telemonitoring process is the main goal of this profile proposal that defines the rules to create and to manage a cross-enterprise workflow including the complete clinical history of a telemonitored patient.

The introduction in clinical practice of a telemonitoring service, with a good management of the workflow, is increasingly important because of the growing of the number of people suffering of chronic diseases that need to be continuous monitored. In addition, it has been shown that adopting telemonitoring services would so entail a considerable advantage in terms of quality of life for patients and cost savings.

## 2. The Problem

In the workflow related to the management of patients with chronic diseases (e.g. heart failure, COPD, diabetes) followed by a telemonitoring service, many different actors of different enterprises can be involved, for example: different specialists in hospital and physicians in Rural Hospital (since these patients have often comorbidities and need to be visited in different clinical areas), the GP and the Tele-homecare Center's staff. For the correct management of these patients, each of these actors should have the possibility to share and manage the patient's complete clinical history. At the moment, the management of the workflow inside the

single enterprise is already described in the DEC Profile of PCD Domain but, in this specific case, where many actors are involved in the process and each of them manages his part of the telemonitoring workflow, there is the need to manage a cross-enterprise workflow: this is feasible by using the XDW profile, as in this profile proposal, allowing every actor to share the complete telemonitoring workflow, including all related documents, produced for each event incurring during the process (data sending, request for a visit, change of therapy), and the related workflow status.

This proposal focuses on the Cross Enterprise TeleHomeMonitoring Workflow Definition in support of telemonitoring workflow document and status management. The key elements are:

- managing telemonitoring cross-enterprise workflow tracking all events and related documents;
- managing workflow specific status with relationship to one or more documents;
- tracking status of all events in telemonitoring process (in progress, completed, etc.).

To have a scale of the problem, an analysis as been performed on some European data about the most relevant chronic diseases: now COPD affects approximately 44 million of people and heart failure about 15 million people.

The introduction of a telemonitoring service for these patients, with a good management of the workflow, would so entail a considerable advantage in terms of quality of life for patients and cost savings.

## 3. Use Cases

The physician (the specialist or the GP) requests for a Tele-homecare monitoring service to the Tele-homecare Center for his patient with chronic heart failure. To accomplish this, the physician creates a Telemonitoring Workflow Document with references to the reports of the exams, that can be useful to evaluate the possibility to follow up at home, including a formal request for service activation for the patient and the customized telemonitoring protocol (clinical parameters to collect, frequency of data transmission, threshold values to detect alarm situations and the reference physician). After the Tele-homecare Center evaluates and approves the request of the physician, the patient collects his clinical parameters at home and sends these data to the Tele-homecare Center. The Tele-homecare Center elaborates the data received, transmits them to the physician's EHR, and includes them in the Telemonitoring Results Document referenced in the Telemonitoring Workflow Document. This process is repeated for every data transmission so, the Telemonitoring Workflow Document is continuous updated and tracks all events and their respective status along with the associated documents, allowing all physicians treating the patient to share and manage the complete workflow of the telemonitoring process any time they need.

In the case that the data sent by the patient go out the threshold, the Tele-homecare Center alerts the reference physician including in the Telemonitoring Workflow Document, together with the Telemonitoring Result Document, the reference to a Request Consult Document. The physician analyzes the data of the patient and decides if the patient needs to change therapy or telemonitoring timing, and in this case he simply communicates the changes to the patient and to the Tele-homecare Center that has to update the telemonitoring protocol, or to have a specialist visit. In this last case, the physician creates the eReferral Document, referenced in the same Workflow Document, for the visit order. When the visit takes place, the specialist, may

consult the Workflow Document to have the complete clinical history of the telemonitored patient and he can update it based on the visit outcomes.

The workflow ends when the patient doesn't need to be monitored anymore by the Tele-homecare Center.

## 4. Standards & Systems

Afferent IHE Domains: IT Infrastructure, Patient Care Coordiantion, Patient Care Device

Afferent IHE Profiles – Existing: ITI – XDW, ITI – XDS.b, PCD – DEC (Device Enterprise Communication), PCD – ACM (Alarm Communication Management), PCD – IDCO (Implantable Device Cardiac Observation), PCD – RTM (Rosetta Terminology Mapping)

## 5. Technical Approach

This proposal arises from the necessity of different actors to manage the workflow related to a patient followed by a tele-homecare monitoring service. The value statement of this proposal is:

- adopting XDW profile for the management of a telemonitoring process, including all clinical events and tracking their status and their related documents, allowing all actors involved to share and contribute to the same cross-enterprise workflow;
- define the rules to track the telemonitoring process through the workflow document.

All steps described in the use case and related to the telemonitoring process, as the request of the service activation, the storage and the management of the clinical data monitored by the patient, the request of a consult to a physician in the case of abnormal data, the request of a visit and the change of the therapy, shall involve the Workflow Document which composition is driven by the set of rules proposed by the Cross Enterprise TeleHomeMonitoring Workflow Definition Profile.

To create, upload and consult the Workflow Document, every actor involved shall act as Content Creator, Content Updater and Content Consumer and shall use the ITI transaction described in XDS Profile to send, request and retrieve the Document Workflow from a Registry/Repository Infrastructure.

In addition, this profile proposal connects two domain, ITI and PCD, leading a complete management of the telemonitoring process. In fact, with the support of the first domain and, in particular, of the XDW profile, it increases the consistency of workflow interoperability and it is allowed to share and update all events of the telemonitoring process by the various care areas. With the PCD domain, instead, it is standardized the data stream, leading the interoperability between different information systems and different actors, using PCD transaction as PCD-01.

**New actors**

None

**Existing actors**

XDS Document Source, XDS Document Consumer, XDS Document Repository, XDS Document Registry, XDW Content Creator, XDW Content Updater, XDW Content Consumer, DEC Device Observation Reporter, DEC Device Observation Consumer, IDCO Implantable Device Cardiac Reporter, IDCO Implantable Device Cardiac Consumer, ACM Alarm Reporter, ACM Alarm Communicator, ACM Alarm Manager.

**New transactions (standards used)**

None

**Existing transactions**

From ITI domain: ITI-41, ITI-42, ITI-43, ITI-18

From PCD domain: PCD-01, PCD-09, PCD-04, PCD-05, PCD-06, PCD-07

**Impact on existing integration profiles**

None

**New integration profiles needed**

None

**Breakdown of tasks that need to be accomplished**

- Definition of the process, the tasks and the related events in the context of a telemonitoring service
- Definition of a set of rules necessary to manage all the tasks (i.e. who is allowed to change the status of each task, the sequence of the tasks,...)

## 6. Risks

Since in real life settings the telemonitoring systems are developed following different projects according to local conditions as existing infrastructure and available technologies, it could be difficult to reach a sharing, between different realities, of the telemonitoring process defined in this profile proposal.

Moreover, the complexity, that could occur in the definition of a Workflow Definition profile related to a telemonitoring process through this profile proposal, could be mainly due to the fact that several domains are included and they must cooperate to achieve a shared definition of the process. Moreover, the telemonitoring process could have some specificity in the different scenarios which have to be analyzed and a common process has to be defined.

## 7. Open Issues

In the case this profile will be extended in XCA multi-community infrastructures, a Change Proposal is needed in ITI. At the level of this proposal no changes are expected because the process is the same both in one community than cross-community

## 8. Effort Estimates

The effort evaluation, estimated high form PCC planning committee, is based on these two points:

- the difficulty of structuring a workflow related to a telemonitoring process;
- the difficulty to define for the first time a Workflow Definition Profile related to a specific clinical process, since there aren't previous implementations of this kind of profile.