**Integrating the Healthcare Enterprise**

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**IHE Patient Care Coordination**

**Technical Framework Supplement**

**Cross Enterprise TeleHomeMonitoring Workflow Definition Profile**

**(XTHM-WD)**

**Draft for Public Comment**

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**Foreword**

This is a supplement to the IHE Patient Care Coordination Technical Framework V7.0. Each supplement undergoes a process of public comment and trial implementation before being incorporated into the volumes of the Technical Frameworks.

This supplement is published on June 05, 2012 for Public Comment. Comments are invited and may be submitted at <http://www.ihe.net/pcc/pcccomments.cfm>. In order to be considered in development of the Trial Implementation version of the supplement comments must be received by July 05, 2012.

This supplement describes changes to the existing technical framework documents and where indicated amends text by addition (bold underline) or removal (bold strikethrough), as well as addition of new sections introduced by editor’s instructions to “add new text” or similar, which for readability are not bolded or underlined.

“Boxed” instructions like the sample below indicate to the Volume Editor how to integrate the relevant section(s) into the relevant Technical Framework volume:

Replace Section X.X by the following:

General information about IHE can be found at: [www.ihe.net](http://www.ihe.net)

Information about the IHE PCC domain can be found at: <http://www.ihe.net/Domains/index.cfm>

Information about the structure of IHE Technical Frameworks and Supplements can be found at: <http://www.ihe.net/About/process.cfm> and <http://www.ihe.net/profiles/index.cfm>

The current version of the IHE Technical Framework can be found at: <http://www.ihe.net/Technical_Framework/index.cfm>

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# Introduction to this Supplement

This supplement is written according to the specific template defined for Workflow Definition profiles. The structure of this document differs from a PCC Content Profile. In particular the XTHM-WD Profile doesn’t define new IHE transactions or IHE actors, but establishes a common set of rules to share between participants involved in a telemonitoring workflow.

The telemonitornig process, and workflow related to it, are applicable to many different sharing infrastructures. In this profile we present a specific XDS based use-case.

Volume 1 is related to the introduction of the profile with the description of the telemonitoring process flow with the references to the tasks, to the produced documents and to the Workflow Participants involved in the process. This volume reports also the use case of the telemonitoring analyzing in details each possible step of the process.

Volume 2 aims to explain how to use XDW Workflow Document to track and manage this workflow: in particular the detail features of each step of the workflow, and rules to follow to go through these steps are analyzed.

At the end of the supplement (Appendix A) is presented a complete example of a Workflow Document produced during a telemonitoring workflow; diagrams to provide a depiction of the technical development of the Workflow Document related to the telemonitoring are reported in Appendix B.

## Open Issues and Questions

None

## Closed Issues

* *(Reviewers should evaluate how to manage the task “Telemonitoring” in status FAILED. In general, the cardinality of this task is1..n but in the case where the status is FAILED, it should be required to be 2..n. After a “Telemonitoring” task is put in status FAILED (i.e., there are problems with sending data) there must be another “Telemonitoring” task with status COMPLETED (the measurement is repeated after the failure). Is there a need to specify this situation in the document? If yes, how can we describe it? (see table X.2-1 of Volume 2))* Answer: in case of failing of the Telemonitoring task it is not required to repeat the action traced but it is suggested to solve the problems in sending data adding new task Events.
* *(Reviewers should evaluate the need to define options within the Workflow Definition to facilitate implementation of the workflow definition profile. Should there be options on the (1) support of specific workflow tasks/status, (2) reference content document profiles, (3) remaining options from XDW ? These would be formalized and placed in Section X.4 Option of Volume 1. The requirements for support of options related to the XDW Profile may not be properly placed in Section X.4 and should be moved to Volume 2.)* Answer: The workflow Definition profile defines a section Options where are described alternative paths, or alternative rules for th evolution of the process.
* *(Reviewers should evaluate the proposed table in Section 6.5 that describes the documents created during the workflow process, their requirements, their nature and their related PCC(or other) document content profiles that define them and, in case that these are not present, the note that the PCC may/should define them in the future. How specific should a workflow definition profile be in terms of referenced documents conformance requirements?)* The Workflow Definition profile defines only “documents labels” to define the role of an attachment of th profile.
* *(In many parts of this document we present XML examples to better understand how the Workflow Document can track information related to the process. This structure will be affected by CPs proposed to the ITI domain (CP-643, CP-637). So these XML parts may change sections X.2.1.1, X.2.2.1, X.2.3.1 and Appendix A)* Small xml parts are removed from text, we left only the appendix A to show a complete example of Workflow Document.

Volume 1 – Profiles

# X Cross Enterprise TeleHomeMonitoring Workflow Definition (XTHM-WD) Profile

This profile focuses on the definition of a standardized and shared document structure for the proper management of the clinical process involving chronic patients followed by telemonitoring services. Although this profile has the word “home” in its title, the telemonitoring process considered in this profile allows the patient to be monitored not only from his home but from the place in which he is resident.

The main goal is to allow every participant involved in the process (e.g., specialist, general practitioner, telemonitoring centre’s staff) to manage and share the complete clinical history of the patient, from the monitored data to the events occurring during the process (e.g., visits, changes of therapy). To achieve this, this profile is based on the ITI Cross-enterprise Document Workflow (XDW) Profile that provides a structure to build cross-enterprise workflows, where each event and the related status and documents are tracked and shared between all individuals involved. The XTHM-WD Profile follows the technical specifications contained in the XDW Profile to define the rules needed to create and manage a cross-enterprise workflow related to a telemonitoring process.

## X.1 Purpose and Scope

The workflow related to the management of patients with chronic diseases (e.g., heart failure, COPD, diabetes) followed by a telemonitoring service is a cross-enterprise workflow since many different individuals from different enterprises can be involved: specialists and physicians, working in hospitals, rural areas or urban areas, general practitioners (GP), and general caregivers, as well as the telemonitoring centre’s staff.

For the correct management of these patients, each of these individuals, managing his part of the telemonitoring workflow, should have also the possibility to share and manage the patient’s complete clinical history. However, at the moment there are no technical specifications allowing this to be done in a standardized manner.

This profile provides guidelines to define this kind of cross-enterprise workflow using the XDW profile, allowing every participant involved in a patient's care to share the complete telemonitoring workflow, including all related documents produced for each event occurring 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 demonstrate the scale of the problem, an analysis has been performed on some European data about the most relevant chronic diseases: now COPD affects approximately 44 million people; heart failure affects about 15 million people. The introduction of a telemonitoring service for these patients, with good workflow management, as defined in this profile, would entail a considerable advantage in terms of quality of life for patients and cost savings.

## X.2 Process Flow

This section is focused on the description of the general telemonitoring process flow, which can be described with the following steps:

1. The Telemonitoring process starts when a GP or a general caregiver requests the activation of a telemonitoring service for his patient to a telemonitoring service provider. In this initial phase of the process the GP defines the telemonitoring protocol for the patient and produces a telemonitoring Workflow Document with a “Requested” task as the first entry.
2. The service provider now evaluates and approves the physician's request and activates the service; the workflow document is updated with a new “Approved Request” task.
3. The patient starts to collect the required clinical parameters at his home or place of residence. The data collected is transmitted to the service provider that manages the data, making them available to any clinicians involved in the process. The Workflow Document is updated with a “Telemonitoring” task.
4. If the data sent by the patient goes outside the threshold levels defined in the protocol, the service provider alerts the referring physician and updates the Workflow Document with a “Consult Request” task.
5. The physician analyses the patient's data and decides if the patient needs to change their therapy, to have a specialist visit, or if there is no need to perform any action. The Workflow Document is updated with a task that depends on the decision taken by the clinician:

E1. “Analysis and Request Visit”

E2. “Analysis and Change Protocol”

E3. “Analysis and Clinical Actions”

E4. “Analysis and No Actions”.

1. Depending on the resulting task from step E, two options can result:

F1. If the decision is to schedule a visit, an eReferral process is activated. When the eReferral workflow ends the clinician that performed the referral updates the Workflow Document with the task “Visit Result”.

F2. If the result includes a need to change the protocol, the service provider receives the protocol from the clinician and activates it, updating the Workflow Document with the task “New Protocol Activation”.

The patient now continues with the telemonitoring service.

The workflow ends and is set to “Closed” when the patient doesn’t need to be monitored any more by the telemonitoring service. Each task can lead to the closing of the Workflow Document and this can be tracked by including a closure document in the outputs of the current task.

These steps can be tracked in nine different tasks throughout the workflow:

1. Requested: tracks step A, performed by the patient’s clinician;
2. Approved Request: tracks step B, performed by the telemonitoring service provider;
3. Telemonitoring: tracks step C, performed by the telemonitoring service provider;
4. Consult Request: tracks step D, performed by the telemonitoring service provider;
5. Analysis and Request Visit: tracks step E1, performed by the patient’s clinician;
6. Visit Result: tracks step F1, performed by the patient’s clinician;
7. Analysis and Change Protocol: tracks step E2, performed by the patient’s clinician;
8. New Protocol Activation: tracks step F2, performed by the telemonitoring service provider;
9. Analysis and Clinical Actions: tracks step E3, performed by the patient’s clinician;
10. Analysis and No Actions: tracks step E4, performed by the patient’s clinician.

Figure X.2-1 below shows the schematic modality of all tasks related to the process and the relationship between these.

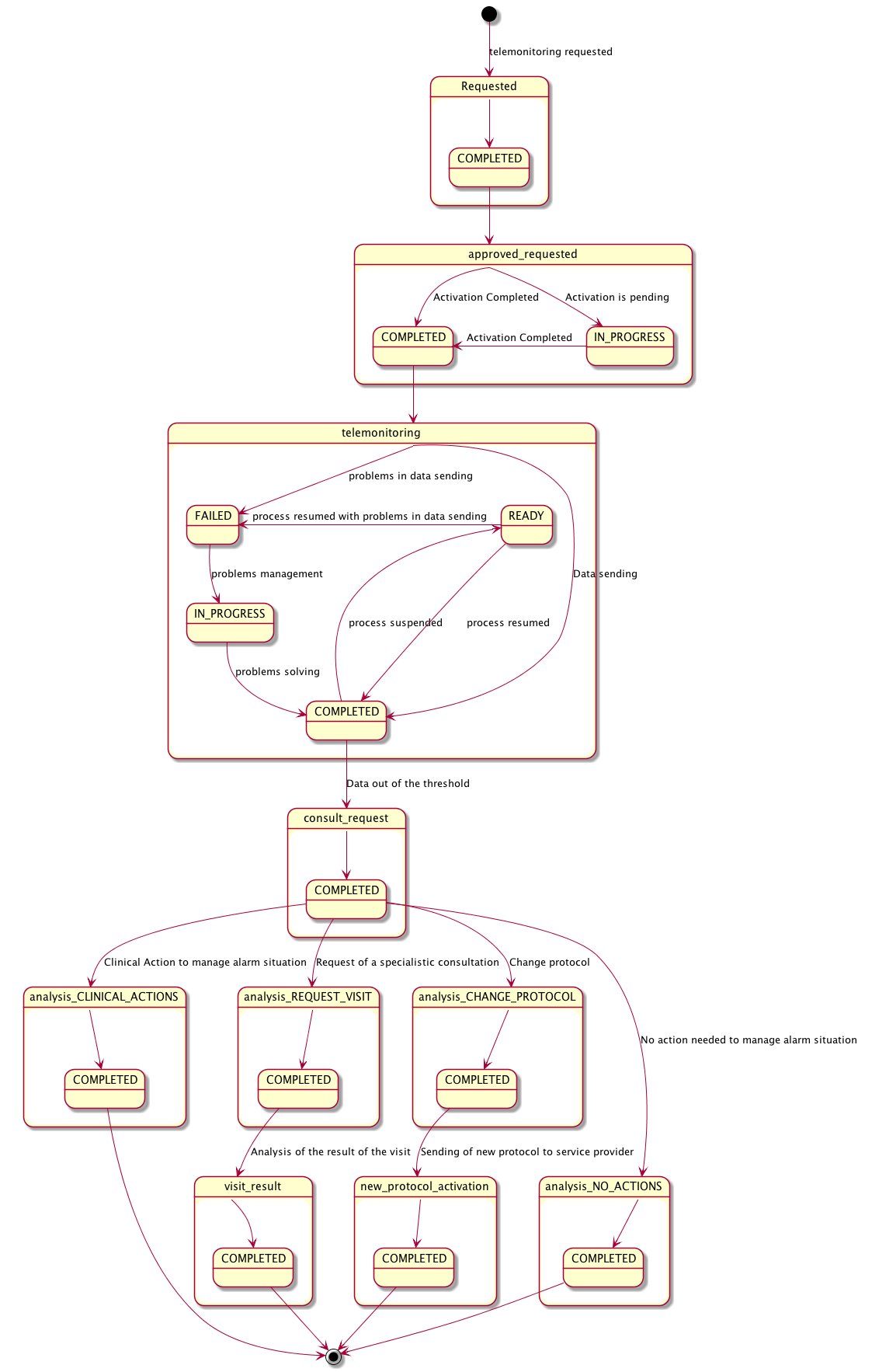
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Figure X.2-1: Workflow Definition sample process flow

A telemonitoring process produces many documents and each of these documents is referenced in related tasks of the Workflow Document. Figure X.2-2 and Table X.2-1, outlines the documents neded as input and output for each task.

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**Figure X.2-2: Input and Output Documents of each task**

**Table X.2-1: Input and Output Documents of each task/status pair**

| Task Type | Task Status | Input Docs | Option | Output Docs | Option |
| --- | --- | --- | --- | --- | --- |
| Requested | COMPLETED | Clinical Input | O  \* These may change if Workflow Options are selected | Request Activation Document | R |
| Approved | IN\_PROGRESS | Request Activation Document | R | N/A | - |
| Clinical Input | O  \* These may change if Workflow Options are selected |
| COMPLETED | Request Activation Document | R | N/A | - |
| Clinical Input | O  \* These may change if Workflow Options are selected |
| Telemonitoring | COMPLETED | N/A | - | Telemonitoring Results Document | R |
| FAILED | N/A | - | Telemonitoring Results Document | R |
| IN\_PROGRESS | Telemonitoring Results Document | O | N/A | - |
| READY | N/A | - | N/A | - |
| Consult Request | COMPLETED | Telemonitoring Results Document | R  \* These may change if Workflow Options are selected | Request Consult Document | R |
| Analysis and Request Visit | COMPLETED | Telemonitoring Results Document | R  \* These may change if Workflow Options are selected | eReferral folder.uniqueID | R |
| Request Consult Document | R | eReferral Document | R |
| Visit Result | COMPLETED | Clinical Report of the visit | R | Visit Result Document | R |
| eReferral folder.uniqueID | R |
| Analysis and Change Protocol | COMPLETED | Telemonitoring Results Document | R  \* These may change if Workflow Options are selected | Telemonitoring Protocol Updated | R |
| Request Consult Document | R |
| New Protocol Activation | COMPLETED | Telemonitoring Protocol Document Updated | R | N/A | - |
| Analysis and Clinical Actions | COMPLETED | Telemonitoring Results Document | R  \* These may change if Workflow Options are selected | N/A | - |
| Request Consult Document | R |
| Analysis and no actions | COMPLETED | Telemonitoring Results Document | R  \* These may change if Workflow Options are selected | N/A | - |
| Request Consult Document | R |

## X.3 Workflow Participants

In this section we present the Workflow Participants involved in the telemonitoring process and, using the figure X.3-1, we describe in detail process transactions and interactions between them.

A Workflow Participant is an abstraction of system or user involved in the telemonitoring process. They can be identified, based on their roles in the process, as one of three specific participants. Each of these workflow participants has specific rights and duties in the process. They drive the process from one step to another, performing determinate actions on the workflow:

**Care Manager** is the participant that performs the following actions and related tasks:

* Activating the telemonitoring service – task APPROVED;
* Creating the Telemonitoring Results Document for each set of data sent – task TELEMONITORING;
* Creating the Request Consult Document in the case of alarm situations – task REQUEST CONSULT;
* Activating new telemonitoring protocol when requested form the General Clinician Manager – Task NEW PROTOCOL ACTIVATION;

**General Clinician Manager** is the participant that performs the following actions and related tasks:

* Creating the Workflow Document for the telemonitoring of his patient;
* Creating the Request Activation Document – task REQUESTED;

**Consult Manager** is the participant that performs the following actions and related tasks:

* Analyzing any alarm situations and deciding how to manage them – tasks ANALYSIS AND REQUEST VISIT, ANALYSIS AND CHANGE PROTOCOL, ANALYSIS AND CLINICAL ACTIONS AND ANALYSIS AND NO ACTIONS;
* If a specialist visit is needed, producing an eReferral Document and creating the related eReferral Workflow Document – task ANALYSIS AND REQUEST VISIT;
* After receive the Clinical Report of the visit by the specialist as the end of the eReferral process, checking the visit’s outcomes and confirming the telemonitoring protocol – task VISIT RESULT;
* If a change of protocol is decided, updating the Telemonitoring Protocol Document – task ANALYSIS AND CHANGE PROTOCOL;
* If clinical actions are decided (e.g. change therapy) – task ANALYSIS AND CLINICAL ACTIONS;
* If no actions is decided – task ANALYSIS AND NO ACTIONS.

Table X.3-1 describes these Workflow Participants.

**Table X.3-1: Workflow Participants**

|  |  |
| --- | --- |
| Workflow  Participants | Description |
| Care Manager | *Participant responsible for the management of the telemonitored data sent by the patient from his home and of the alarm situations incurring when data go outside of the thresholds* |
| General Clinician Manager | *Participant responsible for the request of activation of the telemonitoring process and producing the telemonitoring Workflow Document* |
| Consult Manager | *Participant responsible for the management of the clinical care process of the patient from the activation of the telemonitoring service with the clinical management of alarm situations reported by the Care Manager* |

The figure below describes the relationship between each Workflow Participants and the tasks of the telemonitoring process.

Figure X.3-1: Process transaction between Workflow Participants

### X.3.1 Use Cases

Dr. Rossi, a general practitioner, visits his patient, Mr. Jones, who has chronic heart failure.

He decides to include Mr. Jones in a telemonitoring program which monitors the heart rate of the patient, and his O2-saturation. He activates this service by filling in a formal request to the service provider, stating the clinical parameters that have to be monitored (pulse-oximetry and heart rate), the frequency of the patient’s measurements, the threshold values to detect alarm situations, and his contact information to inform the service provider that he is the primary physician who will follow the patient in the service.

At the telemonitoring centre, Mr. Bonning receives the request and approves it: at this point, Mr. Bonning starts scheduling the installation of the devices at the patient’s home.

After the devices are installed and tested, Mr. Jones starts the devices and is being monitored. The measurements and the related data are transmitted to the telemonitoring centre.

A week later, the heart rate measuring device sends an alarm to the telemonitoring centre, indicating a possible atrial fibrillation. Dr. Rossi receives a message from the Telehome monitoring centre; after an analysis of the patient’s data, Dr. Rossi decides to refer Mr. Jones to his cardiologist. After receiving the results of the visit to the cardiologist, Dr. Rossi evaluates that his patient can continue with the scheduled telemonitoring program.

The use case presented in this section, related to the definition of a telemonitoring process workflow, is composed of two parts.

The first one is about the creation of the Workflow Document (WD), which tracks all the events occurring during the telemonitoring process of a patient, and how it is updated with the daily transmission of the patient's clinical data (from step A to C1).

The second part of this use case follows the workflow that occurs when the data sent by the patient goes outside of the thresholds set in the protocol, causing the occurrence of an alarm situation for the patient (from step C2 to step F).

The workflow related to this use case is a multi-step process:

A. The GP requests the telemonitoring service for his chronic patient;

B. The telemonitoring service provider evaluates and accepts the activation request and activates the service for the patient;

C. The patient performs his measurements according to the protocol and transmits them to the telemonitoring service provider. At this point there are two possibilities:

C1. The patient’s measurements are normal and telemonitoring continues;

C2. The patient’s measurements are outside the thresholds defined;

D. The telemonitoring service provider detects an alarm situation for the patient and requests a physician’s consultation;

E. The GP analyses the alarm situation. At this point there are three possibilities:

1. The GP analyses the alarm situation and decides to request a specialist visit for his patient;
2. The GP analyses the alarm situation and decides to change the telemonitoring protocol of his patient, in particular the therapy or the monitoring timing or the alarm thresholds;
3. The GP analyses the alarm situation and decides to perform clinical actions to solve the situation, e.g. change the therapy.
4. The GP analyses the alarm situation and decides to perform no actions.

F. The alarm situation is resolved. At this point there are three possibilities depending on the path chosen at step E:

F1. The GP checks the results of the visit and confirms the new telemonitoring protocol.

F2. The telemonitoring service provider activates the new telemonitoring protocol;

Each step is now described both from a clinical and a technical point of view.

We present below the detailed chronological sequence of steps.

**A. The GP requests the telemonitoring service for his chronic patient**

In this task, the GP determines that his patient with chronic heart failure needs to be followed by a telemonitoring service allowing him to be monitored remotely as he performs daily measurements of his clinical parameters. The GP requests a service activation to the telemonitoring service provider, creating a document for the formal request (Request Activation Document) including the customized telemonitoring protocol (clinical parameters to collect, frequency of data transmission, threshold values to detect alarm situations, information about the referencing physician and the patient’s therapy) and referencing the reports and results that can be used to evaluate the possibility of a follow up at home.

The GP’s software, or some system acting as a General Clinician Manager, produces the Request Activation Document and one Workflow Document to track the clinical workflow of the patient being followed by the telemonitoring service. As shown in column A of Figure X.3.1-2, at this time the Workflow Document has only one task (“Activation Requested”) characterized by:

* a status of “Completed”
* references to Clinical Input as inputs of the task
* reference to the Request Activation Document as the output of the task

In order to share the documents produced during the task, the system acting as the General Clinician Manager submits the Request Activation Document and the Workflow Document to an XDS Document Repository.

**B. The telemonitoring service provider evaluates and accepts the activation request and activates the service for the patient**

In order to evaluate the activation request from the GP, the telemonitoring service provider queries for and retrieves the Request Activation Document and the associated Workflow Document using a system which acts as a Care Manager.

If the telemonitoring service provider approves the activation request, as shown in column B of Figure X.3.1-2, it updates the Workflow Document with a new version in which a new task “Approved Request” has been added to the content of the previous version. The task “Approved Request” is characterized by:

* a status “Completed”
* the references to the Request Activation Document produced by the GP and Clinical Input as inputs of the task

The telemonitoring service provider's system, as a Care Manager, provides the updated version of Workflow Document to the XDS Document Repository/Registry, replacing the previous version.

At this step, there is the possibility for a system of subscription and notification, through the use of the Document Metadata Subscription (DSUB) profile or the Notification of Document Availability (NAV) profile, to notify the GP that performed the request that the patient has been activated.

**C1. The patient performs his measurements according to the protocol and transmits them to the telemonitoring service provider. The patient’s measurements are normal and telemonitoring continues**

The patient is activated with the telemonitoring service. He collects his clinical parameters at home and sends these data to the telemonitoring service provider. The telemonitoring service provider evaluates the data received and includes them in the Telemonitoring Results Document referenced in the Workflow Document.

To accomplish this the telemonitoring service provider, using a system that acts as a Care Manager, queries and retrieves the Workflow Document and creates the Telemonitoring Results Document.

At this step of the workflow, as shown in column C1 of Figure X.3.1-2, the Workflow Document is updated with a new version in which a new task “Telemonitoring n.1” is added to the content of the previous version of the Workflow Document. The task “Telemonitoring n.1” is characterized by:

* a status “Completed”
* a reference to the Telemonitoring Results Document as output of the task.

The telemonitoring service provider’s software, as a Care Manager, provides the updated version of Workflow Document to the Document Repository, replacing the previous version.

At any time the GP may review the Workflow Document and the new documents produced related to this workflow. This is accomplished through a query and retrieve by the GP’s software of the active Workflow Document from the XDS Document Registry and the XDS Document Repository.

This process is repeated for every data transmission so the Workflow Document is continuously 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.

Each time the patient performs a measurement this task is created, and there would be the possibility for a system of subscription and notification, through the use of the Document Metadata Subscription (DSUB) profile or the Notification of Document Availability (NAV) profile, to communicate the creation of the task and the related Telemonitoring Results Document to the GP, so that they can access the workflow and view the patient’s data.

Figure X.3.1-1 describes the process flow reporting the related tasks from step A to C1.

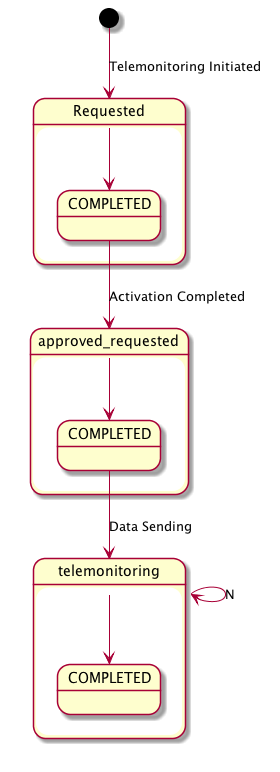
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Figure X.3.1-1: Workflow Definition sample process flow

To demonstrate how the Workflow Document is populated during the process, Figure X.3.1-2 shows the evolution of the Workflow Document during this telemonitoring workflow from step A to step C1. Each one of the steps is depicted in a column.

Figure X.3.1-2: Management of the Workflow Document from step A to step C1

**C2. The patient performs his measurements according to the protocol and transmits them to the telemonitoring service provider. The patient’s measurements are outside the thresholds defined;**

The patient collects his clinical parameters at home and sends these data to the telemonitoring service provider. The telemonitoring service provider evaluates the data received and includes them in the Telemonitoring Results Document referenced in the Workflow Document.

To accomplish this the telemonitoring service provider uses a system that acts as Care Manager to query and retrieve the Workflow Document and creates the Telemonitoring Results Document.

At this step of the workflow, the Workflow Document is updated with a new version in which a new task “Telemonitoring n. n+1” is added to the content of the previous version of the Workflow Document. The task “Telemonitoring n. n+1” is characterized by:

* a status “Completed”
* the reference to the Telemonitoring Results Document as output of the task

The telemonitoring service provider’s system, as a Care Manager, provides the updated version of Workflow Document to the Document Repository, replacing the previous version.

**D. The telemonitoring service provider detects the alarm situation for the patient and requires a physician’s consultation**

If the data sent by the patient are outside of the normal range defined by the GP in the telemonitoring protocol, the telemonitoring service provider has to manage an alarm situation for the patient.

The telemonitoring service provider needs to alert the referring physician so, using a system that acts as a Care Manager, it creates a Request Consult Document including a request for the physician to evaluate this alarm situation. At the same time the telemonitoring service provider queries and retrieves the Workflow Document.

At this step of the workflow, the Workflow Document is updated with a new version in which a new task, “Consult Request,” is added to the content of the previous version. The task “Consult Request” is characterized by:

* a status “Completed”
* a reference to the Telemonitoring Results Document as input of the task
* a reference to the Request Consult Document as output of the task

The telemonitoring service provider’s software, as a Care Manager, provides the updated version of Workflow Document to the Document Repository, replacing the previous version.

Each time the telemonitoring service provider detects an alarm situation, there is a possibility for a system of subscription and notification through the use of the Document Metadata Subscription (DSUB) profile or the Notification of Document Availability (NAV) profile, to communicate the presence of an alarm to the GP.

**E. The GP analyses the alarm situation**

The physician analyses the alarm situation for the patient by accessing the Workflow Document, using a system that acts as a Consult Manager, to query and retrieve it together with the Telemonitoring Results Document and the Request Consult Document.

Depending on how the GP decides to manage the alarm situation, there are three possible options at this point

For each of the following cases, when the GP solves the alarm situation, there is a possibility for a system of subscription and notification between tasks, through the use of the Document Metadata Subscription (DSUB) profile or the Notification of Document Availability (NAV) profile, to notify the telemonitoring service provider that the alarm condition has been resolved.

***Case 1***

**E1. The GP analyses the alarm situation and decides to request a specialist visit for his patient;**

If the GP decides that the patient needs to have a specialist visit, he refers the patient to a specialist, creating an eReferral Document and the related eReferral Folder to track the specific events related to the visit, using a system that acts as a Consult Manager.

The Workflow Document is updated with a new task, “Analysis and Request Visit,” which is characterized by:

* a task status “Completed”
* references to the Telemonitoring Results Document and the Request Consult Document as inputs of the task
* references to the eReferral Document and the link to the eReferral Folder of the new Workflow Document as outputs

The GP’s system, as a Consult Manager, provides an updated version of the Workflow Document to the Document Repository, replacing the previous version.

At this time this Workflow will be on standby until the eReferral process is concluded. When the eReferral Workflow Document generated in this task is completed and the report produced by the specialist is returned to the GP, he can decide how to proceed.

For a description of the management of the eReferral Workflow Document, refer to the Cross-enterprise Basic eReferral Workflow Definition Profile.

**F1. The alarm situation is resolved. The GP checks the results of the visit and confirm the telemonitoring protocol.**

The physician checks the results of the referral, consulting the Clinical Report referenced in the eReferral Workflow Document. At this time, the Workflow Document related to the telemonitoring process is reactivated by the GP, using a system that acts as a Consult Manager, to notify the telemonitoring service provider that the telemonitoring of the patient can proceed.

The GP creates a Visit Result Document including a description of the visits outcomes and a confirmation that the telemonitoring protocol can continue. This document is included in the Workflow Document as a reference.

The Workflow Document is updated with a new task, “Visit Result,” characterized by:

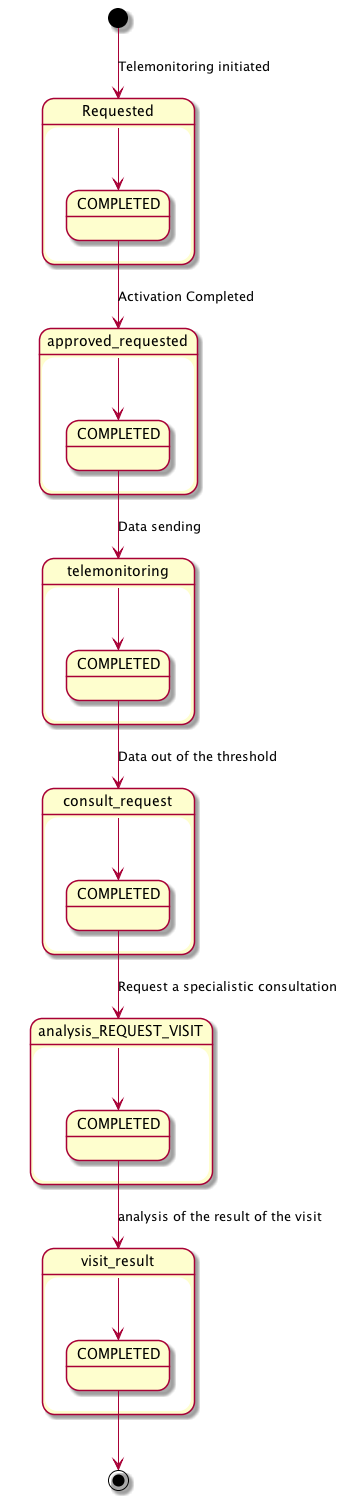
* a task status “Completed”
* references to the Clinical Report of the visit from the referral and a link to the eReferral Folder as inputs of the task
* a reference to the Visit Result Document as output of the task

The GP’s system, as a Consult Manager, provides the updated version of Workflow Document to the Document Repository, replacing the previous version.

The telemonitoring service provider can then review the Workflow Document and the new documents produced related to this workflow. This is accomplished through a query and retrieve of the active Workflow Document by the telemonitoring service provider’s system from the XDS Document Registry and the XDS Document Repository.

Figure X.3.1-3 describes this process flow and related tasks from step A to F1.

For further technical details see Appendix B.

**Figure X.3.1-3: Workflow Definition sample process flow**

***Case 2***

**E2. The GP analyses the alarm situation and decides to change the telemonitoring protocol of his patient, in particular the therapy or the monitoring timing or the alarm thresholds.**

If the GP decides to change the telemonitoring protocol, including therapy type, telemonitoring timing or alarm thresholds:

* the GP’s system, as a Consult Manager, produces a Telemonitoring Protocol Document, updated with the new telemonitoring protocol
* the GP’s system updates the Workflow Document

This step is characterized by the creation of another task, “Analysis and Change Protocol,” related to the telemonitoring protocol change.

In the Workflow Document, the “Analysis and Change Protocol” task is characterized by:

* a task status “Completed”
* references to the Telemonitoring Results Document and the Request Consult Document as inputs of the task
* a reference to the Telemonitoring Protocol Document Updated as output of the task

The GP’s system, as a Consult Manager, provides the updated version of Workflow Document to the Document Repository, replacing the previous version.

**F2. The alarm situation is resolved. The telemonitoring service provider activates the new telemonitoring protocol.**

After the GP publishes the new telemonitoring protocol and notifies the telemonitoring service provider, the new telemonitoring protocol for the patient must be activated. The telemonitoring service provider retrieves the updated Telemonitoring Protocol Document and the associated Workflow Document accessing them using a system that acts as a Consult Manager.

Once the telemonitoring service provider activates the new telemonitoring protocol it updates the Workflow Document with a new version in which the task “New Protocol Activation” is updated with the new information. The task “New Protocol Activation” is characterized by:

* a status “Completed”
* the reference to the updated Telemonitoring Protocol Document produced by the GP as input of the task

The telemonitoring service provider’s system, as a Consult Manager, provides the updated version of Workflow Document to the XDS Document Repository/Registry, replacing the previous version.

Other clinicians involved in the care of the patient, e.g., the specialist that visits the patient, can access the Workflow Document to view his complete clinical history in relation to the telemonitoring process.

Figure X.3.1-4 describes the process flow and related tasks from step A to F2.

For further technical details see Appendix B.

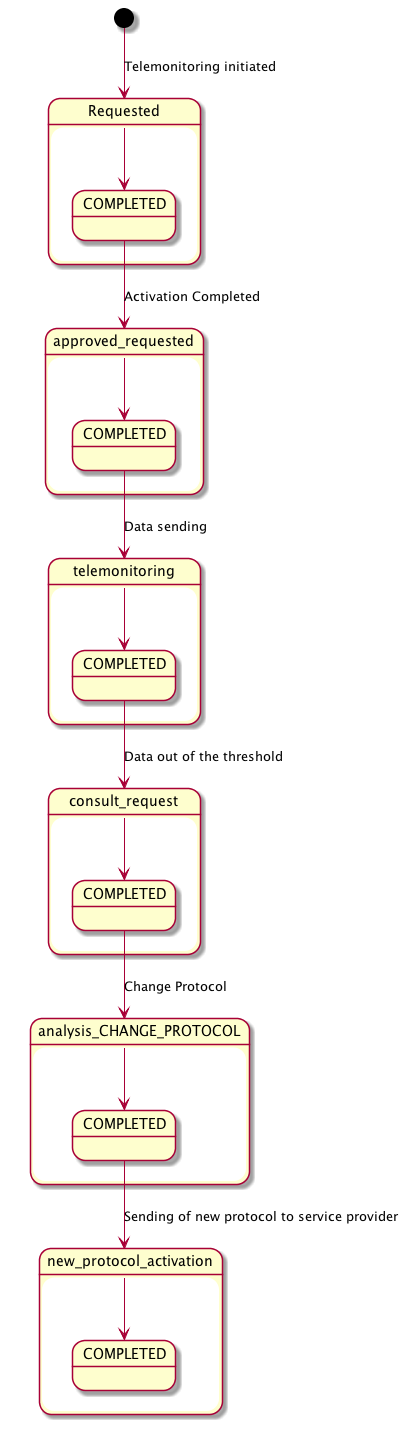
****

Figure X.3.1-4: Workflow Definition sample process flow

***Case 3***

**E3. The GP analyses the alarm situation and decides to perform clinical actions.**

If the GP decides that the alarm situation requires clinical actions, that include e.g. a change of the patient’s therapy, he updates the Workflow document with a new task, “Analysis and Clinical Actions”.

In the Workflow Document, the task “Analysis and Clinical Actions” is characterized by:

* a task status “Completed”
* references to the Telemonitoring Results Document and the Request Consult Document as inputs of the task

The GP’s system, as a Consult Manager, provides the updated version of Workflow Document to the Document Repository, replacing the previous version.

Figure X.3.1-5 describes the process flow and related tasks from step A to E3.

For further technical details see Appendix B.

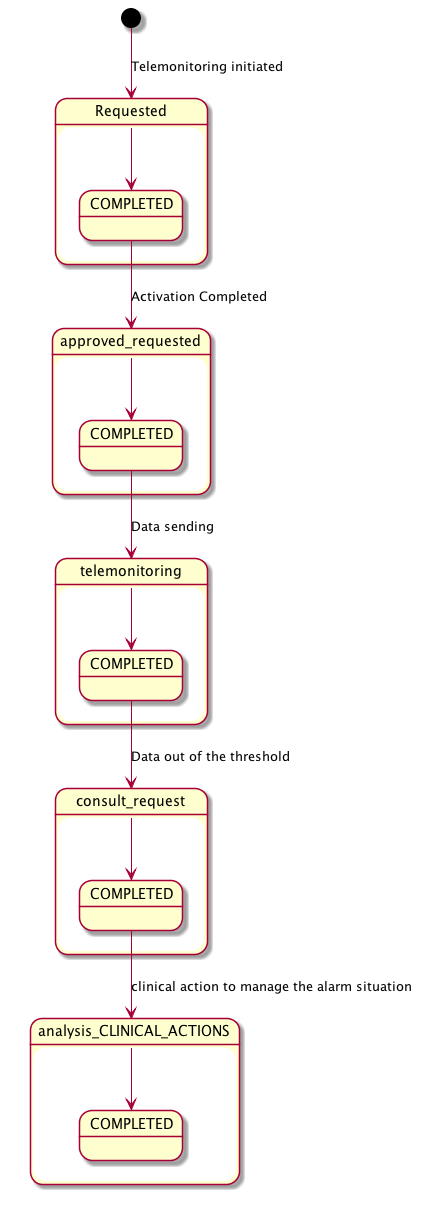


Figure X.3.1-5: Workflow Definition sample process flow

***Case 4***

**E4. The GP analyses the alarm situation and decides to perform no actions.**

If the GP decides that the alarm situation requires no action, he updates the Workflow document with a new task, “Analysis and No Actions”.

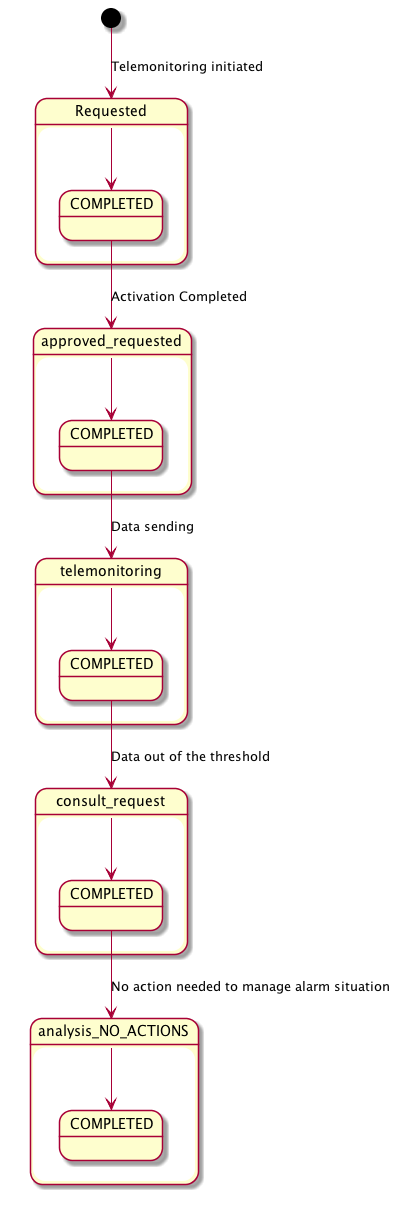
In the Workflow Document, the task “Analysis and No Actions” is characterized by:

* a task status “Completed”
* references to the Telemonitoring Results Document and the Request Consult Document as inputs of the task

The GP’s system, as a Consult Manager, provides the updated version of Workflow Document to the Document Repository, replacing the previous version.

Figure X.3.1-6 describes the process flow and related tasks from step A to E4.

For further technical details see Appendix B.

****

**Figure X.3.1-6: Workflow Definition sample process flow**

The workflow ends when the patient doesn’t need to be monitored any more by the telemonitoring service.

It would also be possible for a system of subscription and notification to communicate the progress between the different steps through the use of the Document Metadata Subscription (DSUB) profile or the Notification of Document Availability (NAV) profile.

## X.4 Options

In this section we describe which variations from the normal process are allowed. It is mandatory for implementers to explicity define which workflow options, if any, are addressed by their products.

Options that may be selected for this Profile are listed below along with the Workflow Participants to which they apply.

This Workflow Definition Profile is intended to be combined with other IHE Profiles. These other profiles may have their specific options. These are not addressed in this section, which focuses only on the Options identified for this Workflow Definition Profile.

## X.4.1 Consult Request task without Telemonitoring task as ancestor

The process can develop without the requirement to have the Telemonitoring task with data out of threshold as ancestor of the task Consult Request. This allows this profile to be implemented in many other real use-cases. If the “Consult Request task without Telemonitoring task as ancestor” option is chosen, rules to manage the process shall change.

If this workflow definition option is impemented, e.g. if the Care Manager is a single system that collects and manages data, when collected data are out of treshold, the Care Manager creates directly the Consult Request task with the Request Consult Document including the alarm information together with the clinical parameters of interest; this, without creating previously the Telemonitoring task that is not needed because it should include a document with the same information.

These rule changes are addressed in the Task Specification section Y.3:

* Task “Consul Request”:
  + Task dependencies:
    - Ancestors: Approved, Telemonitoring of a previous data collection without alarms, Visit Result, New protocol activation, Analysis and clinical actions, Analysis and no actions.
  + Input:
    - None
* Task “Analysis and Request Visit”:
  + Input
    - Request Consult Document (Required)
* Task “Analysis and Change Protocol”:
  + Input
    - Request Consult Document (Required)
* Task “Analysis and clinical actions”:
  + Input
    - Request Consult Document (Required)
* Task “Analysis and no actions”:
  + Input
    - Request Consult Document (Required)

**X.4.2 Clinical Input Option**

If this option is selected it is required that a Clinical Input is referenced as input of the tasks Requested and Approved.



## X.5 Grouping



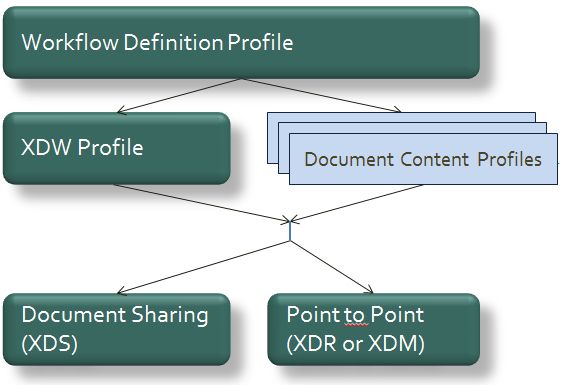




This Workflow Definition Profile is intended to be combined with other IHE Profiles. The profiles that are candidates for such combinations and the associated rules are specified in this Section.

Figure X.5-1 presents an overview for the major classes of IHE Profiles that shall or may be grouped:

* The Workflow Definition Profile SHALL be grouped with the XDW Profile.
* The Workflow Definition Profile SHOULD be grouped with one or more Document Content Profiles matched to the input and output reference “Document Labels” in the Workflow Definition Profile (Defined in Vol.2). The Workflow Definition Profile provides only “Document Labels” for these input and output reference documents and not the actual specifications. This selection of the actual document content specification (IHE Content profiles or others), need to be made by the environment that deploys the Workflow Definition Profile.
* The Workflow Definition Profile, the XDW Profile and the selected Document Content Profiles shall be grouped as decided by the deployment environment, with the suitable Integration Profile supporting a document transport service such as XDS for Document Sharing, XDR/XDM for point-to-point directed transport, or other functionally equivalent profiles.



**Figure X.5-1 Grouping of profiles**

Volume 2 – Content Modules

## XTHM Workflow Definition - XDW Workflow Document – Common Attributes

This workflow definition profile is assigned a specific OID that shall be used to assign an identifier to the workflowDefinitionReference element of a Workflow Document that tracks a telemonitoring process.

Table Y.1-1: XTHM-WD Workflow – Workflow Definition Reference

|  |  |
| --- | --- |
| type of Workflow | Workflow Definition Reference |
| Telemonitoring workflow | 1.3.6.1.4.1.19376.1.5.3.1.5.2 |

The XTHM-WD Workflow Definition does not introduce new metadata and all the metadata elements used are the common XDS document metadata specified in ITI TF-3:4.1.5 and in ITI TF-3:5.4.6. In this section only the use of some specific metadata for use of XDW in the XTHM-WD context is specified.

Table Y.1-2: XTHM-WD Workflow – XDS Metadata Attribute

| XDS Metadata Attribute | Definition |
| --- | --- |
| typeCode | For the Workflow Document which tracks the XTHM-WD process the code for the typeCode shall be:  This code will be assigned by LOINC |
| classCode | For the Workflow Document which tracks the XTHM-WD process the code for the classCode is defined by the XDW profile.  See XDW Supplement Section 5.4.6.1 |
| eventCodeList | **Rule 1:**  An XTHM-WD workflow shall be created with code OPEN and shall remain in this status until it is set to CLOSE.  **Rule 2:**  An XTHM-WD workflow should be set to CLOSE when there is the need to end the telemonitoring workflow for any reason. In this case the current last task of the workflow has to be set in status COMPLETED. Each task of the process can lead to the closing of the workflow.  **Rule 3:**  An XTHM-WD workflow that was set to CLOSE can be reopened and set to OPEN if the patient has a need to use the telemonitoring service again.  See IHE ITI TF-3: 5.4.5.7 for a general description of this attribute. |
| serviceStartTime | Is the time at which work began on the first task for this workflow. |
| serviceStopTime | Is the time at which the status of the overall Workflow is changed from OPEN to CLOSED.  It shall be empty when the workflow is still in OPEN state. |

## XDW Content Modules

The main instrument of the Cross-enterprise TeleHomeMonitoring Workflow Definition Profile is the Workflow Document defined in the XDW Profile. This document does not include clinical information about the patient directly. It shall only contain information necessary for organizing and defining work tasks. All clinical information regarding any task shall be provided through separate documents that are referenced from the associated input or output documents.

Detailed knowledge of the Cross-enterprise Document Workflow (XDW) profile is indispensable in understanding the following sections. For more detailed, refer to ITI TF-3: 5.4.

## Tasks Specifications

Workflow Description Overview:

Table Y.2-1: Workflow Description Overview

| Task Type | Requirement  For task initiation | Task Statuses  \*valid when task initiated | Task  Property | Input Docs | Option | Output Docs | Option |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requested | At XDW doc creation | COMPLETED\* | Cardinality: 1..1  Removable: no | Clinical Input | O  \* These may change if Workflow Options are selected | Request Activation Document | R |
| Approved | When Requested completed | IN\_PROGRESS\*  COMPLETED\* | Cardinality: 1..1  Removable: no | Request Activation Document | R | N/A |  |
| Clinical Input | O  \* These may change if Workflow Options are selected |
| Telemonitoring | For the first time in the WD: when Approved completed | READY  COMPLETED\*  FAILED\*  IN PROGRESS | Cardinality: 1..n  Removable: no | N/A |  | Telemonitoring Results Document | R |
| Consult Request | If Telemonitoring with data out of the threshold | COMPLETED\* | Cardinality: 1..n  Removable: no | Telemonitoring Results Document | R  \* These may change if Workflow Options are selected | Request Consult Document | R |
| Analysis and Request Visit | When Consult Request Completed | COMPLETED\* | Cardinality: 1..n  Removable: no | Telemonitoring Results Document | R  \* These may change if Workflow Options are selected | eReferral folder.uniqueID | R |
| Request Consult Document | R | eReferral Document | R |
| Visit Result | When Request Visit Completed | COMPLETED\* | Cardinality: 1..n  Removable: no | Clinical Report of the Visit | R | Visit Result Document | R |
| eReferral folder.uniqueID | R |
| Analysis and Change Protocol | When Consult Request Completed | COMPLETED\* | Cardinality: 1..n  Removable: no | Telemonitoring Results Document | R  \* These may change if Workflow Options are selected | Telemonitoring Protocol Updated | R |
| Request Consult Document | R |
| New Protocol Activation | When analysis and change protocol completed | COMPLETED\* | Cardinality: 1..n  Removable: no | Telemonitoring Protocol Document Updated | R | N/A | - |
| Analysis and Clinical Actions | When Consult Request Completed | COMPLETED\* | Cardinality: 1..n  Removable: no | Telemonitoring Results Document | R  \* These may change if Workflow Options are selected | N/A | - |
| Request Consult Document | R |
| Analysis and no actions | When Consult Request Completed | COMPLETED\* | Cardinality: 1..n  Removable: no | Telemonitoring Results Document | R  \* These may change if Workflow Options are selected | N/A | - |
| Request Consult Document | R |

In this section we define rules and constraints for the creation and update of the XDW Workflow Document related to the telemonitoring process.

The set of rules defined here is necessary to manage transitions between tasks. For each task the following are defined:

* Task attributes: ID, name, type description;
* The sequence of the tasks: the previous and the next task;
* Which Workflow Participant is allowed to create each task and to change the status;
* The task event;
* The input and output documents.

### Task: Requested

| Task attributes | Rules for the task “Requested” |
| --- | --- |
| Task id | Unique id of the instance of the task |
| Task type | **Requested** |
| Task name | Activation Requested |
| Task description | Request the activation of the telemonitoring service activation for a patient. |
| Task dependencies | Ancestors: None  Successors: Approved |
| Status allowed | **COMPLETED** |
| Status transactions (\*) | None, task is created completed.   |  |  |  | | --- | --- | --- | | **Initial Status** | **Final Status** | **eventType** | | none | COMPLETED | create | |
| Input | * Optional   + Clnical input (all relevant documents useful to evaluate the possibility for follow up of the patient at home, e.g., clinical or laboratory reports)   \* These may change if Workflow Options are selected |
| Output | * Required   + Request Activation Document |
| Owner | General Clinician Manager |
| owner changes | No |
| <taskEvent> | Only one |
| Task Removal allowed | May workflow participants remove a task when updating a XDW Workflow Document): No |
| Task duplication | May the task appear more than once in the Workflow Definition: No |

(\*) The element eventType stores the type of event that produces the change in the task status. In the “Status transactions” we want to associate the specific type of event to the status transaction produced. For further details on eventType element see XDW profile.

### Task: Approved

| Task attributes | Rules for the task “Approved” |
| --- | --- |
| Task id | Unique id of the instance of the task |
| Task type | **Approved** |
| Task name | Approved Request |
| Task description | Approval of the request for activation for the telemonitoring service. |
| Task dependencies | Ancestors: Requested  Successors: Telemonitoring |
| Status allowed | **IN\_PROGRESS:** if the enrollment of the patient is pending and needs more information or time to be completed  **COMPLETED:** if the enrollment is completed |
| Status transactions | None, if the task is created in completed state. If the task is created with status IN\_PROGRESS, the status shall be changed to COMPLETED when the approving process is completed   |  |  |  | | --- | --- | --- | | **Initial Status** | **Final Status** | **eventType** | | none | IN\_PROGRESS | create | | IN\_PROGRESS | COMPLETED | complete | | none | COMPLETED | create | |
| Input | * Required   + Request activation Document * Optional   + Clinical Input   \* These may change if Workflow Options are selected |
| Output | None |
| Owner | Care Manager (Approver of the request activation) |
| owner changes | No |
| <taskEvent> | Only one (completed): if the approving process is completed  Two in the other cases |
| Task Removal allowed | May workflow participants remove a task when updating a XDW Workflow Document): No |
| Task duplication | May the task appear more than once in the Workflow Definition: No |

### Task : Telemonitoring

| Task attributes | Rules for the task “Telemonitoring” |
| --- | --- |
| Task id | Unique id of the instance of the task |
| Task type | **Telemonitoring** |
| Task name | Telemonitoring <N> |
| Task description | Sending of data to the service provider |
| Task dependencies | Ancestors: Approved, Telemonitoring, Visit Result, New Protocol Activation, Anlysis and no actions and Analysis and clinical actions  Successors: Telemonitoring, Consult Request |
| Status allowed | **READY**: if the process is suspended for a period  **or**  **COMPLETED**  **or**  **FAILED:** in case of problems in sending data.  **or**  **IN PROGRESS:** to manage the problems after a status FAILED (not required) |
| Status transactions | None if the task created with status COMPLETED or FAILED. If there is the need to suspend the telemonitoring for a patient, the last task available with status COMPLETED moves to the status READY. When the process is resumed, the status shall be changed into COMPLETED, or into FAILED if there are problems in sending data when the process is resumed. In case of failing of the Telemonitoring task it is not required to repeat the action traced but it is suggested to solve the problems, occured in sending data, adding new task Events:   * when the Care Manager takes in charge the problem there is the transaction from status FAILED to status IN\_PROGRESS; * when the errors are corrected, there is the transaction from status IN\_PROGRESS to status COMPLETED.  |  |  |  | | --- | --- | --- | | **Initial Status** | **Final Status** | **eventType** | | none | COMPLETED | create | | COMPLETED | READY | suspend | | READY | COMPLETED | resume | | READY | FAILED | fail | | none | FAILED | fail | | FAILED | IN\_PROGRESS | resume | | IN\_PROGRESS | COMPLETED | complete | |
| Input | * Optional:   + Telemonitoring Results Document: if the status is IN\_PROGRESS |
| Output | * Required   + Telemonitoring Results Document |
| Owner | Care Manager |
| owner changes | No |
| <taskEvent> | Not specified |
| Task Removal allowed | May workflow participants remove a task when updating a XDW Workflow Document): No |
| Task duplication | May the task appear more than once in the Workflow Definition: Yes |

### Task: Consult Request

| Task attributes | Rules for the task “Consult Request” |
| --- | --- |
| Task id | Unique id of the instance of the task |
| Task type | **Consult Request** |
| Task name | Consult Request <N> |
| Task description | Generation of an alarm because data are outside of the thresholds |
| Task dependencies | Ancestors: Telemonitoring with data out of the threshold  \* These may change if Workflow Options are selected  Successors: Analysis and Request visit, Analysis and change protocol, Analysis and no actions, Analysis and clinical actions |
| Status allowed | **COMPLETED** |
| Status transactions | None, task is created with status completed.   |  |  |  | | --- | --- | --- | | **Initial Status** | **Final Status** | **eventType** | | none | COMPLETED | create | |
| Input | * Required * Telemonitoring Results Document   \* These may change if Workflow Options are selected |
| Output | * Required   + Request Consult Document |
| Owner | Care Manager |
| owner changes | No |
| <taskEvent> | Only one |
| Task Removal allowed | May workflow participants remove a task when updating a XDW Workflow Document): No |
| Task duplication | May the task appear more than once in the Workflow Definition: Yes |

### Task: Analysis and Request Visit

| Task attributes | Rules for the task “Analysis and Request Visit” |
| --- | --- |
| Task id | Unique id of the instance of the task |
| Task type | **Analysis and Request Visit** |
| Task name | Analysis and Request Visit <N> |
| Task description | Analysis of the Telemonitoring Results Document and request of a specialist consultation |
| Task dependencies | Ancestors: Consult Request  Successors: Visit Result |
| Status allowed | **COMPLETED** |
| Status transactions | None, task is created with status completed.   |  |  |  | | --- | --- | --- | | **Initial Status** | **Final Status** | **eventType** | | none | COMPLETED | create | |
| Input | * Required * Telemonitoring Results Document   \* These may change if Workflow Options are selected   * Request Consult Document |
| Output | * Required   + eReferral folder.uniqueID   + eReferral document |
| Owner | Consult Manager |
| owner changes | No |
| <taskEvent> | Only one |
| Task Removal allowed | May workflow participants remove a task when updating a XDW Workflow Document): No |
| Task duplication | May the task appear more than once in the Workflow Definition: Yes |

### Task: Visit Result

| Task attributes | Rules for the task “Visit Result” |
| --- | --- |
| Task id | Unique id of the instance of the task |
| Task type | **Visit Result** |
| Task name | Visit Result <N> |
| Task description | Analysis of the Results of the requested eReferral process |
| Task dependencies | Ancestors: Analysis and Request Visit  Successors: Any task to collect or manage telemonitored data or alarms |
| Status allowed | **COMPLETED** |
| Status transactions | None, task is created with status completed.   |  |  |  | | --- | --- | --- | | **Initial Status** | **Final Status** | **eventType** | | none | COMPLETED | create | |
| Input | * Required * Clinical Report of the visit * eReferral folder.uniqueID |
| Output | * Required   + Visit Result Document |
| Owner | Consult Manager |
| owner changes | No |
| <taskEvent> | Only one |
| Task Removal allowed | May workflow participants remove a task when updating a XDW Workflow Document): No |
| Task duplication | May the task appear more than once in the Workflow Definition: Yes |

### 

### Task: Analysis and Change Protocol

| Task attributes | Rules for the task “Analysis and Change Protocol” |
| --- | --- |
| Task id | Unique id of the instance of the task |
| Task type | **Analysis and Change Protocol** |
| Task name | Analysis and Change Protocol <N> |
| Task description | Analysis of the alarm situation and change of the telemonitoring protocol |
| Task dependencies | Ancestors: Consult Request  Successors: New Protocol Activation |
| Status allowed | **COMPLETED** |
| Status transactions | None, task is created with status completed.   |  |  |  | | --- | --- | --- | | **Initial Status** | **Final Status** | **eventType** | | none | COMPLETED | create | |
| Input | * Required * Telemonitoring Results Document   \* These may change if Workflow Options are selected   * Request Consult Document |
| Output | * Required   + Telemonitoring Protocol Updated |
| Owner | Consult Manager |
| owner changes | No |
| <taskEvent> | Only one |
| Task Removal allowed | May workflow participants remove a task when updating a XDW Workflow Document): No |
| Task duplication | May the task appear more than once in the Workflow Definition: Yes |

### Task: New Protocol Activation

| Task attributes | Rules for the task “New Protocol Activation” |
| --- | --- |
| Task id | Unique id of the instance of the task |
| Task type | **New Protocol Activation** |
| Task name | New Protocol Activation <N> |
| Task description | Analysis of the Telemonitoring Protocol Updated and new protocol activation |
| Task dependencies | Ancestors: New Protocol Activation  Successors: Any task to collect or manage telemonitored data or alarms |
| Status allowed | **COMPLETED** |
| Status transactions | None, task is created in status completed.   |  |  |  | | --- | --- | --- | | **Initial Status** | **Final Status** | **eventType** | | none | COMPLETED | create | |
| Input | * Required * Telemonitoring Protocol Document Updated |
| Output | None |
| Owner | Care Manager |
| owner changes | No |
| <taskEvent> | Only one |
| Task Removal allowed | May workflow participants remove a task when updating a XDW Workflow Document): No |
| Task duplication | May the task appear more than once in the Workflow Definition: Yes |



### Task: Analysis and clinical actions

| Task attributes | Rules for the task “Analysis clinical actions” |
| --- | --- |
| Task id | Unique id of the instance of the task |
| Task type | Analysis and clinical actions |
| Task name | Analysis and clinical actions <N> |
| Task description | Analysis of the alarm situation and clinical actions |
| Task dependencies | Ancestors: Consult Request  Successors: Any task to collect or manage telemonitored data or alarms |
| Status allowed | **COMPLETED** |
| Status transactions | None, task is created in status completed.   |  |  |  | | --- | --- | --- | | **Initial Status** | **Final Status** | **eventType** | | none | COMPLETED | create | |
| Input | * Required * Telemonitoring Results Document   \* These may change if Workflow Options are selected   * Request Consult Document |
| Output | None |
| Owner | Consult Manager |
| owner changes | No |
| <taskEvent> | Only one |
| Task Removal allowed | May workflow participants remove a task when updating a XDW Workflow Document): No |
| Task duplication | May the task appear more than once in the Workflow Definition: Yes |

### Task: Analysis and no actions

| Task attributes | Rules for the task “Analysis and no actions” |
| --- | --- |
| Task id | Unique id of the instance of the task |
| Task type | Analysis and no actions |
| Task name | Analysis and no actions <N> |
| Task description | Analysis of the alarm situationn and no actions are necessary |
| Task dependencies | Ancestors: Consult Request  Successors: Any task to collect or manage telemonitored data or alarms |
| Status allowed | **COMPLETED** |
| Status transactions | None, task is created in status completed.   |  |  |  | | --- | --- | --- | | **Initial Status** | **Final Status** | **eventType** | | none | COMPLETED | create | |
| Input | * Required * Telemonitoring Results Document   \* These may change if Workflow Options are selected   * Request Consult Document |
| Output | None |
| Owner | Consult Manager |
| owner changes | No |
| <taskEvent> | Only one |
| Task Removal allowed | May workflow participants remove a task when updating a XDW Workflow Document): No |
| Task duplication | May the task appear more than once in the Workflow Definition: Yes |

## Y.4 Input and output documents

The WS-HumanTask element that permit to store the reference of an object in input or output sections is described in IHE ITI TF-3:5.4.3.

In table Y.4-1 we define the kind of document involved in the telemonitoring process. For each type of document this table defines the Documents Labels of the document. This Label describes the function or the role that the document performs in the course of the process or during the execution of a task, and defines the type of information conveyed and expected by the owner of the tasks.

Table Y.4-1: Documents involved in the telemonitoring process

| Document Label | Example of Content Profile |
| --- | --- |
| **Clinical Input** | XDS-SD  PPOC  XD-LAB  ECDR  CIRC  DRPT  APSR |
| **Request Activation Document** | XDS-SD |
| **Telemonitoring Results Document** | PHMR  XDS-SD |
| **Request Consult Document** | XDS-SD |
| **eReferral** | XDS-SD |
| **Clinical Report of the Visit** | XDS-SD  EDR  PPOC  XD-LAB  ECDR  CIRC  DRPT  APSR |
| **Visit Result Document** | XDS-SD |
| **Telemonitoring Protocol Updated** | XDS-SD |

Appendix A- Complete example of Telemonitoring Workflow Document

In this Appendix we provide a complete example of a Workflow Document related to the telemonitoring process from the request for service activation and creation of the Workflow Document (WD), through the uploading of daily transmissions of clinical patient data, to the management of an alarm situation with no actions and then with a request of a visit.

|  |
| --- |
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Appendix B: Technical development of WD related to the telemonitoring process

In this Appendix we present more technical information related to the use-case scenario described in Volume 1 of this profile.

## B.1 Management of alarm situation with a request of a visit



Figure B.1-1: Management of the Workflow Document: request of a visit

## B.2 Management of alarm situation with a change of the protocol



Figure B.2-1: Management of the Workflow Document: change protocol

## B.3 Management of alarm situation with clinical actions



Figure B.3-1: Management of the Workflow Document: clinical actions

## B.4 Management of alarm situation with no actions



Figure B.4-1: Management of the Workflow Document: no actions