Integrating the Healthcare Enterprise

IHE Radiology RAD
White Paper

Cross-Enterprise Screening Mammography Workflow Definition

Revision 1.0

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Foreword

Integrating the Healthcare Enterprise (IHE) is an international initiative to promote the use of standards to achieve interoperability among health information technology (HIT) systems and effective use of electronic health records (EHRs). IHE provides a forum for care providers, HIT experts and other stakeholders in several clinical and operational domains to reach consensus on standards-based solutions to critical interoperability issues.

The primary output of IHE is system implementation guides, called IHE Profiles. IHE publishes each profile through a well-defined process of public review and trial implementation and gathers profiles that have reached final text status into an IHE Technical Frameworks.

For more information regarding IHE in general, see www.ihe.net. Information about the IHE Radiology may 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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55

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1 Introduction

This White Paper arises from the necessity to manage the process of breast screening in Radiology area and provides a more general approach which allows to integrate the Radiology mammography exam in a complex scenarios and to manage the breast screening workflow.
The value statements of the Cross-Enterprise Screening Mammography are the standardization of the workflow's management process as well as the associated workflow tracking structure linked with the clinical process of the breast screening and the creation of an instrument able to respond at the present needs and possibly to extend to future requirements.

This White Paper involves Radiology domain profiles in managing the complexity of the workflow features defined in the RAD domain's profiles and the Cross-Enterprise Document Workflow profile from the ITI domain. XDW profile allows to track and manage all the tasks concerned in the screening process (multi-blind reading evaluation,...) also extending future requirements as well as XDS profile provides the multi enterprise exchange of useful clinical document and DICOM study related information.

1.1 Purpose of the Cross-Enteprise Screening Mammography Workflow Definition Whitepaper

It increases the consistency of workflow interoperability and the skill to solve the requests of the various care areas providing a standard solution to manage this clinical process and avoid that different competing solutions are developed in the different areas.

1.2 Intended Audience

The intended audience of the IHE RAD Cross-Enterprise Screening Mammography Workflow Definition White Paper is:

- Manufacturer marketing departments
- IT departments of healthcare institutions
- Technical staff of vendors participating in the IHE initiative
- Experts involved in the screening programs and standards development
- Those interested in integrating healthcare information systems and workflows

1.3 Comment Process

In order to match and to provide a reliably representation on most of mammography screening programs, comments and country based elements on each different services may be submitted to fvanzo@consorzioarsenal.it.

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1.4 Open and Closed Issues

The Open Issues related to this White Paper are the same that arise from the XDW profile, MAWF profile, SWF profile. At the first level the open issue is related to an XCA management of the screening process. Today the XDW profile is approved in trial implementation for the management of processes inside a community. It is the work for the next year the development of the XDW in the XCA. So in this sense for now all actors involved in the screening process shall be part of different enterprise but in the same community. For the other open issues refer to the specific profiles involved.

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CONTENTS

1 Introduction 3
1.1 Purpose of the Cross-Enteprise Screening Mammography Workflow Definition Whitepaper 3
1.2 Intended Audience 3
1.3 Comment Process 3
1.4 Open and Closed Issues 4
2 Cross-Enterprise Screening Mammography Workflow Definition (XSM-WD) 7
2.1 Actors/Transactions 7
2.2 Cross-Enterprise Screening Mammography – Workflow Definition White Paper Options 10
2.2.1 View Option 10
2.2.2 Document Import Option 10
2.3 Screening Mammography Workflow 10
2.3.1 Screening Mammography – Italian Use Case 13
2.3.1.1 Data Model 13
2.3.1.2 Description Step-by-Step 16
2.3.1.3 Process Flow 27
2.3.2 Screening Mammography – German Use Case 30
2.3.2.1 Data Model 30
2.3.2.2 Description Step-by-Step 30
2.3.2.3 Process Flow 30
2.3.3 Mammography Screening Country-based elements 30
2.3.4 Screening Mammography – Canadian Use Case 30
2.3.4.1 Data Model 30
2.3.4.2 Description Step-by-Step 30
2.3.4.3 Process Flow 30
2.3.5 Mammography Screening Country-based elements 30
3 Cross-Enterprise Screening Mammography Workflow Definition (XSM-WD) – Technical Rules 31
3.1 Italian Use Case 31
3.1.1 Workflow Definition Identifier 31
3.1.2 Workflow Opening and Closing 31
3.1.3 Task Descriptions 31
3.1.4 Task 1: Recruitment 32
3.1.5 Task 2b: No Admission 33
3.1.6 Task 2a: Examination 35
3.1.7 Task 3: Evaluation 1 37
3.1.8 Task 4: Evaluation 2 38
3.1.9 Task 5: CS Evaluation 40
3.1.10 Task 6a: End 1 42
3.1.11 Task 6b: Second Level 1 43
3.1.12 Task 6c: Evaluation 3 45
3.1.13 Task 7: Response 47

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3.1.14 Task 8: End 2 48
3.1.15 Task 9: Second Level 2 50
3.2 German Use Case 52
3.2.1 Workflow Definition Identifier 52
3.2.2 Workflow Opening and Closing 52
3.2.3 Task Descriptions 52
3.3 Canadian Use Case 52
3.3.1 Workflow Definition Identifier 52
3.3.2 Workflow Opening and Closing 52
3.3.3 Task Descriptions 52
4 Transactions 53
4.1 Further details on transactions? 53
5 National Extensions 54
5.1 Introduction 54
5.2 Scope 54
Glossary 54

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2 Cross-Enterprise Screening Mammography Workflow Definition (XSM-WD)

The Cross-Enterprise Screening Mammography Workflow Definition White Paper leads a complete management of a Screening service program conntecting the RAD domain and the ITI domain. The RAD domain has the duty to define the specific workflow and the XDW profile from ITI domain enhances the same workflow's interoperability and allows to share and update all events of the screening process between different enterprises.

The White Paper describes the orchestration of the screening workflow in order to allows the workflow participants to share a common understanding of the specific tasks, the dependencies between these tasks and a number of rules to effectively manage the workflow execution and leads the interoperability between different information systems. All the details of the process are conveyed through the XDW Workflow Document.

2.1 Actors/Transactions

Figure X.1-1 diagrams the actors involved in this White Paper and the transactions between actors including the unique grouped entity for the XDW profile.

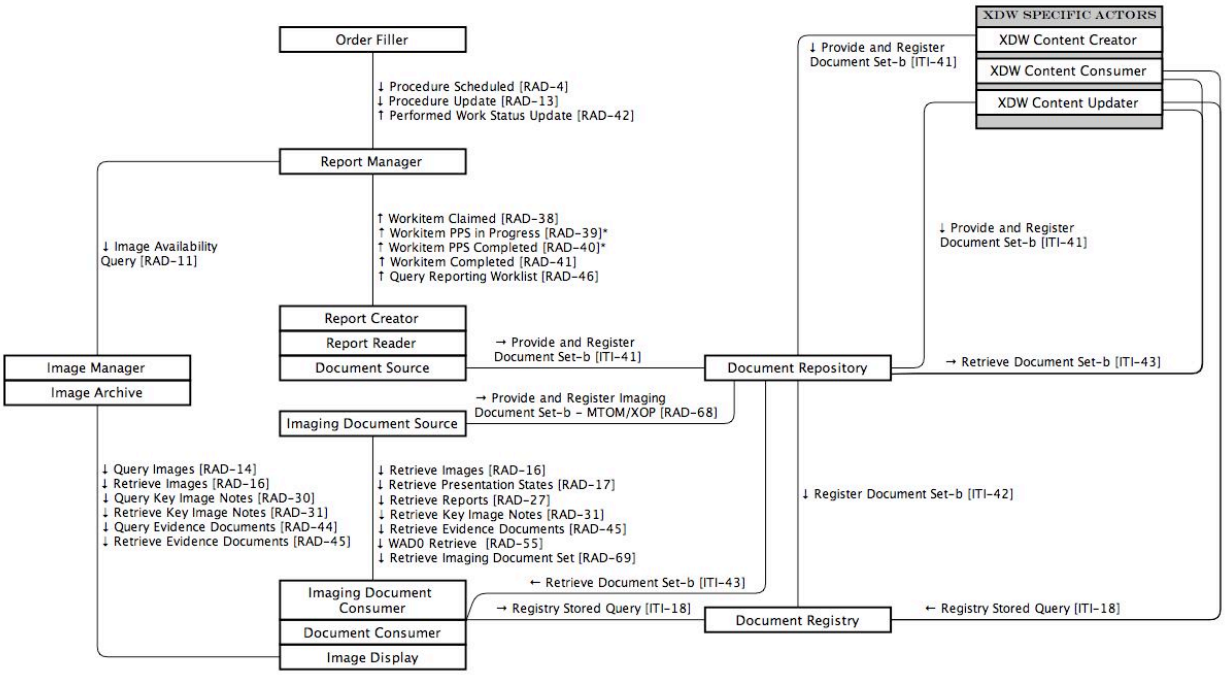

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Figure X.1-1. Cross-Enterprise Screening Mammography – Workflow Definition Diagram

Table X.1-1 lists the transactions potentially involved and considered for each actor in the Cross-Enterprise Screening Mammography White Paper even if basically the use case adopts mainly XDS transactions in the process. The transactions which optionality is labeled "R" are required and those labeled "O" are optional.

Table X.1-1. Cross-Enterprise Screening Mammography - Workflow Definition - Actors and Transactions

Actors	Transactions	Optionality	Vol 2/3 Section or ITI
Content Consumer	Registry Stored Query [ITI-18]	R	
	Retrieve Document Set-b [ITI-43]	R	
Content Creator	Provide and Register Document Set-b [ITI-41]	R	
Content Updater	Registry Stored Query [ITI-18]	R	
	Retrieve Document Set-b [ITI-43]	R	
Document Consumer	Registry Stored Query [ITI-18]	R	
	Retrieve Document Set-b [ITI-43]	R	
Document Registry	Registry Stored Query [ITI-18]	R	
	Register Document Set-b [ITI-42]	R	
Document Repository	Provide and Register Document Set-b [ITI-41]	R	
	Register Document Set-b [ITI-42]	R	
	Retrieve Document Set-b [ITI-43]	R	
	Provide and Register Document Set-b MTOM/XOP [RAD-68]	R	
Document Source	Provide and Register Document Set-b [ITI-41]	R	
Image Display	Query Images [RAD-14]		4.14
	Retrieve Images [RAD-16]		4.16
	Query Key Image Note [RAD-30]		4.30
	Retrieve Key Image Note [RAD-31]		4.31
	Query Evidence Documents [RAD-44]		4.44
	Retrieve Evidence Documents [RAD-45]		4.45
Image Manager / Image Archive	Image Availability Query [RAD-11]		4.11
	Query Images [RAD-14]		4.14
	Retrieve Images [RAD-16]		4.16
	Query Key Image Note [RAD-30]		4.30
	Retrieve Key Image Note [RAD-31]		4.31

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Actors	Transactions	Optionality	Vol 2/3 Section or ITI
	Query Evidence Documents [RAD-44]		4.44
	Retrieve Evidence Documents [RAD-45]		4.45
Imaging Document Consumer	Retrieve Images [RAD-16]	R	4.16
	Retrieve Presentation States [RAD-17]	R	4.17
	Retrieve Reports [RAD-27]	R	4.27
	Retrieve Key Image Note [RAD-31]	R	4.31
	Retrieve Evidence Documents [RAD-45]	R	4.45
	WADO Retrieve [RAD-55]	R	4.55
	Registry Stored Query [ITI-18]	R	
	Retrieve Document Set-b [ITI-43]	R	
Imaging Document Source	Retrieve Images [RAD-16]	R	4.14
	Retrieve Presentation States [RAD-17]	R	4.17
	Retrieve Reports [RAD-27]	R	4.27
	Retrieve Key Image Note [RAD-31]	R	4.31
	Retrieve Evidence Documents [RAD-45]	R	4.45
	WADO Retrieve [RAD-55]	R	
	Provide & Register Imaging Document Set MTOM/XOP [RAD-68]	R	
	Retrieve Imaging Document Set [RAD-69]	R	
Order Filler	Procedure Scheduled [RAD-4]	R	4.4
	Procedure Update [RAD-13]	R	4.13
	Performed Work Status Update [RAD-42]	R	4.42
Report Creator / Report Reader	Workitem Claimed [RAD-38]		4.38
	Workitem PPS in Progress [RAD-39]		4.39
	Workitem PPS Completed [RAD-40]		4.40
	Workitem Completed [RAD-41]		4.41
	Query Reporting Worklist [RAD-46]		4.46
Report Manager (optionally grouped with a Report Repository)	Procedure Scheduled [RAD-4]		4.4
	Image Availability Query [RAD-11]		4.11
	Procedure Update [RAD-13]		4.13
	Workitem Claimed [RAD-38]		4.38
	Workitem PPS in Progress [RAD-39]		4.39
	Workitem PPS Completed [RAD-40]		4.40
	Workitem Completed [RAD-41]		4.41
	Performed Work Status Update [RAD-42]		4.42
	Query Reporting Worklist [RAD-46]		4.46

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2.2 Cross-Enterprise Screening Mammography – Workflow Definition White Paper Options

Options that may be selected for this White Paper are listed in the table X.2-1 along with the Actors to which they apply.

Table X.2-1. Cross-Enterprise Screening Mammography – Workflow Definition – Actors and Options

MORE OPTIONS SHALL BE ADDED

Actor	Options	Vol & Section
Content Creator	*No options defined*	- -
Content Consumer	*View Option*	ITI TF-1: 30.2.1
	Document Import Option	ITI TF-1: 30.2.2
Content Updater	*View Option*	ITI TF-1: 30.2.1
	Document Import Option	ITI TF-1: 30.2.2

2.2.1 View Option

...

2.2.2 Document Import Option

...

2.3 Screening Mammography Workflow

In order to understand the workflow document context of creation and updating it is assumed the following XDW Actor Diagram that simplifies the Workflow Document processing.

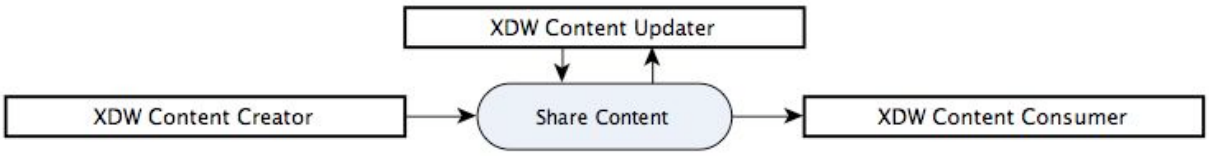

Figure X.3-3. XDW Actor Diagram

The transactions that occours between the three actors are necessary to compose and update the Workflow Document by filling it with associated metadata as well as references to external documents and may be useful for its other optional display capabilities, storage, specific for the mammography screening service.

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There are content and sequencing rules in this process and that may be followed by using profiles as XDS, XDS-I.b, XDR and XDM, SWF, RWF, MAMMO.

Since the Screening Mammography workflow between participants in a multi-organization environment is managed by the XDW Workflow Document which depicts every task described for this clinical background taking into account each task respectively.

Each task is described by several attributes:

- the name, the code and the type of task
- the owner of the task: a person or an organization assigned to the specific task
- the current status of this task (one of the status value that are valid for this task): “created”, “ready”, “in progress” , “completed”, “failed”
- the references to documents used for input or produced as output
- the history of past Task Events (a record of a change of status, or other attribute which specifications rely on the OASIS Human Task standard) for this task, that document the progress of the task up to the present state

The first part of each column displays the general workflow information and the second part lists all the worflow tasks information up to that specific task considered as shown in the Figure X.3-4. Each task is characterized by name, status, input, output and owner. The owner represents the author in the Workflow document information the moment this task occurs.

For further specifications refer to the IT Infrastructure Technical Framework Supplement – Cross-Enterprise Document Workflow (XDW).

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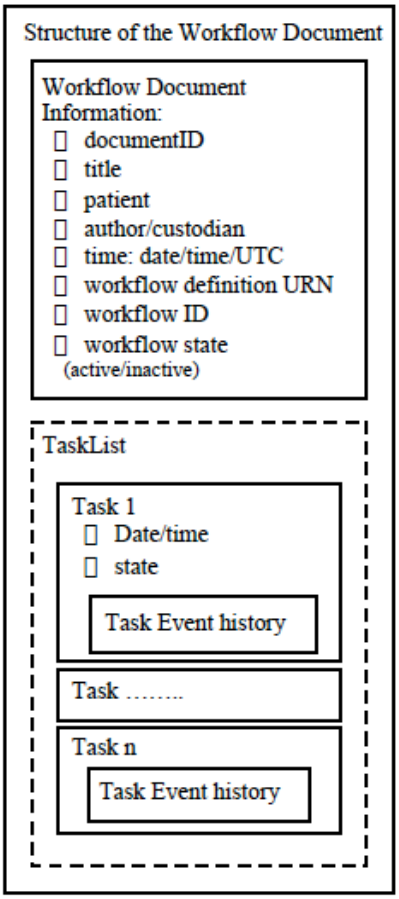

Figure X.3-4. Workflow Document General Structure

The Content Updater has to bring up to date the Workflow Document for each mammography screening process task adding one (or more) new task, updating an existing task, record a past taskEvent and refresh the general Screening Mammography Workflow Document Information elements.

Each update to the Workflow Document results in a new instance of the Workflow Document which is published as a replacement. The older versions of the Workflow Document shall have the XDSDocumentEntry availabilityStatus with the "Deprecated" value. The technical description of the updating process of the Workflow Document is specified in ITI TF-3:5.4.5.4.

The high level of interaction between principal parties in the process has to match the screening features to go through every task and to ensure that the Workflow Document is timely updated according to the proposed structure.

In particular the XDW specific actors, illustrated in the Cross-Enterprise Screening Mammography Diagram, are only logical actors because they are respectively grouped

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together as well as the Report Creator/Document Source and Report Reader/Document Consumer/Image Display.

The "Screening Mammography Workflow Document" shall be populated according to technical details describen in the IHE ITI Technical Framework Supplement XDW. The following sections highlight the process flow which contributes to better understand the managing of mammographic screening program taking into account possible pathways, from the selection of the candidates in order to pre-schedule the appointments, to the actions to be taken based on the results.

2.3.1 Screening Mammography – Italian Use Case

This use case is based on the Italian screening program for breast cancer which basically represents a common approach to worlwide mammography screening flows. Each step can be handled by using the XDW profile that can deal with the processes with a central information system (CS) and the hospital information systems and actors in charge to update the Workflow Document for each task.

2.3.1.1 Data Model

The process is composed as follows:

At first, the CS generates a list of all women in the risk range of age based on the anagraphical systems (primary target age group), past exams,... The CS checks the list, schedules all the appointments for the different enterprises, matching also addresses and range of different locations criteria.

At this time the first step in the workflow process for a patient is the invite to do the exam: the CS composes and sends out the recruiting (or invitation) letters containing place of the facility, date and time of the visit and information (describing the screening and answering to common questions and concerns women have about mammography). Invitation letter represents the output of the Workflow Document as shown in the image below [Task 1 in the Figure X.3.1.1-2]. Every day the CS compiles the list of scheduled appointments and sends it to the different enterprises.

- The second task in the workflow is the visit [Task 2a in the Figure X.3.1.1-2]. Each recruited woman, who comes to the hospital, is admitted and all previous examinations and the recruiting letter are collected as input of this second task in the Workflow Document.
- If a woman misses her scheduled appointment, the entire path ends with a "No admission" document, which is the Workflow Document's final output in this case and a notification is sent to the CS which can reschedule the exam [Task 2b in the Figure X.3.1.1-2].

The visit takes place and KOS Document (from Mammography Acquisition Workflow and Mammography Image Profiles) as well as the anamnestic document are available and they represent the output documents of this task. Once the CS is aware of the completion of exams, it compiles the worklist and sends it to the radiologist.

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Every exam must have a double evaluation. At this point of the process, two radiologists proceed in modality "double blind" to check the exam and to produce the report with the result (positive or negative). These two evaluation tasks [Task 3 and 4 in the Figure X.3.1.1-2] shall have as input the KOS document, in order to retrieve the images, and the anamnestic document and as output the report.

The fifth task in the process is the evaluation by the CS of the two reports:

- If both reports are negative the CS sends a letter including the negative result to the patient and the process ends [Task 6a in the Figure X.3.1.1-2].
- If both reports are positive the CS will compose an "Alert" letter including instructions and the second level of the screening process starts [Task 6b in the Figure X.3.1.1-2].
- If the two results are discordant (one positive, one negative) the CS reschedules one blind reading in another worklist for a third evaluation. In this case we have another "valuation task" [Task 6c in the Figure X.3.1.1-2].

The CS analyzes the new result and produces the response report [Task 7 in the Figure X.3.1.1-2]:

- If the third report is negative the CS sends a letter with the negative result to the patient and the use case ends [Task 8 in the Figure X.3.1.1-2].
- If the third report is positive the CS composes an "Alert" letter including instructions and the second level of the screening process starts. [Task 9 in the Figure X.3.1.1-2].

All main input and output items for each task are clarified in the Figure X.3.1.1-2.

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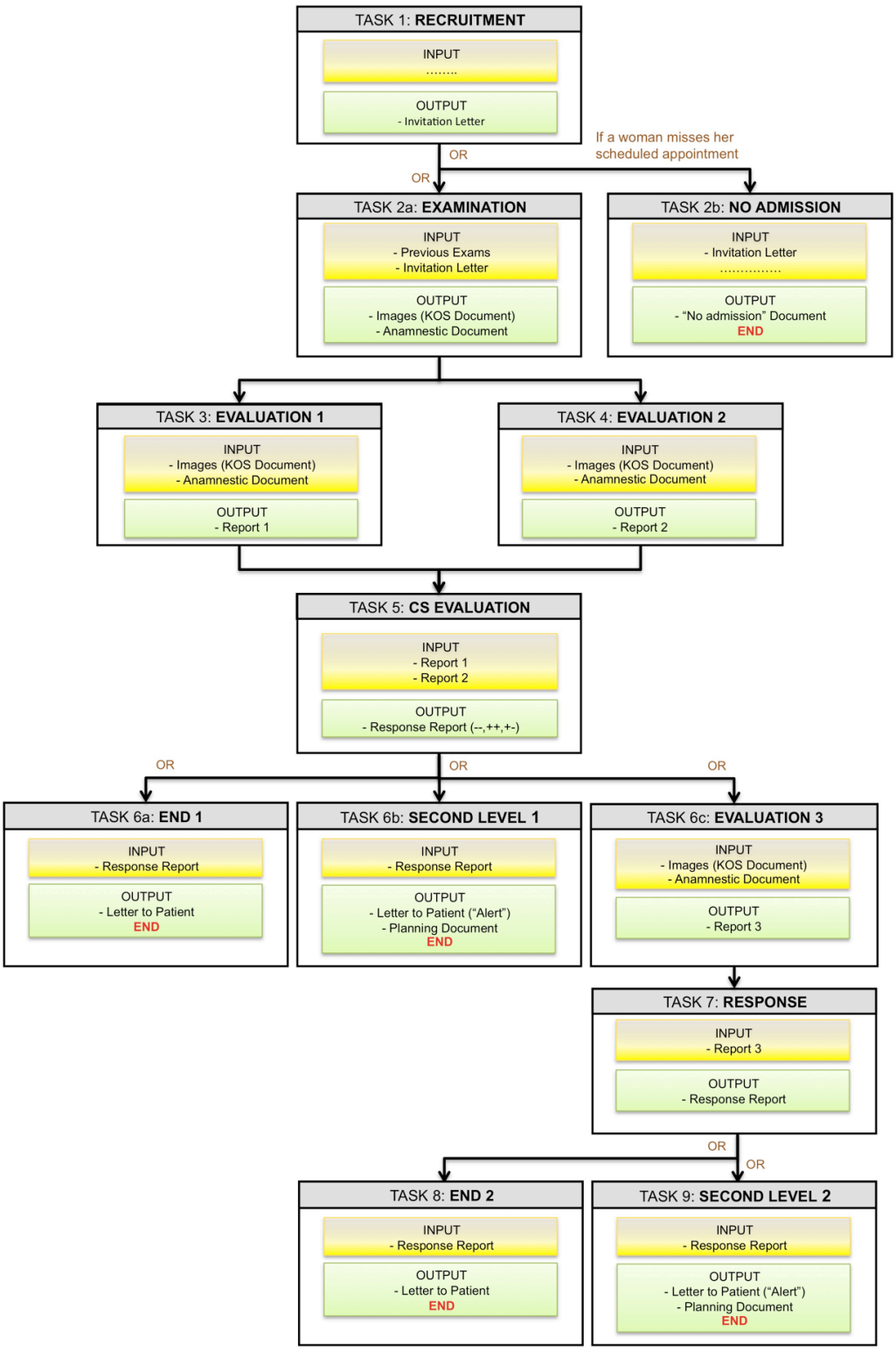

330

Figure X.3.1.1-1. Screening Mammography – Tasks

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All the previously explained tasks shall involve the Workflow Document which composition is driven by the set of rules proposed by the Cross-Enterprise Screening Mammography Workflow Definition.

2.3.1.2 Description Step-by-Step

The following description represents the meaningful element needed to understand in the Workflow Document structuration task-by-task.

The logical operations concerning updates on Workflow Document shall be taken into account for each task of the process. For each woman recruited by the CS it will be created her own Workflow Document recording specific Workflow Document Information elements and attributes.

The CS which is grouped with a XDW Content Creator, shall:

- Create a New Workflow Context Folder in the Repository
- Generate the First Version of the XSM-WD Workflow Document with the Description information, the Recruitment task setting as “Completed” the task’s status including the Input/Output Document References
- Submit the Workflow Document to the Folder stored in the Document Repository by using the XDS Provide and Register Document Set-b [ITI-41] which shall register its metadata in the Document Registry with the transaction Register Document Set-b [ITI-42]

From the Workflow Document point of view there are several informations that need to be collected (Please refer to the ITI XDW Profile Content Specification Sec. 5.4.3), for example:

Workflow Document Information:

- id : *documentId*
- title : « *Screening Mammography Workflow Document »*
- effectiveTime : …
- confidentialityCode : …
- languageCode : …
- patient : Jane Doe
- author : CS
- workflowIstanceId : ...
- workflowDocumentSequenceNumber : *« 1 »*
- workflowStatus : *« OPEN »*
- workflowDefinitionReference : *to workflow definition template (urn: OID:…)*

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- XDWdocumentHistory : …

Task 1: RECRUITMENT

The Central Information System (CS) is responsible of the start of the sequence for the screening process. In this task the CS shall send out the Invitation Letters and it shall create the first version of the Workflow Document.

The workflowDocumentSequenceNumber starts from the value *« 1 »* and shall be incremented by one for each update of the Workflow Document in the Screening Process evolution.

The workflowStatus *« OPEN »* means that the Workflow Document shall be updated when the following task in the screening process takes place.

The author in most of the cases is the last task's actual Owner.

Initially, there shall be only one taskEvent which is the unitary element including the description of a task, conveying basically the enrollment features of the screening:

taskData

- Name : Recruitment
- id : ...
- Status : Completed
- Date/time : ...
- Input : **Lists of eligible women (documentId)**
- Output : **Invitation Letter (documentId)**
- actualOwner : CS
- **…**

The input "Lists of eligible women" includes the selected patient "Jane Doe" 's data. The output of the task shall be used as input for the following task: in this case the Invitation Letter useful content is included in the Workflow Document informations and shall be used to obtain the patient data for the Order Filler that could be the Radiology Information System (RIS) or another departmental Information System which manages the scheduling of the new order for each screening mammography examination. The use case description will focus on Workflow Document changes and leaves the radiological workflow delineation to the Scheduled Workflow (SWF) which is assumed to be implemented in this context.

From this moment the Content Consumers/Updaters are grouped with each actors involved in the screening process are in charge to respectively retrieve/modify the Workflow Document.

At each task they shall :

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- Get the only "Approved" version of the Workflow Document in the Folder: the Content Consumer shall query the Document Registry with the transaction Registry Stored Query [ITI-18] and shall use the recalled metadata to retrieve the Workflow Document by using the transaction Retrieve Document Set-b [ITI-43]
- Update XSM-WD Workflow Document Description elements
- Include the new task, added to the content of the latest Workflow Document version, with its own Input/Output Document References
- Save all changes in a new Workflow Document, setting as "Deprecated" the last one and as "Approved" the current version)
- Submit the updated Workflow Document to the Folder (stored in the Document Repository) by using the Provide and Register Document Set-b [ITI-41] transaction

The Document Repository shall forward the new Workflow Document metadata to the Document Registry with the transaction Register Document Set-b [ITI-42].

Task 2a: EXAMINATION

From this point the Worflow Document is processed by the Content Updater grouped with the actor in charge of the modification which shall change at least the fields "author" and "workflowDocumentSequenceNumber". In the second section a further taskEvent element shall be added to the Workflow Document and it is filled with its specific's task data.

Into the Folder there will be only one Workflow Document with the "Approved" status. All the previous ones are located into the same Folder and they (one for this task) shall have a "Deprecated" status and it shall be updated by the Document Source (or another Actor in charge) according to the rules explained in the end of the previous task.

The patient comes to the scheduled appointment facilities and she is admitted. Her exam's data are sent to the acquisition modality's worklist, the technologist performs the mammography examinations and the Imaging Document Source produces the KOS Document (See specification in XDS-I.b Supplement: 4.68.4.1.2.1), and submits the document with the associated metadata to the Document Repository which shall register the metadata in the Document Registry. The KOS Document and the Anamnestic Document shall represent the Output in the Workflow Document for this task.

Task 2b: NO ADMISSION

If a woman misses the appointment the entire process shall end and the workflowStatus shall be turned "CLOSED" by the ADT (or the CS).

The Output shall be the "No Admission Doc" or another legacy solution to track the missed appointment. The final author and owner shall be the ADT Operator (or the CS).

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Assuming that the ADT (or the CS) is grouped with a Content Consumer and a Conter Updater it shall update the Workflow Document according to the updating rules explained at the end of the Task 1.

Task 3: EVALUATION 1

The first radiologist in charge to evaluate the mammography images is added as author and owner of this task. The doctor retrieves the images from the mammography workstation using the attributes included in the KOS Document (Please refer to XDS-1.b for additional level of specification). In this White Paper it is assumed to be implicit the selection of the information and the retrieve of the Mammography images from the Image Archive/Image Document Source or from the XDS Repository. After the interpretation of the images the radiologist produces the Report 1 (Output for the Workflow Document for this task).

The radiologist workstation RIS is assumed to be grouped with a Content Consumer and a Conter Updater in order to retrieve the last version of the Workflow Document, to update and release it according to the updating rules explained at the end of the Task 1.

Task 4: EVALUATION 2

For this second evaluation the author/owner will be the second radiologist whose Report 2 shall be obtained in the same contitions of the previous radiologist. The Workflow Document is updated adding all the task data (author/owner, ...).

The case with more potential Content Updaters working in the same time, which modify and add new data using a common latest version of the Workflow Document, shall succeed only for the first Content Updater who submits it. Infact the other(s) would submit the Workflow Document with the documentUniqueID of a “Deprecated” Workflow Document and this fact can not be accepted : an error occurs and the Content Consumer shall retrieve again the actual last version of the Workflow Document to allow the current updating of the Workflow Document.

When the second radiologist is always definited her/his Content Consumer shall always refer to the Evaluation 1 Worflow Document to avoid errors:

- The second radiologist will not see the screening Images on his/her worklist until the first one will have finished his/her evaluation (sequential double reading)
- Retrieve of the “actual” Workflow Document and update of it only at the end of each Evaluation (for these two tasks)

The pre-identification of the radiologists in charge for each reading is a rigid workflow strategy: it would bind the interdependence of the Task 3-4 and eventually the Task 6c as well as the interchangeability of the radiologists, therefore it is necessary to take into account these aspects before adopting this approach.

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Task 5: CS EVALUATION

At this point of the process the role of the CS is crucial in order to settle the end of the screening process or to ask for the third radiologist opinion. The CS Content Consumer retrieved the only "Approved" version of the Workflow Document in the Folder by quering the Document Registry with the transaction Registry Stored Query [ITI-18] and by retrieving the Workflow Document by using the transaction Retrieve Document Set-b [ITI-43]. The Workflow Document contains the reference to the two Reports to be retrieved to perform the CS evaluation and to generate the Response Report.

Once the CS is able to interpret the two Reports then there are three cases whose generates a different Reponse Report:

- 2 Negative reports: the CS Response Report (--) shall lead to the Task 6a
- 2 Positive reports: the CS Response Report (++) shall lead to the Task 6b for the second level of the screening
- 2 Discordant reports: the CS Response Report (+-) shall lead to the Task 6c which implies the third radiologist evaluation

The CS submittes the new version of the Workflow Document as explained in the end of the Task 1.

The type/format standard of the report (for example DICOM SR Template 4200 "Breast Imaging Report") is subject of discussion because of the interpretability of the fields.

Task 6a: END 1

The Task 6a occurs when the CS Evaluation provides a Response Report (--) which is triggered when the two reports are both "negative".

The CS sends the Letter with the negative response to the patient and updates the Workflow Document according to the steps explained in the end of the Task 1 section and turning the workflowStatus as "CLOSED" which implies the end of the screening process.

Task 6b: SECOND LEVEL 1

The Response Report (++) entails the Task 6b which represents the start of a second level of the screening treatment. In this use case the second level of the screening is not included so the CS sends the "Alert" Letter to the patient and updates the Workflow Document. In this task the CS is in charge to update the Workflow Document as explained in the end of the Task 1 and it shall set the workflowStatus "CLOSED".

Task 6c: EVALUATION 3

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After the CS Evaluation if there are discurdant reports a third radiologist evaluation occurs. In the Evaluation 3 Task the author/owner will be the third radiologist whose Report 3 shall be obtained in the same contitions of the two previous radiologists. The Workflow Document is updated adding all the task data (author/owner, ...) in the same way that have been explained in the end of the first task.

Task 7: RESPONSE

After the submission of the Report 3, the CS shall settle the end of the screenin process according to the result. As explained before, the CS Content Consumer retrieved the only "Approved" version of the Workflow Document in the Folder by quering the Document Registry with the transaction Registry Stored Query [ITI-18] and by retrieving the Workflow Document by using the transaction Retrieve Document Set-b [ITI-43]. The Workflow Document contains the reference to the third Report to be retrieved in order perform the last CS evaluation and to generate the Response Report.

If the Report 3 is "Negative" the CS creates a Response Report (+--) and the following task shall be the Task 8, on the other hand, if the Report 3 is "Positive" the CS generates a Reponse Report (+-+) which shall lead to the Task 9.

As mentioned before, the type/format standard of the report (for example DICOM SR Template 4200 "Breast Imaging Report") is subject of discussion because of the interpretability of the fields.

Task 8: END 2

The Reponse Report (+--) entails the Task 8 of the process in the CS sends the Letter with the negative response to the patient and updates the actual "Approved" version of the Workflow Document, previously retrieved, according to the steps explained in the end of the Task 1 section and turning the workflowStatus as "CLOSED" which implies the end of the screening process.

Task 9: SECOND LEVEL 2

In presence of the Response Report (+-+) the second level of the screening treatment shall takes place. In this use case the second level of the screening is not part of this text. The CS shall send the "Alert" Letter to the patient and updates the Workflow Document and shall update the Workflow Document as explained in the end of the Task 1 and it shall set the workflowStatus "CLOSED".

The figures below show how the Workflow Document grows through the different tasks of the process and an example of the attributes.

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In particular the following figure illustrates the shortest possible path which occours when a woman misses her scheduled appointment (Task 1 and Task 2b). In the Figure X.3.1.2-2 explains the process up to the Task 5 from the startup sequence to the end of the double reasing of the mammography exam. The Figure X.3.1.2-3 and Figure X.3.1.2-4 illustrates the first two closing tasks and the Figure X.3.1.2-5 the tasks from the third reading to the two possible final Tasks.

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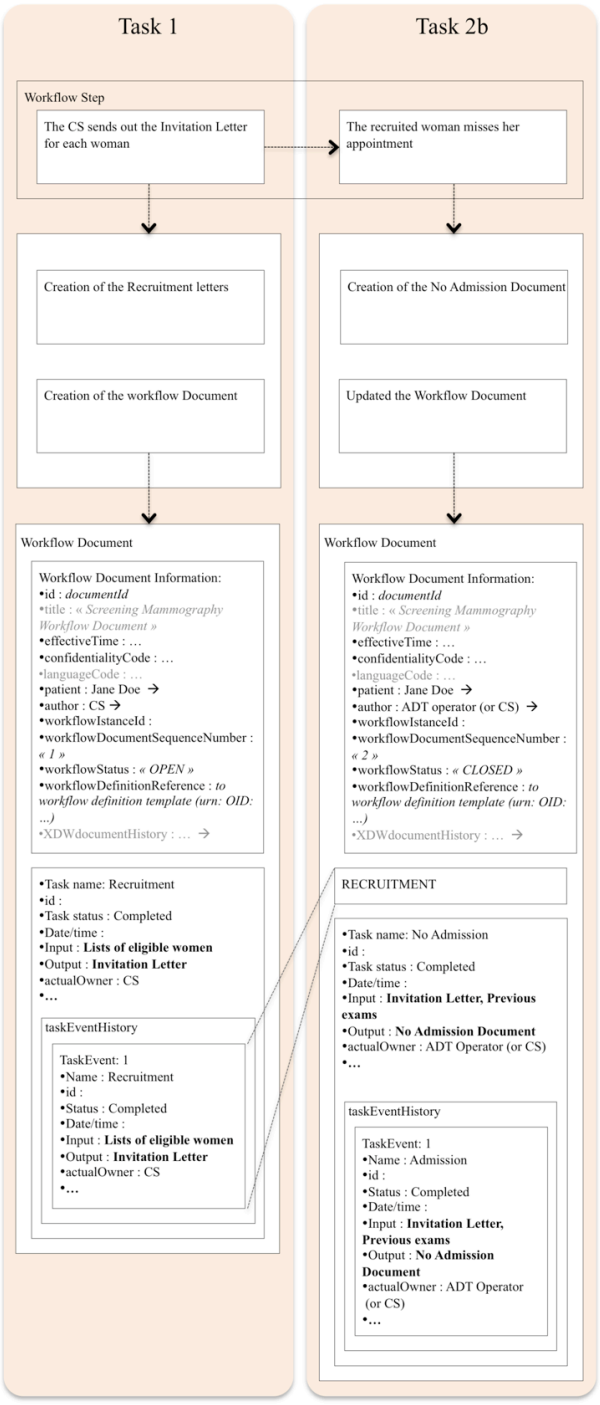

560 **Figure X.3.1.2-1. Workflow Document Tasks: 1 – 2b**

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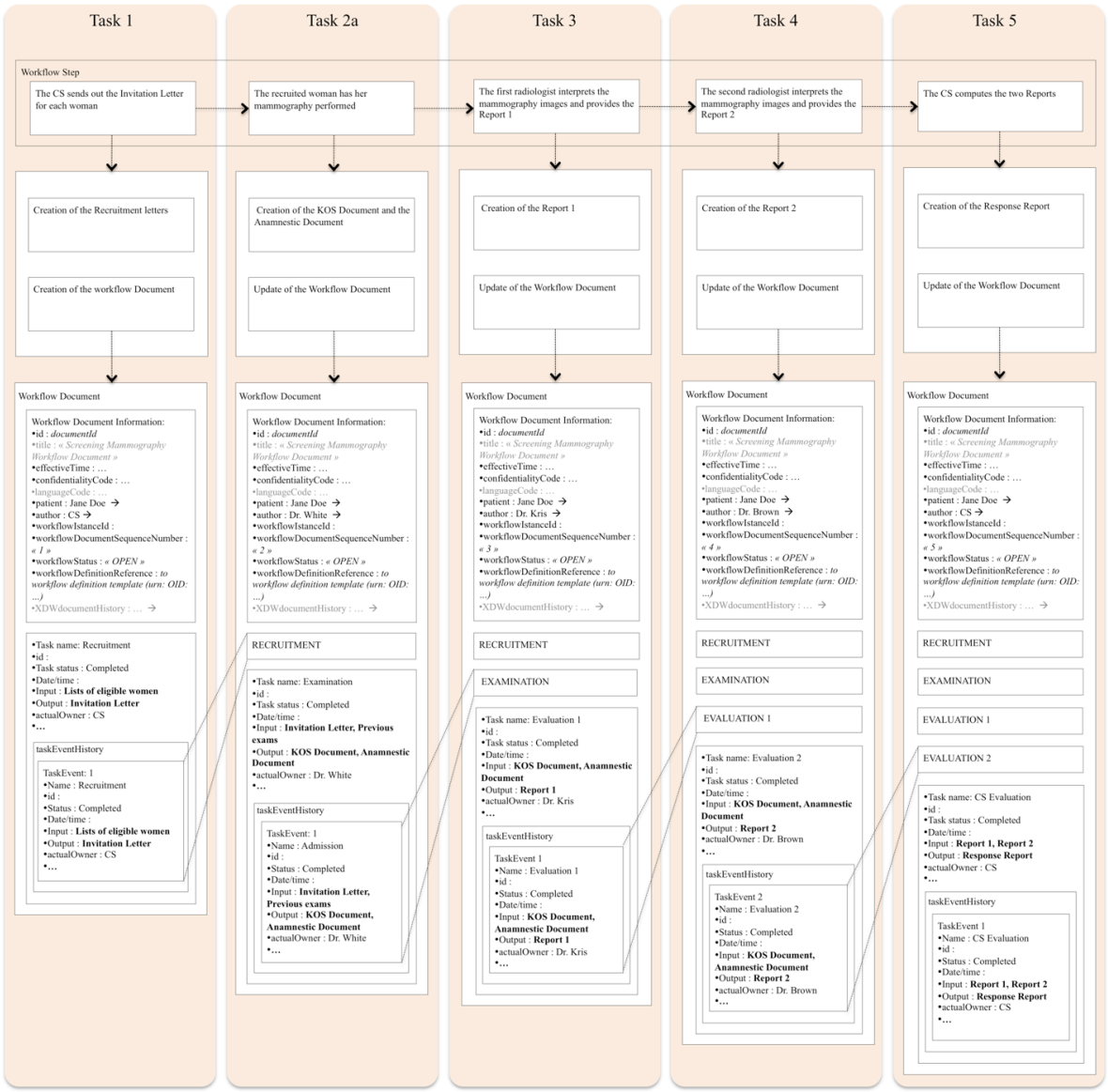
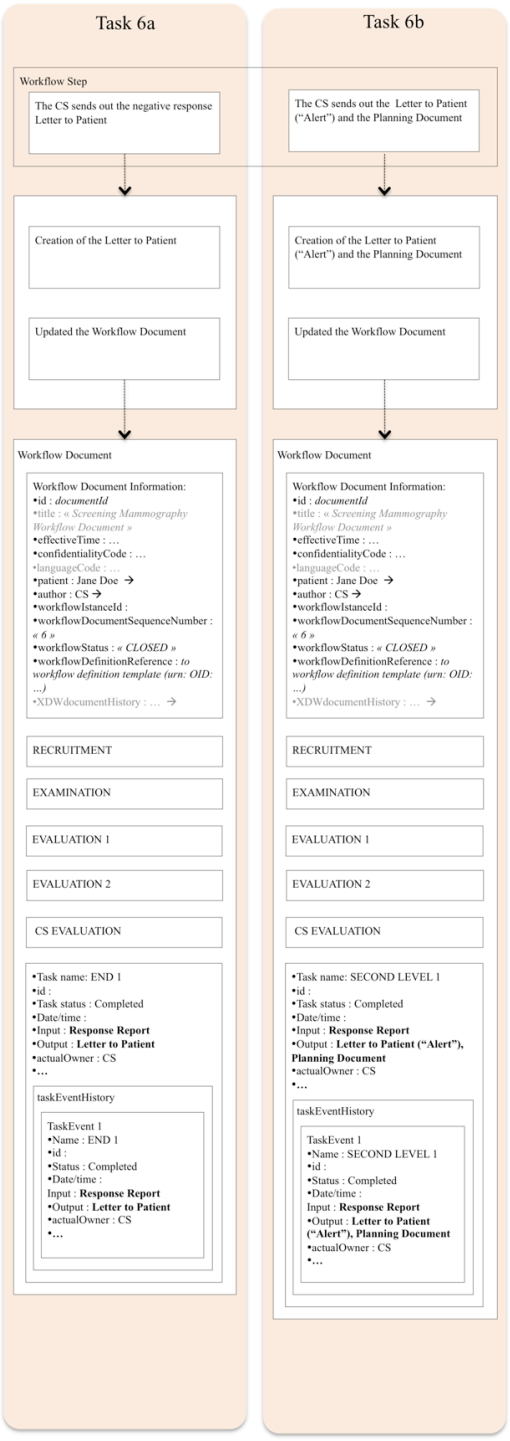


Figure X.3.1.2-2. Workflow Document Tasks: 1 – 5

Copyright © 2012: IHE International, Inc.



565 **Figure X.3.1.2-3. Workflow Document Tasks: 6a – 6b**

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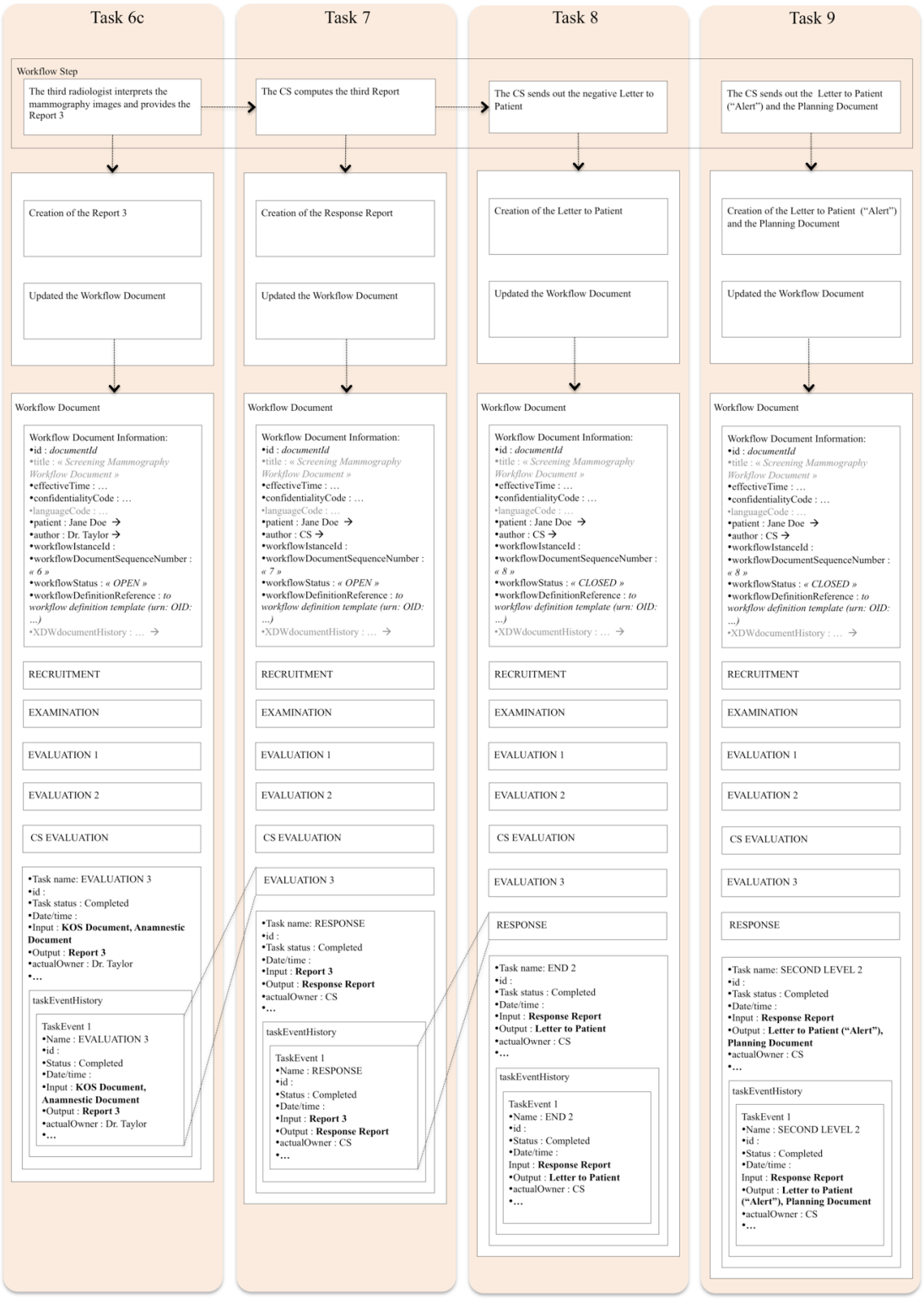

Figure X.3.1.2-4. Workflow Document Tasks: 6c – 9

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2.3.1.3 Process Flow

The use case's process flow is illustrated in the following figures and includes the main actors, actions and transactions (internal or XDS). The tasks box shall occour according to the rules of the use case.

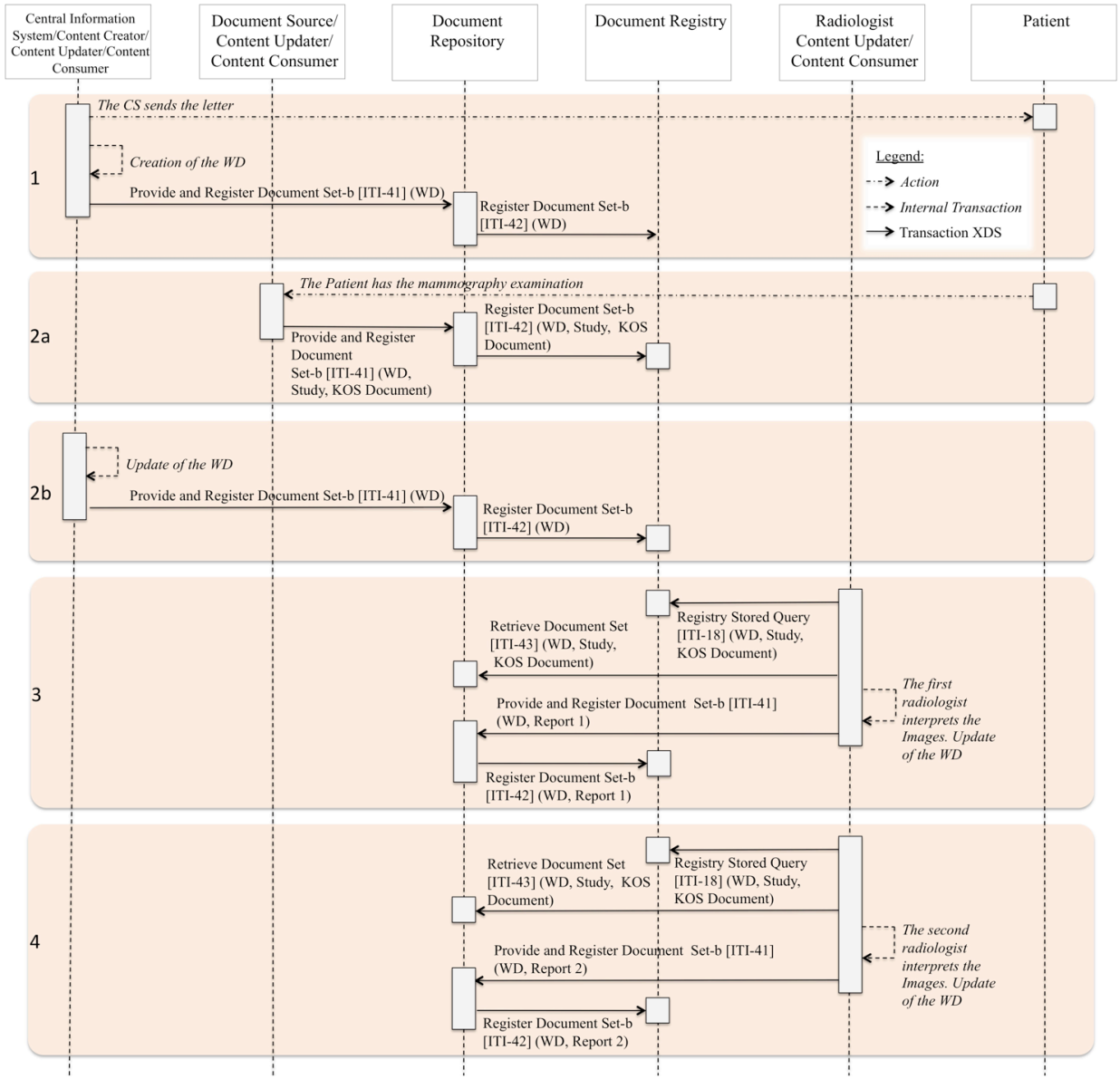

Figure X.3.1.3-1. XSM-WD Basic Process Flow Tasks: 1 – 4

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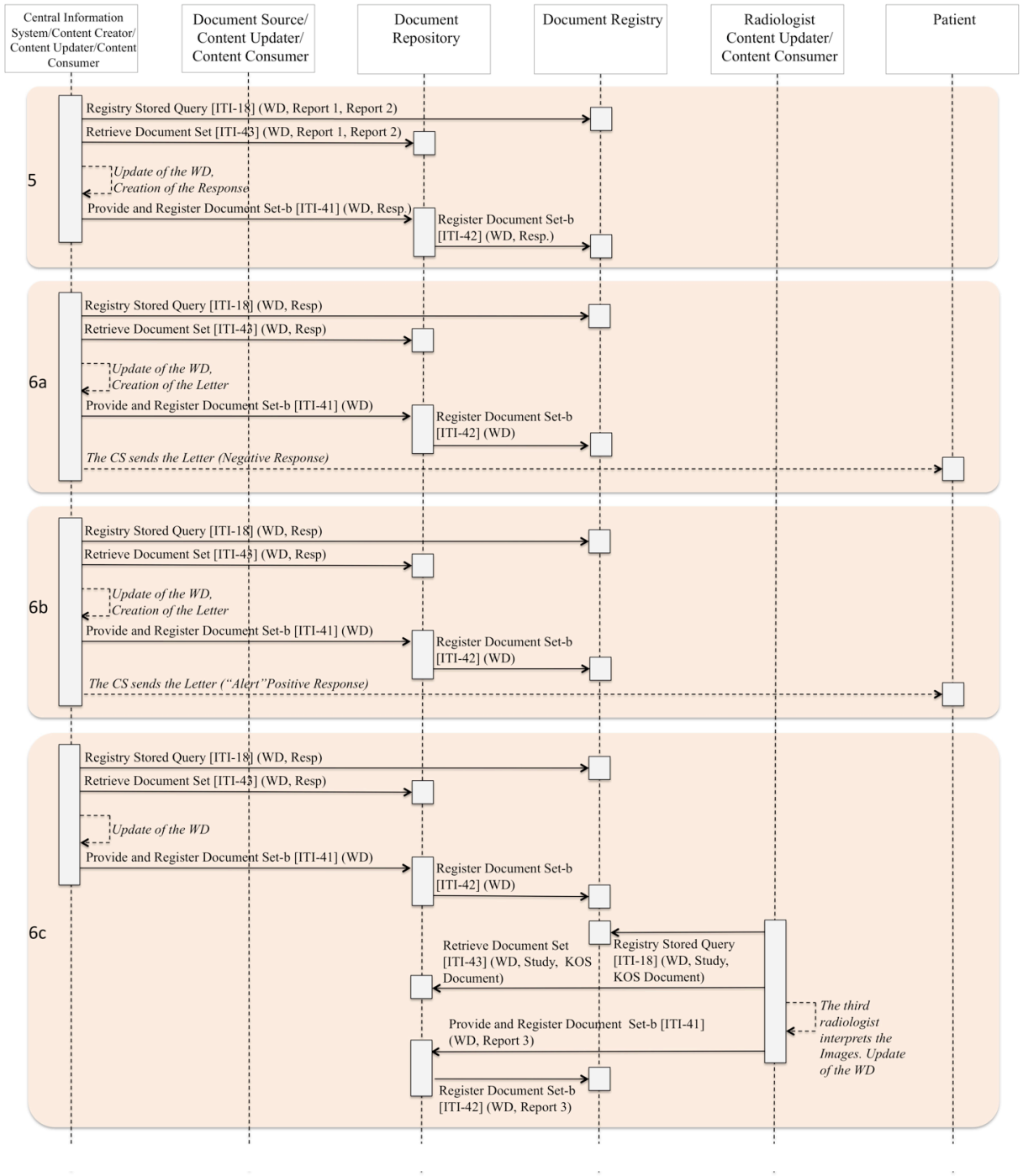

575

Figure X.3.1.3-2. XSM-WD Basic Process Flow Tasks: 5 – 6c

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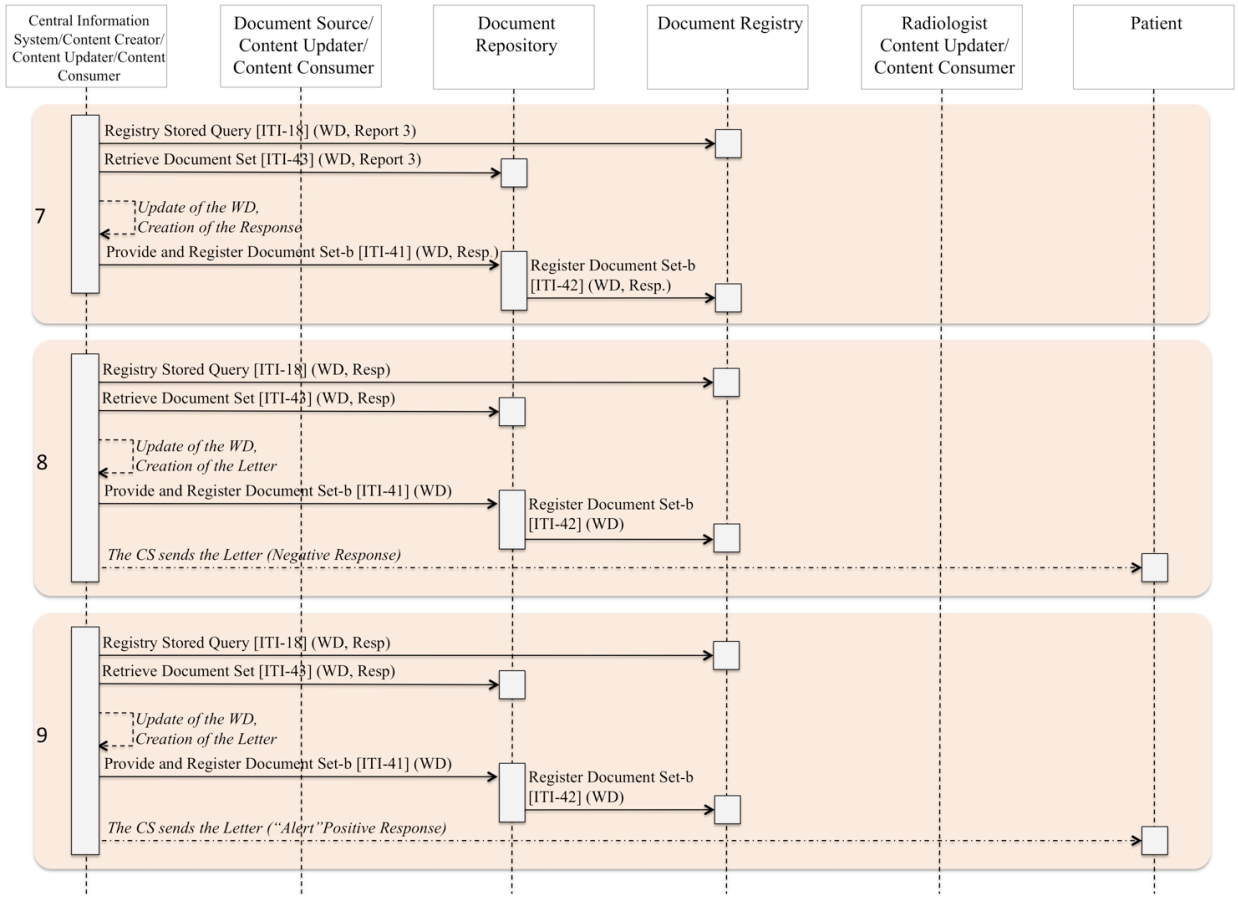

Figure X.3.1.3-3. XSM-WD Basic Process Flow Tasks: 7 – 9

The schemas displayed above indicate the basic process progress using mainly the XDS profile, otherwise the Document Metadata Subscription (DSUB) profile oor the Notification of Document Availability (NAV) profile could be another option to manage the notifications across the tasks sequence.

In the Tasks 5 to 9, the CS makes queries to retrieve the WD, Reports and Response. Depending on the implementations, the last two kind of document's queries could be submitted after the WD's rietrieve.

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2.3.2 Screening Mammography – German Use Case

This use case is based on the ...

2.3.2.1 Data Model

...

2.3.2.2 Description Step-by-Step

...

2.3.2.3 Process Flow

...

2.3.3 Mammography Screening Country-based elements

...

2.3.4 Screening Mammography – Canadian Use Case

This use case is based on the ...

2.3.4.1 Data Model

...

2.3.4.2 Description Step-by-Step

...

2.3.4.3 Process Flow

...

2.3.5 Mammography Screening Country-based elements

...

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3 Cross-Enterprise Screening Mammography Workflow Definition (XSM-WD) – Technical Rules

3.1 Italian Use Case

In the Section X.X.X.i the Italian Screening program has been explained in all its tasks for each possible sequence path: missing appointment, positive or negative results in the double blind reading as well as in the case with a third reading is needed to be performed. As mentioned before, this text does not include the Second Level of the Mammography Screening analysis which is out of the scope of this White Paper.

3.1.1 Workflow Definition Identifier

The workflow definition identifier shall be places into the DefinitionReference element of the Workflow Document.

Workflow Definition name	DefinitionReference
Screening Mammography Workflow Document	Urn: OID: reference to Workflow definition Document

3.1.2 Workflow Opening and Closing

The Screening Mammography Workflow shall be opened by a Central Information System which is in charge to enlist all the eligible women. The participant responsible of closing the Workflow shall be the Central System (or the ADT where the No Admission - Task 2b is performed by this actor).

3.1.3 Task Descriptions

Each task shall be characterized by a number of attributes which allow a baseline description for the contents of the Workflow Document during the Mammography Screening. For example the “Task dependencies” establishes which tasks come before the current task and which task are possible after it (ancestors and successors Tasks).

For the specific task description see section XXX.

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3.1.4 Task 1: Recruitment

Task attributes	Rules for the task "Recruitment"
Task id	Unique id of the instance of the task
Task type	Recruitment
Task name	Recruitment
Task description	Invitation of the eligible women to attend the mammography screening appointment
Task dependencies	Ancestors: None Successors: No Admission, Examination
Status allowed	COMPLETED
Status transactions	None
input	Lists of eligible women documentId
output	Invitation Letter
owner	CS
owner changes	No
<taskEvent>	Only one

Example implementation of the XML Workflow Document for the "Recruitment" Task:

```
        :
<ns3:taskData>

        <ns2:taskDetails>
                <ns2:id>urn:oid:1.1.1.1.1</ns2:id>
                <ns2:taskType>Recruitment</ns2:taskType>
                <ns2:name> Recruitment</ns2:name>
                <ns2:status>COMPLETED</ns2:status>
                <ns2:createdTime>2012-02-06T09:00:00.0Z</ns2:createdTime>
                <ns2:lastModifiedTime>2012-02-06T09:00:00.0Z</ns2:lastModifiedTime>
                <ns2:renderingMethodExists>false</ns2:renderingMethodExists>
        </ns2:taskDetails>
        </ns2:description>

        <!-- input documents -->
```


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```
        <ns2:input>
                <ns2:part name="List of eligible women documentId">
                        <!—This document will allow to track each appointment's data -->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.3.2.2.3" home="urn:oid:1.2.3"/>
                </ns2:part>
        </ns2:input>

        <!-- output documents -->
        <ns2:output>
                <ns2:part name="Invitation Letter">
                        <!— Each recruiting letter -->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>
        </ns2:output>

</ns3:taskData>
```

3.1.5 Task 2b: No Admission

Task attributes	Rules for the task "No Admission"
Task id	Unique id of the instance of the task
Task type	No Admission
Task name	No Admission
Task description	The woman does not attend the appointment
Task dependencies	Ancestors: Recruitment Successors: None
Status allowed	COMPLETED
Status transactions	None
input	Invitation Letter
output	No Admission Document
owner	CS
owner changes	No
<taskEvent>	Only one

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Example implementation of the XML Workflow Document for the "No Admission" Task:

```
        :
<ns3:taskData>

        <ns2:taskDetails>
                <ns2:id>urn:oid:1.1.1.1.1.1</ns2:id>
                <ns2:taskType>No Admission</ns2:taskType>
                <ns2:name> No Admission</ns2:name>
                <ns2:status>COMPLETED</ns2:status>
                <ns2:createdTime>2012-02-10T10:00:00.0Z</ns2:createdTime>
                <ns2:lastModifiedTime>2012-02-10T10:00:00.0Z</ns2:lastModifiedTime>
                <ns2:renderingMethodExists>false</ns2:renderingMethodExists>
        </ns2:taskDetails>

        </ns2:description>

        <!-- input documents -->
        <ns2:input>
                <ns2:part name="Invitation Letter">
                        <!—This document points out the sigle appointment -->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.3.2.2.3" home="urn:oid:1.2.3"/>
                </ns2:part>
        </ns2:input>
        <!-- output documents -->
        <ns2:output>
                <ns2:part name="No Admission Document">
                        <!—- Or another legacy solution to track the missed appointment --
>
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>
        </ns2:output>
</ns3:taskData>
```


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3.1.6 Task 2a: Examination

Task attributes	Rules for the task "Examination"
Task id	Unique id of the instance of the task
Task type	Examination
Task name	Examination
Task description	The woman attend the appointment and has her mammography exam
Task dependencies	Ancestors: Recruitment Successors: Evaluation 1, Evaluation 2
Status allowed	IN PROGRESS The woman is admitted: when occurs this Task's status shall be IN PROGRESS COMPLETED When the woman has her exam the status shall be COMPLETED
Status transactions	The staring status is IN PROGRESS and then it shall be COMPLETED when the screening examination is completed
input	Invitation Letter, Previous exams
output	KOS Document, Anamnestic Document
owner	Document Source
owner changes	One or more (Depends on who performs the admission and the exam)
<taskEvent>	Two

Example implementation of the XML Workflow Document for the "Examination" Task:

```
        :
<ns3:taskData>


       <ns2:taskDetails>
              <ns2:id>urn:oid:1.1.1.1.1.1</ns2:id>
              <ns2:taskType>Examination</ns2:taskType>
              <ns2:name> Examination</ns2:name>
              <ns2:status>COMPLETED</ns2:status>
              <ns2:createdTime>2012-02-10T10:00:00.0Z</ns2:createdTime>
              <ns2:lastModifiedTime>2012-02-10T10:00:00.0Z</ns2:lastModifiedTime>
              <ns2:renderingMethodExists>false</ns2:renderingMethodExists>
```


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```
        </ns2:taskDetails>

        </ns2:description>

        <!-- input documents -->
        <ns2:input>
                <ns2:part name="invitation Letter">
                        <!—This document points out the sigle appointment details-->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.3.2.2.3" home="urn:oid:1.2.3"/>
                </ns2:part>
                 <ns2:part name="Previous exams">
                        <!—This document contains a list of previous exams (ex:
documentUniqueId of reports,...) -->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.3.2.2.3" home="urn:oid:1.2.3"/>
                </ns2:part>

        </ns2:input>

        <!-- output documents -->
        <ns2:output>
                <ns2:part name="KOS Document">
                        <!-- Significant Images of the study or the entire study -->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>
                <ns2:part name="Anamnestic Document">
                        <!-- Other information about the woman and the examination -->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>

        </ns2:output>

</ns3:taskData>
```


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3.1.7 Task 3: Evaluation 1

Task attributes	Rules for the task "Evaluation 1"
Task id	Unique id of the instance of the task
Task type	Evaluation
Task name	Evaluation 1
Task description	The first radiologist interprets the mammography images and produces the Report 1
Task dependencies	Ancestors: Examination Successors: Evaluation 2, CS Evaluation
Status allowed	COMPLETED
Status transactions	None
input	KOS Document, Anamnestic Document
output	Report 1
owner	Radiologist 1
owner changes	No
<taskEvent>	Only one

Example implementation of the XML Workflow Document for the "Evaluation 1" Task:

```
        :
<ns3:taskData>

        <ns2:taskDetails>
                <ns2:id>urn:oid:1.1.1.1.1</ns2:id>
                <ns2:taskType>Evaluation 1</ns2:taskType>
                <ns2:name> Evaluation 1</ns2:name>
                <ns2:status>COMPLETED</ns2:status>
                <ns2:createdTime>2012-02-17T11:00:00.0Z</ns2:createdTime>
                <ns2:lastModifiedTime>2012-02-17T11:00:00.0Z</ns2:lastModifiedTime>
                <ns2:renderingMethodExists>false</ns2:renderingMethodExists>
        </ns2:taskDetails>

        </ns2:description>

        <!-- input documents -->
```


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```
        <ns2:input>
                <ns2:part name="KOS Document">
                        <!-- Significant Images of the study or the entire study -->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>
                <ns2:part name="Anamnestic Document">
                        <!-- Other information about the woman and the examination -->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>

        </ns2:input>

        <!-- output documents -->
        <ns2:output>
                <ns2:part name="Report 1">
                        <!-- The first report submitted -->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>

        </ns2:output>

</ns3:taskData>
```

3.1.8 Task 4: Evaluation 2

Task attributes	Rules for the task “Evaluation 2”
Task id	Unique id of the instance of the task
Task type	Evaluation 2
Task name	Evaluation 2
Task description	The second radiologist interprets the mammography images and produces the Report 2
Task dependencies	Ancestors: Examination Successors: CS Evaluation

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Task attributes	Rules for the task "Evaluation 2"
Status allowed	COMPLETED
Status transactions	None
input	KOS Document, Anamnestic Document
output	Report 2
owner	Radiologist 2
owner changes	No
<taskEvent>	Only one

Example implementation of the XML Workflow Document for the "Evaluation 2" Task:

```
        :
<ns3:taskData>


        <ns2:taskDetails>
                <ns2:id>urn:oid:1.1.1.1.1</ns2:id>
                <ns2:taskType>Evaluation 2</ns2:taskType>
                <ns2:name> Evaluation 2</ns2:name>
                <ns2:status>COMPLETED</ns2:status>
                <ns2:createdTime>2012-02-20T09:00:00.0Z</ns2:createdTime>
                <ns2:lastModifiedTime>2012-02-20T09:00:00.0Z</ns2:lastModifiedTime>
                <ns2:renderingMethodExists>false</ns2:renderingMethodExists>
        </ns2:taskDetails>


        </ns2:description>

        <!-- input documents -->
        <ns2:input>
                <ns2:part name="KOS Document">
                        <!-- Significant Images of the study or the entire study -->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>
                <ns2:part name="Anamnestic Document">
                        <!-- Other information about the woman and the examination -->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>
```


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```
        </ns2:input>

        <!-- output documents -->
        <ns2:output>
                <ns2:part name="Report 2">
                        <!-- The second report submitted -->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>

        </ns2:output>

</ns3:taskData>
```

3.1.9 Task 5: CS Evaluation

Task attributes	Rules for the task “CS Evaluation”
Task id	Unique id of the instance of the task
Task type	CS Evaluation
Task name	CS Evaluation
Task description	The CS creates the Reponse Report Based on the contents included in the Report 1 and in the Report 2
Task dependencies	Ancestors: Evaluation 1, Evaluation 2 Successors: End 1, Second Level 1, Evaluation 3
Status allowed	COMPLETED
Status transactions	None
input	Report 1, Report 2
output	Response Report
owner	CS
owner changes	No
<taskEvent>	Only one

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Example implementation of the XML Workflow Document for the "CS Evalution" Task:

```
        :
<ns3:taskData>

        <ns2:taskDetails>
                <ns2:id>urn:oid:1.1.1.1.1</ns2:id>
                <ns2:taskType>CS Evaluation</ns2:taskType>
                <ns2:name>CS Evaluation</ns2:name>
                <ns2:status>COMPLETED</ns2:status>
                <ns2:createdTime>2012-02-20T10:00:00.0Z</ns2:createdTime>
                <ns2:lastModifiedTime>2012-02-20T10:00:00.0Z</ns2:lastModifiedTime>
                <ns2:renderingMethodExists>false</ns2:renderingMethodExists>
        </ns2:taskDetails>

        </ns2:description>
        <!-- input documents -->
        <ns2:input>
                <ns2:part name="Report 1">
                        <!-- The first report submitted -->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>
                <ns2:part name="Report 2">
                        <!-- The second report submitted -->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>
        </ns2:input>
        <!-- output documents -->
        <ns2:output>
                <ns2:part name="Response Report">
                        <!-- The CS report document-->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>
        </ns2:output>
</n3:taskData>
```


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3.1.10 Task 6a: End 1

Task attributes	Rules for the task "End 1"
Task id	Unique id of the instance of the task
Task type	End 1
Task name	End 1
Task description	The mammography exam is negative and the CS sends the Letter result to the woman
Task dependencies	Ancestors: CS Evaluation Successors: None
Status allowed	COMPLETED
Status transactions	None
input	Reponse Report
output	Letter to Patient
owner	CS
owner changes	No
<taskEvent>	Only one

Example implementation of the XML Workflow Document for the "End 1" Task:

```
        :
<ns3:taskData>

        <ns2:taskDetails>
                <ns2:id>urn:oid:1.1.1.1.1.1</ns2:id>
                <ns2:taskType>End 1</ns2:taskType>
                <ns2:name>End 1</ns2:name>
                <ns2:status>COMPLETED</ns2:status>
                <ns2:createdTime>2012-02-20T10:01:00.0Z</ns2:createdTime>
                <ns2:lastModifiedTime>2012-02-20T10:01:00.0Z</ns2:lastModifiedTime>
                <ns2:renderingMethodExists>false</ns2:renderingMethodExists>
        </ns2:taskDetails>

        </ns2:description>

        <!-- input documents -->
```


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```
        <ns2:input>
                <ns2:part name="Response Report">
                        <!-- The CS report document-->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>

        </ns2:input>

        <!-- output documents -->
        <ns2:output>
                <ns2:part name="Letter to Patient">
                        <!-- The negative result letter -->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>

        </ns2:output>

</ns3:taskData>
```

3.1.11 Task 6b: Second Level 1

Task attributes	Rules for the task “Second Level 1”
Task id	Unique id of the instance of the task
Task type	Second Level 1
Task name	Second Level 1
Task description	The mammography exam is positive and the CS sends the “Alert” Letter to the woman
Task dependencies	Ancestors: CS Evaluation Successors: None
Status allowed	COMPLETED
Status transactions	None
input	Reponse Report
output	Letter to Patient (“Alert”)

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Task attributes	Rules for the task “Second Level 1”
owner	CS
owner changes	No
<taskEvent>	Only one

Example implementation of the XML Workflow Document for the “Second Level 1” Task:

```
        :

<ns3:taskData>

        <ns2:taskDetails>

                <ns2:id>urn:oid:1.1.1.1.1</ns2:id>
                <ns2:taskType>Second Level 1</ns2:taskType>
                <ns2:name>Second Level 1</ns2:name>
                <ns2:status>COMPLETED</ns2:status>
                <ns2:createdTime>2012-02-20T10:01:00.0Z</ns2:createdTime>
                <ns2:lastModifiedTime>2012-02-20T10:01:00.0Z</ns2:lastModifiedTime>
                <ns2:renderingMethodExists>false</ns2:renderingMethodExists>

        </ns2:taskDetails>

        </ns2:description>

        <!-- input documents -->

        <ns2:input>
                <ns2:part name="Response Report">

                        <!-- The CS report document-->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>

                </ns2:part>

        </ns2:input>
```


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```
        <!-- output documents -->
        <ns2:output>
                <ns2:part name="Letter to Patient">
                        <!-- The positive result letter with the "Alert" or other
communications -->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>

        </ns2:output>

</ns3:taskData>
```

3.1.12 Task 6c: Evaluation 3

Task attributes	Rules for the task "Evaluation 3"
Task id	Unique id of the instance of the task
Task type	Evaluation 3
Task name	Evaluation 3
Task description	The third radiologist interprets the mammography images and produces the Report 3
Task dependencies	Ancestors: CS Evaluation Successors: End 2, Second Level 2
Status allowed	COMPLETED
Status transactions	None
input	KOS Document, Anamnestic Document
output	Report 3
owner	Radiologist 3
owner changes	No
<taskEvent>	Only one

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Example implementation of the XML Workflow Document for the "Evalution 3" Task:

```
        :
<ns3:taskData>

        <ns2:taskDetails>
                <ns2:id>urn:oid:1.1.1.1.1.1</ns2:id>
                <ns2:taskType>Evaluation 3</ns2:taskType>
                <ns2:name> Evaluation 3</ns2:name>
                <ns2:status>COMPLETED</ns2:status>
                <ns2:createdTime>2012-02-20T11:00:00.0Z</ns2:createdTime>
                <ns2:lastModifiedTime>2012-02-20T11:00:00.0Z</ns2:lastModifiedTime>
                <ns2:renderingMethodExists>false</ns2:renderingMethodExists>
        </ns2:taskDetails>
        </ns2:description>

        <!-- input documents -->
        <ns2:input>
                <ns2:part name="KOS Document">
                        <!-- Significant Images of the study or the entire study -->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>
                <ns2:part name="Anamnestic Document">
                        <!-- Other information about the woman and the examination -->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>
        </ns2:input>

        <!-- output documents -->
        <ns2:output>
                <ns2:part name="Report 3">
                        <!-- The third report submitted -->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>
        </ns2:output>
</ns3:taskData>
```


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3.1.13 Task 7: Response

Task attributes	Rules for the task "Response"
Task id	Unique id of the instance of the task
Task type	Response
Task name	Response
Task description	The CS creates the final Reponse Report Based on the contents included in the Report 3
Task dependencies	Ancestors: Evaluation 3 Successors: End 2, Second Level 2
Status allowed	COMPLETED
Status transactions	None
input	Report 3
output	Response Report
owner	CS
owner changes	No
<taskEvent>	Only one

Example implementation of the XML Workflow Document for the "Response" Task:

```
        :
<ns3:taskData>

        <ns2:taskDetails>
                <ns2:id>urn:oid:1.1.1.1.1</ns2:id>
                <ns2:taskType>CS Evaluation</ns2:taskType>
                <ns2:name>CS Evaluation</ns2:name>
                <ns2:status>COMPLETED</ns2:status>
                <ns2:createdTime>2012-02-20T11:01:00.0Z</ns2:createdTime>
                <ns2:lastModifiedTime>2012-02-20T11:01:00.0Z</ns2:lastModifiedTime>
                <ns2:renderingMethodExists>false</ns2:renderingMethodExists>
        </ns2:taskDetails>

        </ns2:description>

        <!-- input documents -->
```


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```
        <ns2:input>
                <ns2:part name="Report 3">
                        <!-- The third report submitted -->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>

        </ns2:input>

        <!-- output documents -->
        <ns2:output>
                <ns2:part name="Response Report">
                        <!-- The CS report document-->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>

        </ns2:output>

</ns3:taskData>
```

3.1.14 Task 8: End 2

Task attributes	Rules for the task “End 2”
Task id	Unique id of the instance of the task
Task type	End 2
Task name	End 2
Task description	The Report 3 is negative and the CS sends the results Letter to the woman
Task dependencies	Ancestors: Response Successors: None
Status allowed	COMPLETED
Status transactions	None
input	Reponse Report
output	Letter to Patient

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Task attributes	Rules for the task “End 2”
owner	CS
owner changes	No
<taskEvent>	Only one

Example implementation of the XML Workflow Document for the “End 2” Task:

```
        :
<ns3:taskData>

        <ns2:taskDetails>
                <ns2:id>urn:oid:1.1.1.1.1</ns2:id>
                <ns2:taskType>End 2</ns2:taskType>
                <ns2:name>End 2</ns2:name>
                <ns2:status>COMPLETED</ns2:status>
                <ns2:createdTime>2012-02-20T11:02:00.0Z</ns2:createdTime>
                <ns2:lastModifiedTime>2012-02-20T11:02:00.0Z</ns2:lastModifiedTime>
                <ns2:renderingMethodExists>false</ns2:renderingMethodExists>
        </ns2:taskDetails>
        </ns2:description>

        <!-- input documents -->
        <ns2:input>
                <ns2:part name="Response Report">
                        <!-- The CS report document-->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>
        </ns2:input>

        <!-- output documents -->
        <ns2:output>
                <ns2:part name="Letter to Patient">
                        <!-- The negative result letter -->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>
        </ns2:output>
</ns3:taskData>
```


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3.1.15 Task 9: Second Level 2

Task attributes	Rules for the task "Second Level 2"
Task id	Unique id of the instance of the task
Task type	Second Level 2
Task name	Second Level 2
Task description	The third Report is positive and the CS sends the "Alert" Letter to the woman
Task dependencies	Ancestors: Response Successors: None
Status allowed	COMPLETED
Status transactions	None
input	Reponse Report
output	Letter to Patient ("Alert")
owner	CS
owner changes	No
<taskEvent>	Only one

Example implementation of the XML Workflow Document for the "Second Level 2" Task:

```
        :
<ns3:taskData>

        <ns2:taskDetails>
                <ns2:id>urn:oid:1.1.1.1.1</ns2:id>
                <ns2:taskType>Second Level 2</ns2:taskType>
                <ns2:name>Second Level 2</ns2:name>
                <ns2:status>COMPLETED</ns2:status>
                <ns2:createdTime>2012-02-20T11:02:00.0Z</ns2:createdTime>
                <ns2:lastModifiedTime>2012-02-20T11:02:00.0Z</ns2:lastModifiedTime>
                <ns2:renderingMethodExists>false</ns2:renderingMethodExists>
        </ns2:taskDetails>

        </ns2:description>
```


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```
        <!-- input documents -->
        <ns2:input>
                <ns2:part name="Response Report">
                        <!-- The CS report document-->
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>

        </ns2:input>

        <!-- output documents -->
        <ns2:output>
                <ns2:part name="Letter to Patient">
                        <!-- The positive result letter with the "Alert" or other
communications --
                        <!-- uid: the document uniqueId, home: the homeCommunityId -->
                        <reference uid="urn:oid:1.2.3.4.4.4" home="urn:oid:1.2.3"/>
                </ns2:part>

        </ns2:output>

</ns3:taskData>
```


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3.2 German Use Case

intro...

3.2.1 Workflow Definition Identifier

intro...

3.2.2 Workflow Opening and Closing

intro...

3.2.3 Task Descriptions

intro...

3.3 Canadian Use Case

intro...

3.3.1 Workflow Definition Identifier

intro...

3.3.2 Workflow Opening and Closing

intro...

3.3.3 Task Descriptions

intro...

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4 Transactions

4.1 Further details on transactions?

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1205

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5 National Extensions

5.1 Introduction

...

5.2 Scope

...

Glossary

Workflow Document: The instrument to manage and track a shared workflow. It records the creation of tasks and maintains a historical record of tasks as they move through the associated workflow. The Workflow Document also maintains the references to health information input and output associated with each task. Such shared workflow status information allows the various participating systems to coordinate by:

- being aware of the history of a workflow for a patient
- obtaining and reading the workflow's incomplete tasks
- updating this shared document as the workflow tasks are performed according to a referenced workflow definition

Content Consumer: A XDW actor using the contents created and updated by the Content Creator and the Content Updater respectively.

Content Creator: A XDW actor having the duty to create the Workflow Document.

Content Updater: A XDW actor that modifies the Workflow Document when it is required throughout the workflow.

XDW Content profile: The gathering of the Content Creator, the Content Consumer and the Content Updater.

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