ACC, HIMSS and RSNA

Integrating the Healthcare Enterprise

IHE Patient Care Coordination Technical Framework

Volume I
(PCC TF-1)
Integration Profiles

Revision 3.0
2007-2008

Draft for Trial Implementation

August 15, 2007

Forward

Integrating the Healthcare Enterprise (IHE) is an initiative designed to stimulate the integration of the information systems that support modern healthcare institutions. Its fundamental objective is to ensure that in the care of patients all required information for medical decisions is both correct and available to healthcare professionals. The IHE initiative is both a process and a forum for encouraging integration efforts. It defines a technical framework for the implementation of established messaging standards to achieve specific clinical goals. It includes a rigorous testing process for the implementation of this framework. And it organizes educational sessions and exhibits at major meetings of medical professionals to demonstrate the benefits of this framework and encourage its adoption by industry and users.

The approach employed in the IHE initiative is not to define new integration standards, but rather to support the use of existing standards, HL7, DICOM, IETF, and others, as appropriate in their respective domains in an integrated manner, defining configuration choices when necessary. When clarifications or extensions to existing standards are necessary, IHE refers recommendations to the relevant standards bodies.

This initiative has numerous sponsors and supporting organizations in different medical specialty domains and geographical regions. In North America the primary sponsors are the American College of Cardiology (ACC), the Healthcare Information and Management Systems Society (HIMSS) and the Radiological Society of North America (RSNA). IHE Canada has also been formed. IHE Europe (IHE-EUR) is supported by a large coalition of organizations including the European Association of Radiology (EAR) and European Congress of Radiologists (ECR), the Coordination Committee of the Radiological and Electromedical Industries (COCIR), Deutsche Röntgengesellschaft (DRG), the EuroPACS Association, Groupement pour la Modernisation du Système d'Information Hospitalier (GMSIH), Société Francaise de Radiologie ([www.sfr-radiologie.asso.fr SFR]), and Società Italiana di Radiologia Medica (SIRM). In Japan IHE-J is sponsored by the Ministry of Economy, Trade, and Industry (METI); the Ministry of Health, Labor, and Welfare; and [www.medis.or.jp MEDIS-DC]; cooperating organizations include the Japan Industries Association of Radiological Systems (JIRA), the Japan Association of Healthcare Information Systems Industry (JAHIS), Japan Radiological Society (JRS), Japan Society of Radiological Technology (JSRT), and the Japan Association of Medical Informatics (JAMI). Other organizations representing healthcare professionals are actively involved and others are invited to join in the expansion of the IHE process across disciplinary and geographic boundaries.

The IHE Technical Frameworks for the various domains (Patient Care Coordination, IT Infrastructure, Cardiology, Laboratory, Radiology, etc.) define specific implementations of established standards to achieve integration goals that promote appropriate sharing of medical information to support optimal patient care. These are expanded annually, after a period of public review, and maintained regularly through the identification and correction of errata. The current version for these Technical Frameworks may be found at www.ihe.net.

The IHE Technical Framework identifies a subset of the functional components of the healthcare enterprise, called IHE Actors, and specifies their interactions in terms of a set of coordinated, standards-based transactions. It describes this body of transactions in progressively greater depth. Volume I provides a high-level view of IHE functionality, showing the transactions organized into functional units called Integration Profiles that highlight their capacity to address specific clinical needs. Subsequent volumes provide detailed technical descriptions of each IHE transaction.

Content of the Technical Framework

This technical framework defines relevant standards and constraints on those standards in order to implement a specific use cases for the transfer of information between systems. This document is organized into 2 volumes as follows:

Volume 1 - Overview

This volume is provided as a high level overview of the profiles including descriptions of the use case, the actors involved, the process flow, and dependencies on other standards and IHE profiles. It is of interest to care providers, vendors' management and technical architects and to all users of the profile

Volume 2 – Transactions and Content Profiles

This volume is intended as a technical reference for the implementation of specific transactions in the use case including references to the relevant standards, constraints, and interaction diagrams. It is intended for the technical implementers of the profile.

How to Contact Us

IHE Sponsors welcome comments on this document and the IHE initiative. They should be directed to the discussion server at http://forums.rsna.org or to:

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1 Preface to Volume 1 of the PCC Technical Framework

1.1 Intended Audience

The intended audience of this document is:

- Healthcare professionals involved in informatics
- IT departments of healthcare institutions
- Technical staff of vendors participating in the IHE initiative
- Experts involved in standards development
- Those interested in integrating healthcare information systems and workflows

1.2 Related Information for the Reader

The reader of volume 1 should read or be familiar with the following documents:

- Volume 1 of the Cross-Enterprise Document Sharing (XDS) Integration Profile documented in the ITI Infrastructure Technical Framework
- Volume 1 of the Notification of Document Availability (NAV) Integration Profile documented in the ITI Infrastructure Technical Framework
- Volume 1 of the Audit Trail and Node Authentication (ATNA) Integration Profile documented in the ITI Infrastructure Technical Framework

(See http://www.ihe.net/Technical_Framework/index.cfm for all of the above).

- ASTM/HL7 Continuity of Care Document
- HL7 Clinical Document Architecture Release 2: Section 1, CDA Overview.
- Care Record Summary – Implementation Guide for CDA Release 2 (US Realm): Section 1

1.3 How this Volume is Organized

Section 2 describes the general nature, structure, purpose and function of the Technical Framework. Section 3 and the subsequent sections of this volume provide detailed documentation on each integration profile, including the Patient Care Coordination problem it is intended to address and the IHE actors and transactions it comprises.

The appendices following the main body of the document provide a summary list of the actors and transactions, detailed discussion of specific issues related to the integration profiles and a glossary of terms and acronyms used.

1.4 Conventions Used in this Document

This document has adopted the following conventions for representing the framework concepts and specifying how the standards upon which the IHE Technical Framework is based should be applied.

1.4.1 Technical Framework Cross-references

When references are made to another section within a Technical Framework volume, a section number is used by itself. When references are made to other volumes or to a Technical Framework in another domain, the following format is used:

<domain designator> TF-<volume number>: <section number>

where:

<domain designator>

is a short designator for the IHE domain (PCC= Patient Care Coordination, ITI = IT Infrastructure, RAD = Radiology)

<volume number>

is the applicable volume within the given Domain Technical Framework (e.g., 1, 2, 3), and

<section number>

is the applicable section number.

For example: PCC TF-1: 3.1 refers to Section 3.1 in volume 1 of the IHE Patient Care Coordination Technical Framework, ITI TF-2: 4.33 refers to Section 4.33 in volume 2 of the IHE IT Infrastructure Technical Framework.

1.4.2 IHE Actor and Transaction Diagrams and Tables

Each integration profile is a representation of a real-world capability that is supported by a set of actors that interact through transactions. Actors are information systems or components of information systems that produce, manage, or act on categories of information required by operational activities in the enterprise. Transactions are interactions between actors that communicate the required information through standards-based messages.

The diagrams and tables of actors and transactions in subsequent sections indicate which transactions each actor in a given profile must support.

The transactions shown on the diagrams are identified both by their name and the transaction number as defined in PCC TF-2 (Volume 2 of the PCC Technical framework). The transaction numbers are shown on the diagrams as bracketed numbers prefixed with the specific Technical Framework domain. In some cases, a profile is dependent on a prerequisite profile in order to function properly and be useful. For example, Cross-Enterprise Sharing of Medical Summaries depends on Audit Trail and Node Authentication (ATNA). These dependencies can be found by locating the desired profile in the dependencies section of this document determine which profile(s) are listed as prerequisites. An actor must implement all required transactions in the prerequisite profiles in addition to those in the desired profile.

1.4.3 Process Flow Diagrams

The descriptions of integration profiles that follow include process flow diagrams that illustrate how the profile functions as a sequence of transactions between relevant actors.

These diagrams are intended to provide an overview so the transactions can be seen in the context of an institution's or cross-institutions' workflow. Certain transactions and activities not defined in detail by IHE are shown in these diagrams in italics to provide additional context on where the relevant IHE transactions fit into the broader scheme of healthcare information systems. These diagrams are not intended to present the only possible scenario. Often other actor groupings are possible, and transactions from other profiles may be interspersed.

In some cases the sequence of transactions may be flexible. Where this is the case there will generally be a note pointing out the possibility of variations. Transactions are shown as arrows oriented according to the flow of the primary information handled by the transaction and not necessarily the initiator.

1.5 Copyright Permissions

Health Level Seven, Inc., has granted permission to the IHE to reproduce tables from the HL7 standard. The HL7 tables in this document are copyrighted by Health Level Seven, Inc. All rights reserved. Material drawn from these documents is credited where used.

IHE has been very fortunate in having the American College of Obstetricians and Gynecologists (ACOG) help us in the definition of the data found in the Antepartum Summary Profile (APS).

The Antepartum Summary Profile (APS) describes the content structures and specifications the American College of Obstetricians and Gynecologists (ACOG) views are necessary in an antepartum record. ACOG encourages the use of the content structures contained in the Antepartum Summary Profile of the Patient Care Coordination Technical Framework.

ACOG does not endorse any EMR products. Companies or individuals that use these content structures in EMR product or service are prohibited from using ACOG's name and/or its logo on any promotional material, packaging, advertisement, website or in any other context related to the EMR product or service.

Braden Scale For Predicting Pressure Sore Risk, Copyright © Barbara Braden and Nancy Bergstrom, 1988. Reprinted with permission. Barabara Braden and Nancy Bergstrom have granted permission to use the Braden Scale in the IHE Functional Status Assessment Integration Profile to be provided to vendors for demonstration purposes only. Should a vendor chose to include the Braden Scale in their product, they must seek permission to do so from the copyright holders. More information is available from http://www.bradenscale.com/.

2 Introduction

This document, the IHE Patient Care Coordination Technical Framework (PCC TF), defines specific implementations of established standards. These are intended to achieve integration goals that promote appropriate exchange of medical information to coordinate the optimal patient care among care providers in different care settings. It is expanded annually, after a period of public review, and maintained regularly through the identification and correction of errata. The latest version of the document is always available via the Internet at http://www.ihe.net/Technical_Framework/ , where the technical framework volumes specific to the various healthcare domains addressed by IHE may be found.

The IHE Patient Care Coordination Technical Framework identifies a subset of the functional components of the healthcare enterprises and health information networks, called IHE actors, and specifies their interactions in terms of a set of coordinated, standards-based transactions. The other domains within the IHE initiative also produce Technical Frameworks within their respective areas that together form the IHE Technical Framework. Currently, the following IHE Technical Framework(s) are available:

- IHE IT Infrastructure Technical Framework
- IHE Cardiology Technical Framework
- IHE Laboratory Technical framework
- IHE Radiology Technical Framework
- IHE Patient Care Coordination Technical Framework

Where applicable, references are made to other technical frameworks. For the conventions on referencing other frameworks, see the preface of this volume.

2.1 Relationship to Standards

The IHE Technical Framework identifies functional components of a distributed healthcare environment (referred to as IHE actors), solely from the point of view of their interactions in the healthcare enterprise. It further defines a coordinated set of transactions based on standards (such as HL7, IETF, ASTM, DICOM, ISO, OASIS, etc.) in order to accomplish a particular use case. As the scope of the IHE initiative expands, transactions based on other standards may be included as required.

At its current level of development, IHE has also created Content Integration Profiles to further specify the payloads of these transactions, again based on standards. This has become necessary as the healthcare industry moves towards the use of transaction standards that have been used in more traditional computing environments.

In some cases, IHE recommends selection of specific options supported by these standards. However, IHE does not introduce technical choices that contradict conformance to these standards. If errors in or extensions to existing standards are identified, IHE's policy is to report them to the appropriate standards bodies for resolution within their conformance and standards evolution strategy.

IHE is therefore an implementation framework, not a standard. Conformance claims for products must still be made in direct reference to specific standards. In addition, vendors who have implemented IHE integration capabilities in their products may publish IHE Integration Statements to communicate their products' capabilities. Vendors publishing IHE Integration Statements accept full responsibility for their content. By comparing the IHE Integration Statements from different products, a user familiar with the IHE concepts of actors and integration profiles can determine the level of integration between them. See PCC TF-1: Appendix C for the format of IHE Integration Statements.

2.2 Relationship to Product Implementations

The IHE actors and transactions described in the IHE Technical Framework are abstractions of the real-world healthcare information system environment. While some of the transactions are traditionally performed by specific product categories (e.g. HIS, Clinical Data Repository, Electronic Health record systems, Radiology Information Systems, Clinical Information Systems or Cardiology Information Systems), the IHE Technical Framework intentionally avoids associating functions or actors with such product categories. For each actor, the IHE Technical Framework defines only those functions associated with integrating information systems. The IHE definition of an actor should therefore not be taken as the complete definition of any product that might implement it, nor should the framework itself be taken to comprehensively describe the architecture of a healthcare information system.

The reason for defining actors and transactions is to provide a basis for defining the interactions among functional components of the healthcare information system environment. In situations where a single physical product implements multiple functions, only the interfaces between the product and external functions in the environment are considered to be significant by the IHE initiative. Therefore, the IHE initiative takes no position as to the relative merits of an integrated environment based on a single, all-encompassing information system versus one based on multiple systems that together achieve the same end.

2.3 Framework Development and Maintenance

The IHE Patient Care Coordination Technical Framework is continuously maintained and expanded on an annual basis by the IHE Patient Care Coordination Technical Committee. The development and maintenance process of the Framework follows a number of principles to ensure stability of the specification so that both vendors and users may use it reliably in specifying, developing and acquiring systems with IHE integration capabilities.

The first of these principles is that any extensions or clarifications to the Technical Framework must maintain backward compatibility with previous versions of the framework (except in rare cases for corrections) in order to maintain interoperability with systems that have implemented IHE Actors and Integration Profiles defined there. The IHE Patient Care Coordination Technical Framework is developed and re-published annually following a three-step process:

1. The Patient Care Coordination Technical Committee develops supplements to the current stable version of the Technical Framework to support new functionality identified by the IHE Strategic and PCC Planning Committees and issues them for public comment.
2. The Committee addresses all comments received during the public comment period and publishes an updated version of the Technical Framework for "Trial Implementation." This version contains both the stable body of the Technical Framework from the preceding cycle and the newly developed supplements. It is this version of the Technical Framework that is used by vendors in developing trial implementation software for the IHE Connectathons.
3. The Committee regularly considers change proposals to the Trial Implementation version of the Technical Framework, including those from implementers who participate in the Connectathon. After resolution of all change proposals received within 60 days of the Connectathon, the Technical Framework version is published as "Final Text".

As part of the Technical framework maintenance the Committee will consider change proposals received after the publication to the "Final Text".

2.4 About the Patient Care Coordination Integration Profiles

IHE Integration Profiles offer a common language that healthcare professionals and vendors can use to discuss integration needs of healthcare enterprises and the integration capabilities of information systems in precise terms. Integration Profiles specify implementations of standards that are designed to meet identified clinical needs. They enable users and vendors to state which IHE capabilities they require or provide, by reference to the detailed specifications of the IHE Patient Care Coordination Technical Framework.

Integration profiles are defined in terms of IHE Actors, transactions and their content. Actors (listed in PCC TF-1: Appendix A) are information systems or components of information systems that produce, manage, or act on information associated with clinical and operational activities. Transactions (listed in PCC TF-1: Appendix B) are interactions between actors that communicate the required information through standards-based messages. Content is what is exchanged in these transactions, and are defined by Content Profiles.

Vendor products support an Integration Profile by implementing the appropriate actor(s) and transactions. A given product may implement more than one actor and more than one integration profile.

Content Profiles define how the content used in a transaction is structured. Each transaction is viewed as having two components, a payload, which is the bulk of the information being carried, and metadata that describes that payload. The binding of the Content to an IHE transaction specifies how this payload influences the metadata of the transaction. Content modules within the Content Profile then define the payloads. Content modules are transaction neutral, in that what they describe is independent of the

transaction in which they are used, whereas content bindings explain how the payload influences the transaction metadata.

The figure below shows the relations between the Content Integration Profiles of the Patient Care Coordination Domain.

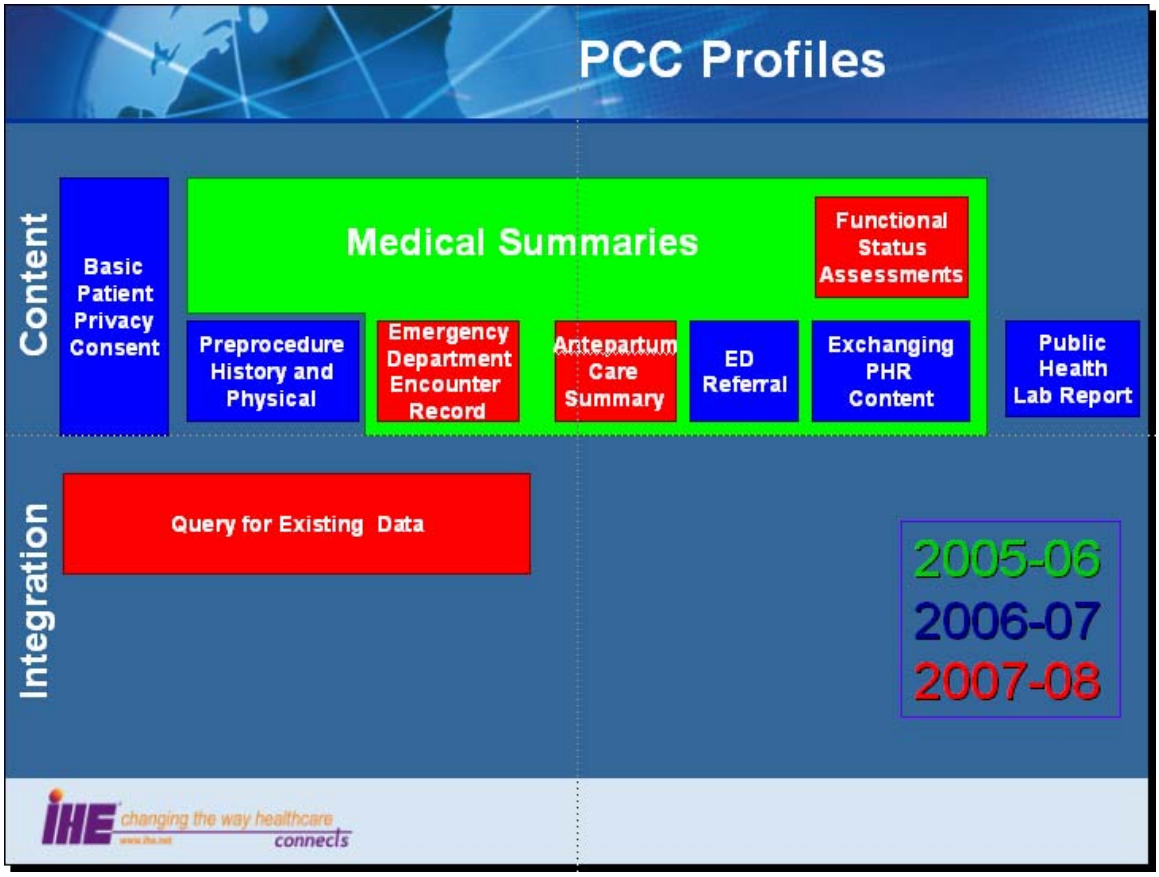


Figure 2.4-1 IHE Patient Care Coordination Content Integration Profiles

2.5 Dependencies of the PCC Integration Profiles

Dependencies among IHE Integration Profiles exist when implementation of one integration profile is a prerequisite for achieving the functionality defined in another integration profile. The table below defines these dependencies. Some dependencies require that an actor supporting one profile be grouped with one or more actors supporting other integration profiles. For example, Cross-Enterprise Sharing of Medical Summaries (XDS-MS) requires that its actors be grouped with a Secured Node Actor of the Audit Trail and Node Authentication (ATNA) Integration Profile. The dependency exists because XDS-MS and XDS actors must support a secured communication channel with proper auditing of the exchange of patient identified information in order to function properly in an environment where protection of patient privacy is critical.

Integration Profile	Depends on	Dependency Type	Purpose
All PCC Content Profiles	*Audit Trail and Node Authentication (ATNA)*	Each Content Creator and Content Consumer actor shall be grouped with the ATNA Secured Node Actor	Required to manage audit trail of exported PHI, node authentication, and transport encryption.
	Consistent Time (CT)	Each Content Creator and Content Consumer actor shall be grouped with the Time Client Actor	Required to manage and resolve conflicts in multiple updates.
Functional Status Assessments (FSA)	*Cross Enterprise Document Exchange of Medical Summaries (XDS-MS)* *OR* *Exchange of Personal Health Record Content (XPHR)* *OR* *Emergency Department Referral (EDR)*	Content Consumers implementing the Functional Status Assessments profile shall be grouped with either the XDS-MS, XPHR or EDR Content Consumer. Content Creators implementing the Functional Status Assessments profile shall be grouped with either the XDS-MS, XPHR or EDR Content Creator.	Ensures that the Functional Status Assessment is communicated as part of an exchange of medical summary information.
Query for Existing Data (QED)	*Audit Trail and Node Authentication (ATNA)*	Each actor in this profile shall be grouped with the ATNA Secure Node or Secure Application actor.	Required to manage audit trail of exported PHI, node authentication, and transport encryption.
Query for Existing Data (QED)	*Consistent Time (CT)*	Each actor in this profile shall be grouped with the Time Client Actor	Required to manage and resolve conflicts in multiple updates.

Table 2.5-1 PCC Integration Profiles Dependencies

To support a dependent profile, an actor must implement all required transactions in the prerequisite profiles in addition to those in the dependent profile. In some cases, the prerequisite is that the actor selects any one of a given set of profiles.

2.6 PCC Integration Profiles Overview

In this document, each IHE Integration Profile is defined by:

- The IHE actors involved
- The specific set of IHE transactions exchanged by each IHE actor.
- The content of the IHE transactions

These requirements are presented in the form of a table of transactions required for each actor supporting the Integration Profile. Actors supporting multiple Integration Profiles are required to support all the required transactions of each Integration Profile supported. When an Integration Profile depends upon another Integration Profile, the transactions required for the dependent Integration Profile have not been included in the table.

The content of the transactions are presented as Content Integration Profiles. These are specification of the content to be exchanged, along with explanations (called bindings) of how the content affects the transactions in which it is exchanged.

It is expected that Content Integration Profiles serve information sharing needs in a coordinated infrastructure environment. Several mechanisms are supported by IHE profiles:

- A registry/repository-based infrastructure is defined by the IHE Cross-Enterprise Document Sharing (XDS) and other IHE Integration Profiles such as patient identification (PIX & PDQ), and notification of availability of documents (NAV).
- A media-based infrastructure is defined by the IHE Cross-Enterprise Document Media Interchange (XDM) profile.
- A reliable messaging-based infrastructure is defined by the IHE Cross-Enterprise Document Reliable Interchange (XDR) profile.
- All of these infrastructures support Security and privacy through the use of the Consistent Time (CT) and Audit Trail and Node Authentication (ATNA) profiles.

For more details on these profiles, see the IHE IT Infrastructure Technical Framework, found here: http://www.ihe.net/Technical_Framework/.

Such an infrastructure is assumed by the use cases that follow.These content integration profiles use similar transactions and differ only in the content exchanged. A process flow for these use cases using Cross Enterprise Document Sharing (XDS) and Notification of Document Availability (NAV) is shown in the figure below. Other process flows are possible using XDM and/or XDR.

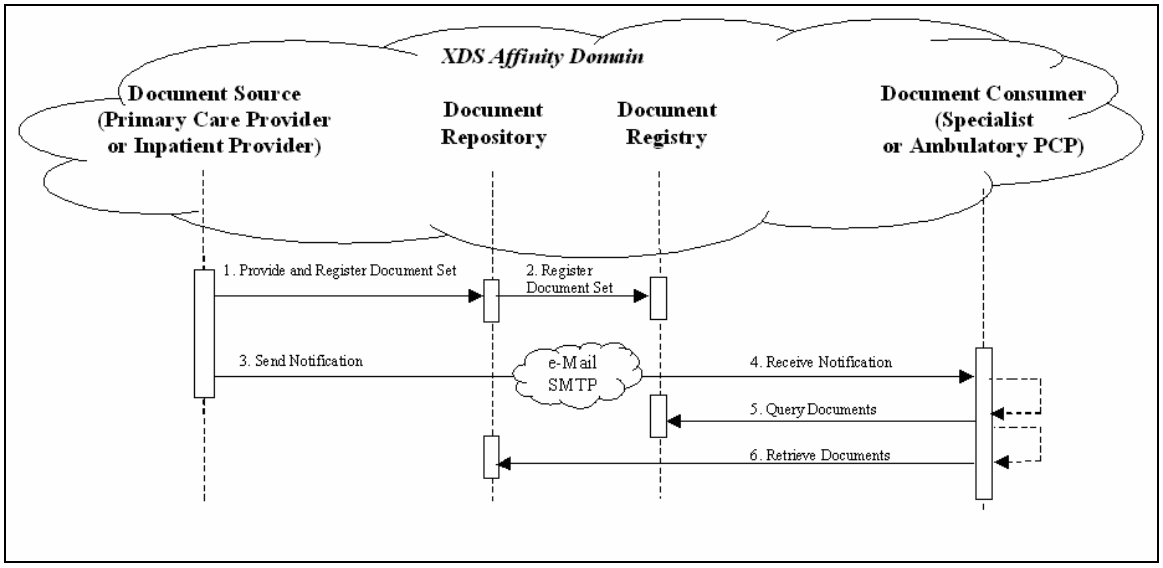


Figure 2.6-1 Use Case Process Flow Diagram

These steps are:

1. Extract/capture a collection of records into a set of documents packaged as an XDS Submission Set. This submission contains at least one clinical document, and may contain a number of other related clinical documents. For example, Medical Summaries are clinical documents (already known in the paper world), which often serve the dual purpose of documenting an encounter and providing the rationale for sending the information to another provider. This step utilizes the transactions provided by the ITI XDS profile to place the records in an XDS Repository (local or shared).
2. The Repository ensures that the documents of the submission set are registered with the XDS Registry of the Affinity Domain (set of cooperating care delivery institutions).
3. Notify the other provider that documents are now available for review. This step utilizes the transactions provided by the ITI NAV profile to perform the e-mail notification.
4. The e-mail notification that contains no patient identified information is received by the specialist EMR system.
5. The receiving provider can then utilize existing query transactions from the XDS profile to find the URL of the Documents.
6. Finally, the receiving provider may choose to display the document, or import relevant information from these records into their own EMR system.

2.6.1 Unplanned Access to past Content

In many cases, a provider may need to assess information from the patient care history, and patients may have content in the XDS repository from prior visits to other providers. For example, Medical Summaries, as well as other documents such as laboratory and

radiology reports are critical for emergency physicians and nurses to provide the best care to patient in acute conditions. The figure below shows the transactions required for this use case, again, using XDS. Other process flows are possible using XDM and/or XDR.

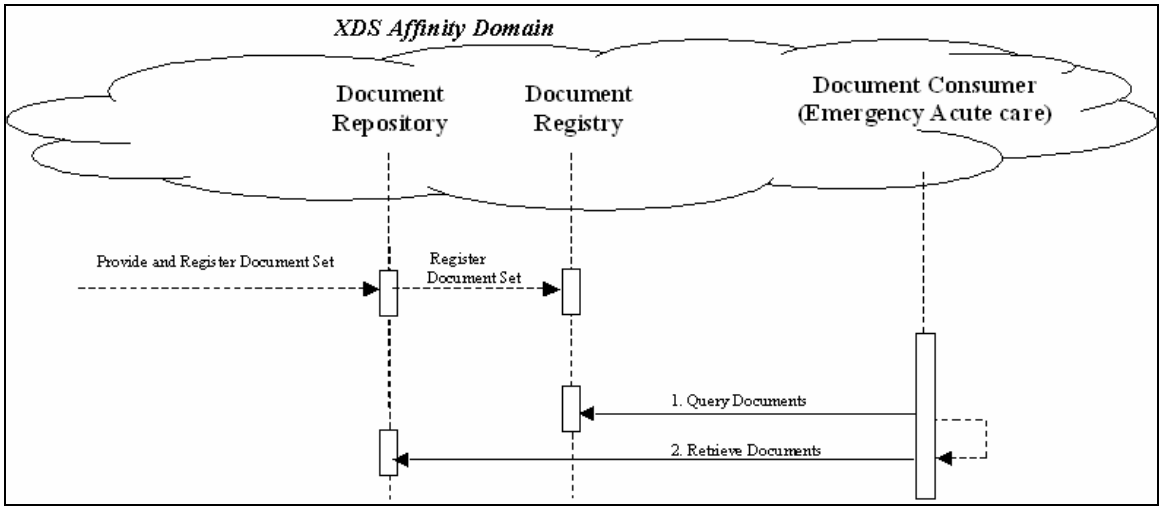


Figure 2.6-2 Unplanned Access Process Flow Diagram

2.7 History of Annual Changes

In the 2005-2006 cycle of the IHE Patient Care Coordination initiative, the first release of the IHE PCC Technical Framework introduced the following integration profile:

- **Cross-Enterprise Sharing of Medical Summaries (XDS-MS) –** a mechanism to automate the sharing process between care providers of Medical Summaries, a class of clinical documents that contain the most relevant portions of information about the patient intended for a specific provider or a broad range of potential providers in different settings. Medical Summaries are commonly created and consumed at points in time of transfers of care such as referrals or discharge.

In the 2006-2007 cycle of the IHE Patient Care Coordination initiative, the following integration profiles were added to the technical framework.

- **Exchange of Personal Health Record Content (XPHR) –** provides a standards-based specification for managing the interchange of documents between a Personal Health Record used by a patient and systems used by other healthcare providers to enable better interoperability between these systems.
- **Basic Patient Privacy Consents (BPPC) –** enables XDS Affinity Domains to be more flexible in the privacy policies that they support, by providing mechanisms to record patient privacy consents, enforce these consents, and create Affinity Domain defined consent vocabularies that identify information sharing policies.
- **Preprocedure History and Physical Content Profile (PPHP) –** supports the exchange of information allowing for the assessment and amelioration of risks related to a procedure.

- **Emergency Department Referral Profile (EDR) –** provides a means to communicate medical summary data from an EHR System to an EDIS System.

In the 2007-2008 cycle of the IHE Patient Care Coordination initiative, the following integration profiles were added to the technical framework.

- **Antepartum Care Summary (APS) -** describes the content and format of summary documents used during antepartum care.
- **Emergency Department Encounter Record (EDER) -** describes the content and format of records created during an emergency department visit.
- **Functional Status Assessment Profile (FSA) -** supports the handoff of assessment information between practitioners during transfers of care by defining the Functional Status Assessment option on the XDS-MS and XPHR profiles.
- **Query for Existing Data (QED) -** allows information systems to query data repositories for clinical information on vital signs, problems, medications, immunizations, and diagnostic results.
- **Public Health Laboratory Report(PHLAB) -** extends the XD*-LAB profile to support reporting from public health laboratories for disease surveillance activities.

In addition, all content within the technical framework was revised in this cycle to encourage compatibility with the ASTM/HL7 Continuity of Care Document Implementation Guide.

2.8 Product Implementations

Developers have a number of options in implementing IHE actors and transactions in product implementations. The decisions cover three classes of optionality:

- For a system, select which actors it will incorporate (multiple actors per system are acceptable).
- For each actor, select the integration profiles in which it will participate.
- For each actor and profile, select which options will be implemented.

All required transactions must be implemented for the profile to be supported (for XDS-MS, refer to the transaction descriptions for XDS in ITI TF-2).

Implementers should provide a statement describing which IHE actors, IHE integration profiles and options are incorporated in a given product. The recommended form for such a statement is defined in PCC TF-1: Appendix C.

In general, a product implementation may incorporate any single actor or combination of actors. When two or more actors are grouped together, internal communication between actors is assumed to be sufficient to allow the necessary information flow to support their functionality; for example, the Document Source Actor of XDS-MS may use the Patient Identifier Cross-reference Consumer Actor to obtain the necessary patient identifier mapping information from its local patient id to that used in the document sharing domain. The exact mechanisms of such internal communication are outside the scope of the IHE Technical Framework.

When multiple actors are grouped in a single product implementation, all transactions originating or terminating with each of the supported actors shall be supported (i.e., the IHE transactions shall be offered on an external product interface).

The following examples describe which actors typical systems might be expected to support. This is not intended to be a requirement, but rather to provide illustrative examples.

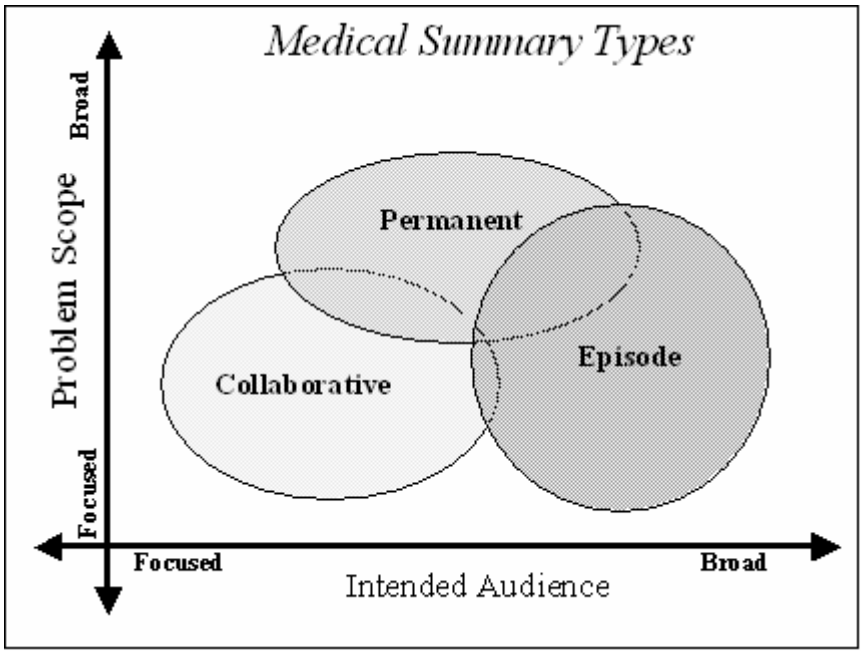
An acute care EMR serving a hospital might include a Document Source Actor, Document Consumer Actor, a Document Repository Actor, a Patient Identification Consumer Actor, as well as a Secured Node Actor. An Ambulatory EMR serving a physician practice might include a Document Source Actor, Document Consumer Actor, a Patient Demographics Client Actor, as well as a Secured Node Actor.

3 Cross-Enterprise Sharing of Medical Summaries (XDS-MS) Integration Profile

3.1 Scope and Purpose

Patient, clinician, industry and governmental demands for improved healthcare quality have created increased focus to make patient healthcare information interoperability across disparate systems a reality.

A solution for interoperability is, however, not a simple undertaking. Unstructured textual data forms remains the predominate mechanism for information exchange among health care providers, and a good majority of data needed by physicians and other health care providers to make good clinical decisions is embedded in this free text. Efficient and effective interoperability therefore begins by identifying the most relevant documents and the most relevant sections within those documents.



By their nature, Medical Summaries form a class of clinical documents that contain the most relevant portions of this information. As the name would indicate they have the purpose of summarizing, both abstracting the most important pieces of information from the EMR and recording free-text summaries at the time of medical summary creation. Operationally, they are commonly created at points in time of transfers of care from one provider to another or from one setting to another.

Patient transfers and, therefore, the summary documents that accompany these transfers can be categorized into 3 primary types: Episodic, Collaborative, or Permanent. These categories are important because they represent a breadth of use case scenarios for Medical Summaries. For example, summaries for collaborative transfers of care such as referral notes have a focused objective for providing the most relevant information about the patient intended *for a specific provider*. Collaborative summaries have a general audience that is generated as an artifact since they also provide the most relevant spot to obtain information about specific classes of patient problems that the patient has.

By contrast, episodic summaries have the primary purpose of highlighting the most relevant details of focused periods of time in a patient history. Examples include discharge summaries or history and physicals. Episodic summaries are written for a broad audience by intent.

Permanent transfers have yet a third purpose of summarizing the entirety of a patient's medical history and therefore covers a broader range of patient problems. The audience may be focused (as in a transfer to a new provider) or general (as in a discharge from the military).

The challenge is to identify the clinically relevant documents (and data elements those documents contain) that are used in typical "transfer of care" scenarios and then to provide interoperability standards to promote ease in transmission of those documents (and data elements). The Cross-Enterprise Sharing of Medical Summary (XDS-MS) Integration Profile facilitates this by defining the appropriate standards for document transmission and a minimum set of "record entries" that should be forwarded or made available to subsequent care provider(s) during specific transfer of care scenarios. In addition, this integration profile needs to define the utilization requirements/options for the receiving entity in order to ensure that the "care context" of the sending entity is appropriately maintained following the information transfer.

3.2 Process Flow

The basic process flow supported by XDS-MS mirrors current manual practices: someone gathers the appropriate documents from the patient medical record, copies them, packages them up with a cover letter explaining the reason the information is being sent, and then ships the package to the receiving provider. This is often accompanied by a telephone call from the sending provider to the receiving provider that indicates that such information is forthcoming.

Because the Collaborative care transfers and Episodic Care transfers differ significantly, these two use cases are defined. Users or implementers of this Integration Profile are offered options in the support of either of these two use cases. Permanent Care Summaries also differ significantly. However their use is less frequent; so this use case was deferred for future work.

3.2.1 Use Case 1: Ambulatory Specialist Referral

This use case involves a "collaborative" transfer of care for the referral of a patient from a primary care provider (PCP) to a specialist. This use case is a central component of an "e-referral" process, which typically requires an appropriate level of agreement/collaboration between the two parties prior to the actual transfer of clinical information being initiated.

The preconditions assume a PCP sees a patient in his office. The PCP has talked to the patient and performed an examination, and has decided to refer the patient to a specialist. An assumption is made that the PCP has an EMR system with capability to write notes and manage data elements. The specific data elements managed by the PCP's EMR are expected to be the source for the information used in creating the medical summary

document related to this transfer of care. A variety of EMR implementations and usage by clinicians may result in some variability in the content of the medical summary.

The detailed content of the medical summary to support this use case will be detailed as part of the document content profile specification (See the Referral Summary Content Module below).

Steps to identify the specialist and obtain insurance preauthorization have been placed out of scope for this Integration Profile.

Post conditions include the specialist physician receiving the notification of referral, locating the documents (via the Document Registry), retrieving the Documents and viewing them and optionally importing data. Import assumes the specialist with an EMR system with the capability for managing those discrete data elements.

3.2.2 Use Case 2: Acute Care Discharge to Ambulatory Care Environment

This use case involves an episodic transfer of care in the form of a patient discharge from a hospital to home. The attending physician in the hospital generates a discharge summary document that is used by the hospital record keeping and billing abstraction. The attending physician in the hospital may or may not also be serving as the ambulatory PCP. If not, a copy of this record is sent to the PCP as well as other specialist providers that will have ambulatory follow-up care.

The events of the use case involve creation of the discharge summary, sharing it, and notifying other providers such as the PCP's office and the surgeon's office.

The post conditions include the receipt and viewing of the discharge summary with optional import into the ambulatory EMR system.

The detailed content of the medical summary to support this use case will be detailed as part of the document content profile specification (See the Discharge Summary Content Module below).

3.2.3 Content Interoperability Levels

The use cases described above imply different levels of interoperability. At the lowest level, a clinician simply needs to be able to access and view some content such as a medical summary. At this level, minimal structured data elements must be present – just enough metadata to verify that access to that document can be accessed appropriately associated with a visual representation of the document.

Beyond this simple metadata, nearly all medical summary documents have organizational elements that group the relevant parts of the medical summary. For humans this allows for more rapid review because it is easier to skip to portions of interest for care. Computers too can take advantage of this structuring. For example, it is relevant to see the list of discharge medications from a discharge summary in relation to current medications for comparison and reconciliation.

At a very high level of interoperability, the ability to pass fully structured and codified data is necessary for computer processing and mapping. For example, the ability to import medications identified in medical summaries from another institution could have

tremendous potential for ensuring that medication orders are transferred correctly. Unfortunately, the cost for providing high levels of semantic interoperability is increased complexity of implementation, and therefore long implementation times.

The HL7 Clinical Document Architecture (CDA) standard and Care Record Summary (CRS) CDA implementation guides support progressive interoperability at multiple levels of complexity, from those needed to provide simple low level interoperability for supporting the most important use case of simple viewing to those providing a path to progressively higher levels of interoperability for vendors and providers wishing to implement it. CDA as constrained in the CRS implementation guides is therefore the base standard for the XDS-MS content profile.

The XDS-MS content profile builds on and further constrains the CDA-CRS implementation guide by defining the required and optional sections required for the Acute Care Discharge and Specialist Referral use cases. Additionally, it places constraints for the most important sections (Medication, Allergy and Problems) of Medical Summaries to ensure that structured field level data are provided.

The figure below shows how the XDS-MS Content profile defines these progressive levels of interoperability for sections of different importance. Header metadata must be present and coded. Most sections must define, at minimum, a section label to identify that section. For the Medication, Allergy, and Problems Sections, data must contain a more granular field level data as discrete text (for example dose or frequency). This is referred to as structured textual representation. Note that the textual strings in this structured text are not duplicates of the textual strings in the human readable text, but simply referenced extracts from the human readable text content, reducing the risk for inconsistencies

Granular field level data may then be optionally coded. If any coded terminology is used it shall be uniquely identified.

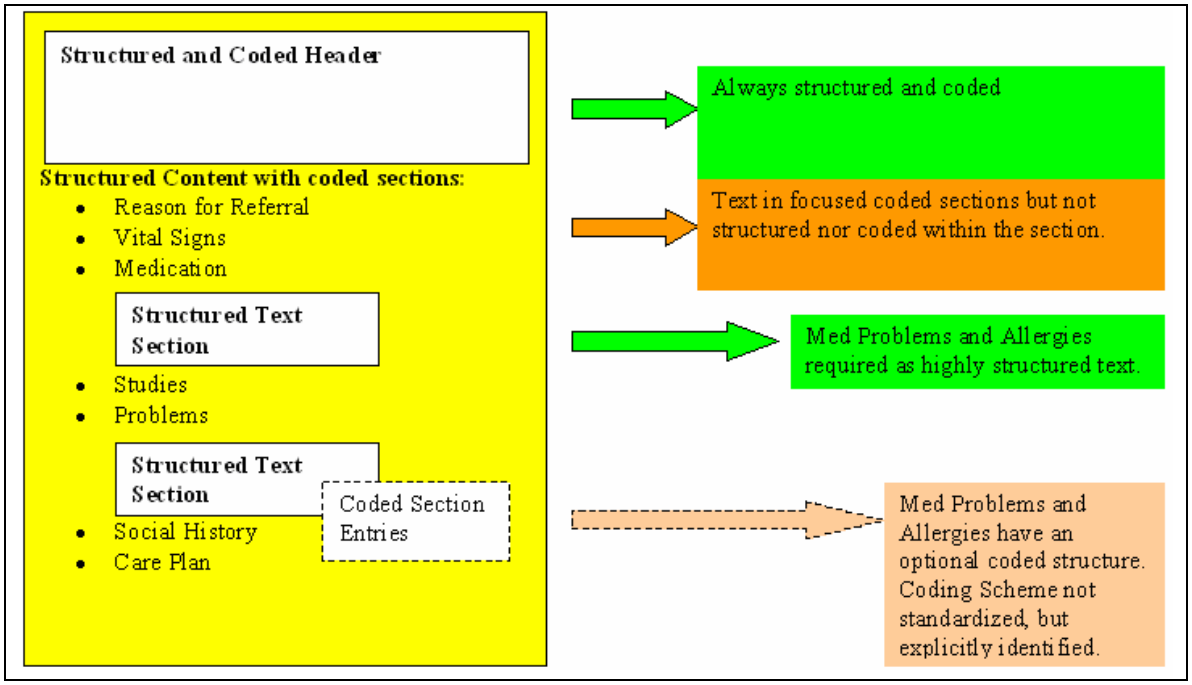


Figure 3.2-1 Tiered Interoperability Levels

Note: The lack of mature and broadly accepted standards for coded terminology requires that this integration profile not specify specific coded vocabularies. However, when agreements can be reached, the capability to exchange coded level information is possible. IHE has on its roadmap to continue working with appropriate standards bodies so that coded terminology standards can be added to this profile in the future.

3.2.4 Use Case Conclusion

The process flow of this profile exhibits a great deal more power and flexibility than the existing manual process. The physician workflow is improved by reusing an existing work product in the very first step (the summary report) to accomplish two purposes: recording care that has been provided, and communicating with another provider.

Secondly, each step utilizes the power of inter-connected EMR systems to make the entire process faster, easier, and less reliant on human labor to accomplish the same feats. This results in reduced time to transfer records between providers, safer transport of the information, and more reliable receipt.

Lastly, the process facilitates the import of relevant data from one set of patient records to the receiving physicians EMR system, resulting in more reliable transfer of information, reduced labor costs transferring information from one provider to another and less time required by the patient to provide information that is already in the physician's possession.

3.3 Actors/Transaction

There are two actors in the XDS-MS profile, the Content Creator and the Content Consumer. Content is created by a Content Creator and is to be consumed by a Content Consumer. The sharing or transmission of content from one actor to the other is

addressed by the appropriate use of IHE profiles described below, and is out of scope of this profile. A Document Source or a Portable Media Creator may embody the Content Creator Actor. A Document Consumer, a Document Recipient or a Portable Media Importer may embody the Content Consumer Actor. The sharing or transmission of content or updates from one actor to the other is addressed by the use of appropriate IHE profiles described in the section on Content Bindings with XDS, XDM and XDR.

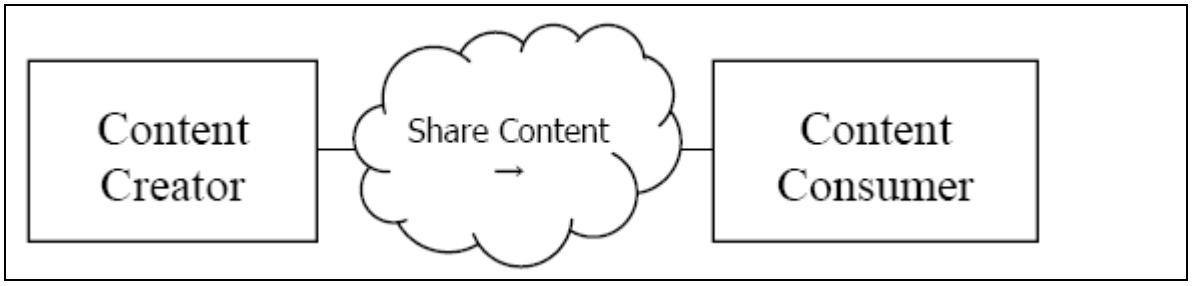


Figure 3.3-1 XDS-MS Actor Diagram

3.4 Options

Actor	Option
Content Consumer	View Option (1)
	Document Import Option (1)
	Section Import Option (1)
	Discrete Data Import Option (1)
Content Creator	Referral Option (1)
	Discharge Summary Option (1)

Table 3.4-1 XDS-MS Options

Note 1: The Actor shall support at least one of these options.

3.5 Content Consumer Options

3.5.1 View Option

This option defines the processing requirements placed on Content Consumers for providing access, rendering and management of the medical document. See the View Option in PCC TF-2 for more details on this option.

3.5.1.1

A Content Creator Actor should provide access to a style sheet that ensures consistent rendering of the medical document content as was displayed by the Content Consumer Actor.

The Content Consumer Actor shall be able to present a view of the document using this style sheet if present.

3.5.2 Document Import Option

This option defines the processing requirements placed on Content Consumers for providing access, and importing the entire medical document and managing it as part of the patient record. See the Document Import Option in PCC TF-2 for more details on this option.

3.5.3 Section Import Option

This option defines the processing requirements placed on Content Consumers for providing access to, and importing the selected section of the medical document and managing them as part of the patient record. See the Section Import Option in PCC TF-2 for more details on this option.

3.5.4 Discrete Data Import Option

This option defines the processing requirements placed on Content Consumers for providing access, and importing discrete data from selected sections of the medical document and managing them as part of the patient record. See the Discrete Data Import Option in PCC TF-2 for more details on this option.

3.6 Content Creator Options

3.6.1 Referral Option

Content Creators implementing this option shall create Referrals that comply with the Referral Content Module found in PCC TF-2.

3.6.2 Discharge Summary Option

Content Creators implementing this option shall create Discharge Summaries that comply with the Discharge Summary Content Module found in PCC TF-2.

3.7 Coded Terminologies

This profile supports the capability to record entries beyond the IHE required coding associated with structured data. Content Creators and Content Consumers may choose to utilize coded data, but interoperability at this level requires an agreement between the communicating parties that is beyond the scope of this Profile.

To facilitate this level of interoperability, the applications that implement actors within this profile shall provide a link to their HL7 conformance profile within their IHE Integration statement. The conformance profile describes the structure of the information which they are capable of creating or consuming. The conformance profile shall state which templates are supported by the application (as a Content Creator or Content Consumer), and which vocabularies and/or data types are used within those templates. It should also indicate the optional components of the entry that are supported.

See the HL7 Refinement Constraint and Localization for more details on HL7 conformance profiles.

3.8 Content Modules

Content modules describe the content of a payload found in an IHE transaction. Content profiles are transaction neutral. They do not have dependencies upon the transaction that they appear in. These dependencies are reflected in the Bindings listed above.

3.8.1 Referral Summary

All referral summaries shall be structured and coded as required by the Referral Summary Content Module described in PCC TF-2. The inclusion of the specific coded attributes explicitly defined as optional, may be supported by specific implementations of Document Sources using an IHE identified coded terminology of their choice. The requirements and manner in which implementations support such capabilities is beyond the scope of this Integration Profile.

3.8.2 Discharge Summary

All discharge summaries shall be structured and coded as required by the Discharge Summary Content Module described in PCC TF-2. The inclusion of the specific coded attributes explicitly defined as optional, may be supported by specific implementations of Document Sources using an IHE identified coded terminology of their choice. The requirements and manner in which implementations support such capabilities is beyond the scope of this Integration Profile.

3.9 Grouping with other Profile Actors

Content profiles may impose additional requirements on the transactions used when grouped with actors from other IHE Profiles.

3.9.1 Cross Enterprise Document Sharing, Media Interchange and Reliable Messages

Actors from the ITI XDS, XDM and XDR profiles embody the Content Creator and Content Consumer sharing function of this profile. A Content Creator or Content Consumer may be grouped with appropriate actors from the XDS, XDM or XDR profiles to exchange the content described therein. The metadata sent in the document sharing or interchange messages has specific relationships or dependencies (which we call bindings) to the content of the clinical document described in the content profile.

The Patient Care Coordination Technical Framework defines the bindings to use when grouping the Content Creator of this Profile with actors from the IHE ITI XDS, XDM or XDR Integration Profiles.

Content	Binding	Actor	Optionality
Referral Summary	Medical Document Binding to XDS, XDM and XDR	Content Creator	O (Note 1)
		Content Consumer	R

Discharge Summary	Medical Document Binding to XDS, XDM and XDR	Content Creator	O (Note 1)
		Content Consumer	R

Figure 3.9-1 Content Bindings

Note 1: Content Creators must support generation of at least one type of content from this table with a transaction in order for the transaction to meet the requirements of the XDS-MS profile. Content Consumers must support both types of content to meet these requirements.

3.9.2 Notification of Document Availability (NAV)

When a Content Creator actor of the XDS-MS Integration Profile needs to notify other systems of documents, it may support the ITI Notification of Document Availability (NAV) Integration Profile. One of the Acknowledgement Request options may be used to request from a Document Consumer that an acknowledgement should be returned when it has received and processed the notification.

When a Content Consumer wants to provide the capability to receive a Receive Notification Transaction it may support the Document Consumer Actor of the NAV Integration Profile. The Send Acknowledgement option may be used to issue a Send Acknowledgement to a Document Source that the notification was received and processed.

3.9.3 Document Digital Signature (DSG)

When a Content Creator Actor of the XDS-MS Integration Profile needs to digitally sign a medical summary or any other documents in a submission set, it shall support the Digital Signature (DSG) Content Profile as a Document Source.

When a Content Consumer Actor of the XDS-MS Integration Profile needs to verify a Digital Signature, it shall support the Digital Signature (DSG) Content Profile as a Document Consumer.

3.10 Security Considerations

The XDS-MS Integration Profile assumes that a minimum security and privacy environment has been established across all participants. There must exist security policies regarding the use of training, agreements, risk management, business continuity and network security that need to be already in place prior to the implementation of XDS-MS.

The IHE ITI ATNA Integration Profile is required of the actors involved in the IHE transactions specified in this profile to protect node-to-node communication and to produce an audit trail of the PHI related actions when they exchange messages.

In addition, the IHE ITI DSG Integration Profiles can be applied to the actors involved in the transactions specified in this profile to securely identify individuals involved in transactions and verify document integrity and authorizations (DSG).

Interested parties should also read the detailed Security Considerations sections provided for each of the aforementioned profiles in the IHE ITI Technical Framework and its supplements.

The XDS-MS profile does have a few security considerations of its own.

EMR systems should be thoughtfully designed so that providers are able to review and verify information before it is imported into their EMR system, and that positive user acknowledgements are made before import, and audit trails are recorded when imports occur.

Imported information should be traceable both to the source [the sharing EMR], and the receiver that accepted it into the EMR system. XDS Affinity domain policies should support policies and procedures for tracing information flows between EMR systems.

Because the information being transferred is in XML, it will be common that different EMR systems utilize different transformations to render the contents into human readable form. A Content Creator should make available the transforms used by the sending provider to review the documents, and a Content Consumer must support rendering the information as seen by the sending provider, allowing both providers to see what was sent in its original rendered form.

3.11 Requirements of XDS-MS Actors

This section describes the specific requirements for each Actor defined within this profile. Specific details can be found in Volume 1 and Volume 2 of the technical framework.

3.11.1 Content Creator

1. A Content Creator shall be able to create either a Referral Summary or a Discharge Summary, or both, according to the specifications for these content profiles found in PCC TF-2.
2. A Content Creator shall be grouped with the Time Client Actor, and shall synchronize its clock with a Time Server.
3. A Content Creator shall be grouped with the Secure Node or Secure Application Actor of the ATNA profile.
4. All activity initiated by the application implementing the Content Creator shall generate the appropriate audit trail messages as specified by the ATNA Profile. The bare minimum requirements of a Content Creator are that it be able to log creation and export of clinical content.
5. A Content Creator shall use secure communications for any document exchanges, according to the specifications of the ATNA profile.

3.11.2 Content Consumer

1. A Content Consumer shall be able to consume a Referral Summary and a Discharge Summary.

2. A Content Consumer shall implement the View Option or Discrete Data import option, or both.
3. A Content Consumer that implements the Document Import or Section Import Option shall implement the View Option as well.
4. A Content Consumer that implements the View option shall be able to:
    a. Demonstrate rendering of the document for display.
    b. Print the document.
    c. Display the document with its original stylesheet.
    d. Support traversal of any links contained within the document.
5. A Content Consumer that implements the Document Import Option shall:
    a. Store the document.
    b. Demonstrate the ability to access the document again from local storage.
6. A Content Consumer that implements the Section Import Option shall offer a means to import one or more document sections into the patient record as free text.
7. A Content Consumer that implements the Discrete Data Import Option shall offer a means to import structured data from one or more sections of the document.
8. A Content Consumer Actor shall be grouped with the Time Client Actor, and shall synchronize its clock with a Time Server.
9. A Content Consumer shall be grouped with the Secure Node or Secure Application Actor of the ATNA profile.
10. All activity initiated by the application implementing the Content Consumer shall generate the appropriate audit trail messages as specified by the ATNA Profile. The bare minimum requirements of a Content Consumer are that it be able to log views or imports of clinical content.
11. A Content Consumer shall use secure communications for any document exchanges, according to the specifications of the ATNA profile.

4 Exchange of Personal Health Record Content Integration Profile (XPHR)

The **Exchange of Personal Health Record Content (XPHR)** integration profile describes the content and format of summary information extracted from a PHR system used by a patient for import into healthcare provider information systems, and visa versa. The purpose of this profile is to support interoperability between PHR systems used by patients and the information systems used by healthcare providers. This profile does not address all the data exchange requirements of PHR systems. A PHR system may leverage other IHE Integration and Content Profiles for interoperability in addition to the XPHR Content Profile. For example, a PHR Systems may implement XDS-MS to import medical summaries produced by EHR systems, XDS-I to import imaging information, XDS-Lab to import laboratory reports, et cetera.

4.1 Exchange of Personal Health Record Content (XPHR)

Upon seeing a healthcare provider for the first time, patients are requested to provide a great deal of information, including, their address, telephone numbers, birth date, sex, marital status, emergency contacts, insurance information, a medical and family history, and current medications and allergies. This information is also reviewed and updated on subsequent visits. This information is usually obtained by having the patient fill out one or more forms, whose contents are then manually transferred in to the information systems used by the healthcare provider. Automating this process will reduce transcription errors during the transfer of information, speed up the registration and check-in processes for patients, and also makes it possible for patients to have more participation in the management of their health information.

Providers also need to participate in helping patients to manage their healthcare information, however, providers should not be solely responsible for updating the patient's health record, since they often are only participating in a portion of the patient's overall health activities.

PHR systems allow patients to manage their healthcare information. EHR and other information systems allow healthcare providers to manage the electronic records they maintain for their patients. These two systems, operating separately, are not sufficient to allow patients and providers to collaborate in the care of the patient. What is needed is a way to integrate the activities of patients using a PHR system and healthcare providers using an EHR or other information system to provide for collaborative care between the patient and their provider.

The XPHR profile is intended to provide a mechanism for patients to supply the information most often requested by their healthcare providers, and to allow those same providers to assist patients in keeping their personal healthcare information up to date. It achieves this by allowing patients to provide a summary of their PHR information to providers, and gives providers a mechanism to suggest updates to the patient's PHR upon completion of a healthcare encounter.

4.2 Actors/Transaction

There are two actors in the XPHR profile, the Content Creator and the Content Consumer. Content is created by a Content Creator and is to be consumed by a Content Consumer. The sharing or transmission of content from one actor to the other is addressed by the appropriate use of IHE profiles described below, and is out of scope of this profile. A Document Source or a Portable Media Creator may embody the Content Creator Actor. A Document Consumer, a Document Recipient or a Portable Media Importer may embody the Content Consumer Actor. The sharing or transmission of content or updates from one actor to the other is addressed by the use of appropriate IHE profiles described in the section on Content Bindings with XDS, XDM and XDR.

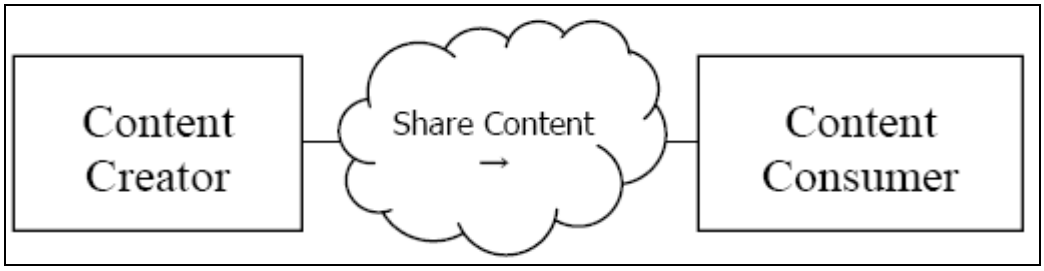


Figure 4.2-1 XPHR Actor Diagram

4.3 Options

Actor	Option
Content Consumer	View Option (1)
	Document Import Option (1)
	Section Import Option (1)
	Discrete Data Import Option (1)
Content Creator	Update Option

Table 4.3-1 XPHR Options

Note 1: The Actor shall support at least one of these options.

4.4 Content Consumer Options

4.4.1 View Option

This option defines the processing requirements placed on Content Consumers for providing access, rendering and management of the medical document. See the View Option in PCC TF-2 for more details on this option.

4.4.1.1

A Content Creator Actor should provide access to a style sheet that ensures consistent rendering of the medical document content as was displayed by the Content Consumer Actor.

The Content Consumer Actor shall be able to present a view of the document using this style sheet if present.

4.4.2 Document Import Option

This option defines the processing requirements placed on Content Consumers for providing access, and importing the entire medical document and managing it as part of the patient record. See the Document Import Option in PCC TF-2 for more details on this option.

4.4.3 Section Import Option

This option defines the processing requirements placed on Content Consumers for providing access to, and importing the selected section of the medical document and managing them as part of the patient record. See the Section Import Option in PCC TF-2 for more details on this option.

4.4.4 Discrete Data Import Option

This option defines the processing requirements placed on Content Consumers for providing access, and importing discrete data from selected sections of the medical document and managing them as part of the patient record. See the Discrete Data Import Option in PCC TF-2 for more details on this option.

4.5 Content Creator Options

4.5.1 Update Option

Content Creators supporting the update option shall create be able to create a PHR Update document structured and coded as required by the PHR Update Module Content found in PCC TF-2.

4.6 Coded Terminologies

This profile supports the capability to record entries beyond the IHE required coding associated with structured data. Content Creators and Content Consumers may choose to utilize coded data, but interoperability at this level requires an agreement between the communicating parties that is beyond the scope of this Profile.

To facilitate this level of interoperability, the applications that implement actors within this profile shall provide a link to their HL7 conformance profile within their IHE Integration statement. The conformance profile describes the structure of the information which they are capable of creating or consuming. The conformance profile shall state which templates are supported by the application (as a Content Creator or Content

Consumer), and which vocabularies and/or data types are used within those templates. It should also indicate the optional components of the entry that are supported.

See the HL7 Refinement Constraint and Localization for more details on HL7 conformance profiles.

4.7 XPHR Content Modules

4.7.1 PHR Extract Module

The content exchanged shall be structured and coded as required by the PHR Extract Module Content found in PCC TF-2. The Content Creator Actor creates a PHR Extract and shares it with the Content Consumer.

4.7.2 PHR Update Module

The content exchanged shall be structured and coded as required by the PHR Update Module Content found in PCC TF-2. The Content Creator Actor creates a PHR Update document as an addendum to a previously exchanged PHR Extract document. This Update is an addendum to the prior document, and reflects changes to that document that are suggested by the Content Creator Actor. A Content Consumer actor shall support viewing of an Update document, and may support import of the Update to reflect those changes to the PHR.

The purpose of this content module is to provide a mechanism whereby healthcare providers, using applications that implement the Content Creator Actor, can suggest updates to a PHR for a patient.

4.8 XPHR Integration Profile Process Flow

One key use scenario has been identified as an example. This use case originated with the Cross-Enterprise Document Sharing on Media (XDM) profile, and is reproduced here.

4.8.1 Personal Health Record (PHR) to ED/Primary Care EHR

Precondition: A patient is using a Personal Health Record application system at home for the record keeping of patient-originated medical information (e.g. social history, family history), snapshots of clinical information that may have been provided from previous care encounters (e.g. medication list, immunization records, etc), and current observations from home care medical devices (e.g. blood pressure, blood sugar level, etc).

Events: The patient requests their provider give them initial information to initialize their new PHR system. Later the patient does an extract of his PHR onto a portable media (USB key, CD) to bring to the care facility as a current set of medical data for the clinician. The patient experiences a medical condition requiring that he needs to present at the ED or his PCP for care. The ED physician or primary care physician receives the portable media from the patient and loads it an office PC to display and/or import, as desired, the information provided on the portable media. Following the encounter, the

provider does an extract of appropriate data elements from the office EMR to yield a snapshot of the patient's medical record. This snapshot is then transferred to an interchange media for the patient to bring home and update his private PHR. The patient imports this document and uses the information in it to update the content of their PHR: e.g., by applying the changes recorded in the PHR Update appropriately .

Postcondition: The patient's PHR is up to date.

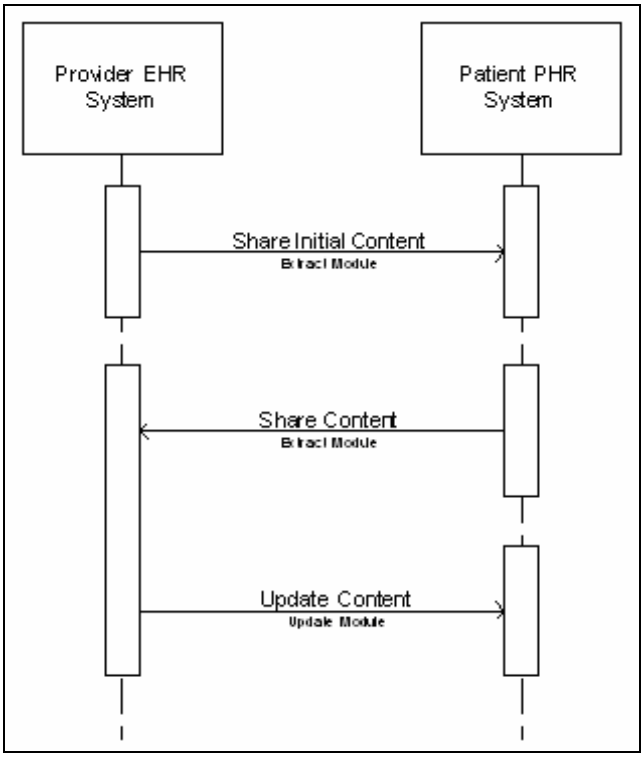


Figure 4.8-1 Basic Process Flow in XPHR Profile

4.9 Grouping with Other Actors

4.9.1 Cross Enterprise Document Sharing, Media Interchange and Reliable Messaging

Actors from the ITI XDS, XDM and XDR profiles embody the Content Creator and Content Consumer sharing function of this profile. A Content Creator or Content Consumer may be grouped with appropriate actors from the XDS, XDM or XDR profiles to exchange the content described therein. The metadata sent in the document sharing or interchange messages has specific relationships or dependencies (which we call bindings) to the content of the clinical document described in the content profile.

The Patient Care Coordination Technical Framework defines the bindings to use when grouping the Content Creator of this Profile with actors from the IHE ITI XDS, XDM or XDR Integration Profiles.

Content	Binding	Actor	Optionality
PHR Extract	Medical Document Binding to XDS, XDM and XDR	Content Creator	R
		Content Consumer	R
PHR Update	Medical Document Binding to XDS, XDM and XDR	Content Creator	O
		Content Consumer	R

Table 4.9-1 XPHR Content Binding

4.9.2 Document Digital Signature (DSG)

Content Creator actors should digitally sign all documents using the Digital Signature (DSG) Content Profile.

Content Consumer actors should verify the Digital Signature of the submission set before use of the information it contains.

4.10 Requirements of XPHR Actors

This section describes the specific requirements for each Actor defined within this profile. Specific details can be found in Volume 1 and Volume 2 of the technical framework.

4.10.1 Content Creator

1. A Content Creator shall be able to create a PHR Extract according to the specification for that content profile found in PCC TF-2.
2. A Content Creator implementing the Update option shall be able to create a PHR Update according to the specification for that content profile found in PCC TF-2.
3. A Content Creator shall be grouped with the Time Client Actor, and shall synchronize its clock with a Time Server.
4. A Content Creator shall be grouped with the Secure Node or Secure Application Actor of the ATNA profile.
5. All activity initiated by the application implementing the Content Creator shall generate the appropriate audit trail messages as specified by the ATNA Profile. The bare minimum requirements of a Content Creator are that it be able to log creation and export of clinical content.
6. A Content Creator shall use secure communications for any document exchanges, according to the specifications of the ATNA profile.

4.10.2 Content Consumer

1. A Content Consumer shall be able to consume a PHR Extract and a PHR Update.
2. A Content Consumer shall implement the View Option or Discrete Data import option, or both.
3. A Content Consumer that implements the Document Import or Section Import Option shall implement the View Option as well.
4. A Content Consumer that implements the View option shall be able to:
   c. Demonstrate rendering of the document for display.
   d. Print the document.
   e. Display the document with its original stylesheet.
   f. Support traversal of any links contained within the document.
5. A Content Consumer that implements the Document Import Option shall:
   a. Store the document.
   b. Demonstrate the ability to access the document again from local storage.
6. A Content Consumer that implements the Section Import Option shall offer a means to import one or more document sections into the patient record as free text.
7. A Content Consumer that implements the Discrete Data Import Option shall offer a means to import structured data from one or more sections of the document.
8. A Content Consumer Actor shall be grouped with the Time Client Actor, and shall synchronize its clock with a Time Server.
9. A Content Consumer shall be grouped with the Secure Node or Secure Application Actor of the ATNA profile.
10. All activity initiated by the application implementing the Content Consumer shall generate the appropriate audit trail messages as specified by the ATNA Profile. The bare minimum requirements of a Content Consumer are that it be able to log views or imports of clinical content.
11. A Content Consumer shall use secure communications for any document exchanges, according to the specifications of the ATNA profile.
12. Emergency Department Referral Integration Profile (EDR)

Physicians frequently determine that patients either onsite, or calling in, should proceed directly to an emergency department for care. The referring physician has valuable data that can inform ED providers, including the history of the current problem, past medical problems, medications, allergies, and frequently a concrete assessment and plan for the patient such as hospital admission. Unfortunately, this information is inconsistently relayed to the ED provider who ultimately cares for the patient. Currently, this transfer of

care requires verbal transfer of extensive information. Unfortunately, the ED provider recording the information may not be the person who will ultimately care for the patient, may not document sufficient detail, or may forget to document any information at all.

Loss of this data can lead to costly over-testing in the ED, or worse, an inappropriate disposition for the patient.

Using an EHR, an ED Referral is created; including the nature of the current problem, past medical history, and medications. Upon arrival of the patient to the ED, the patient is identified as a referral, and the transfer document is incorporated into the EDIS.

This profile may be used to cover a wide variety of ED referral situations, for example, primary care provider to ED Referral, Long term care to ED referral, or even ED to ED referral (as in the case of transfer from a level 2 Critical care facility to a level 1 facility).

4.11 Actors/Transaction

There are two actors in the EDR profile, the Content Creator and the Content Consumer. Content is created by a Content Creator and is to be consumed by a Content Consumer. The sharing or transmission of content from one actor to the other is addressed by the appropriate use of IHE profiles described below, and is out of scope of this profile. A Document Source or a Portable Media Creator may embody the Content Creator Actor. A Document Consumer, a Document Recipient or a Portable Media Importer may embody the Content Consumer Actor. The sharing or transmission of content or updates from one actor to the other is addressed by the use of appropriate IHE profiles described in the section on Content Bindings with XDS, XDM and XDR.

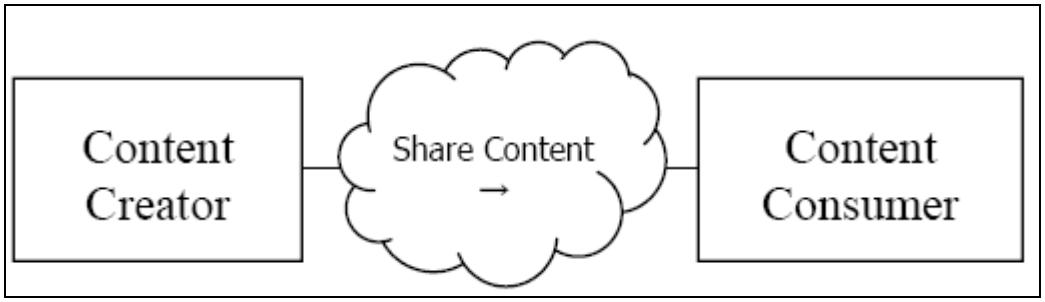


Figure 4.11-1 EDR Actor Diagram

4.12 Options

Actor	Option
Content Consumer	View Option (1)
	Document Import Option (1)
	Section Import Option (1)
	Discrete Data Import Option (1)

Table 4.12-1 EDR Options

Note 1: The Actor shall support at least one of these options.

4.13 Content Consumer Options

4.13.1 View Option

This option defines the processing requirements placed on Content Consumers for providing access, rendering and management of the medical document. See the View Option in PCC TF-2 for more details on this option.

4.13.1.1

A Content Creator Actor should provide access to a style sheet that ensures consistent rendering of the medical document content as was displayed by the Content Consumer Actor.

The Content Consumer Actor shall be able to present a view of the document using this style sheet if present.

4.13.2 Document Import Option

This option defines the processing requirements placed on Content Consumers for providing access, and importing the entire medical document and managing it as part of the patient record. See the Document Import Option in PCC TF-2 for more details on this option.

4.13.3 Section Import Option

This option defines the processing requirements placed on Content Consumers for providing access to, and importing the selected section of the medical document and managing them as part of the patient record. See the Section Import Option in PCC TF-2 for more details on this option.

4.13.4 Discrete Data Import Option

This option defines the processing requirements placed on Content Consumers for providing access, and importing discrete data from selected sections of the medical document and managing them as part of the patient record. See the Discrete Data Import Option in PCC TF-2 for more details on this option.

4.14 Coded Terminologies

This profile supports the capability to record entries beyond the IHE required coding associated with structured data. Content Creators and Content Consumers may choose to utilize coded data, but interoperability at this level requires an agreement between the communicating parties that is beyond the scope of this Profile.

To facilitate this level of interoperability, the applications that implement actors within this profile shall provide a link to their HL7 conformance profile within their IHE

Integration statement. The conformance profile describes the structure of the information which they are capable of creating or consuming. The conformance profile shall state which templates are supported by the application (as a Content Creator or Content Consumer), and which vocabularies and/or data types are used within those templates. It should also indicate the optional components of the entry that are supported.

See the HL7 Refinement Constraint and Localization for more details on HL7 conformance profiles.

4.15 ED Referral Document Content Module

An ED Referral content document is a type of referral summary, and also incorporates the constraints defined for referral summaries found in a Referral Summary as described in PCC TF-2. In addition, the ED Referral content profile includes additional information to support recording the mode of transportation, estimated time of arrival, and proposed disposition.

4.16 ED Referral Process Flow

4.16.1 Use Case 1: Provider to Emergency Department Referral

This use case involves a "collaborative" transfer of care for the referral of a patient from a care provider to the emergency department. This use case is a central component of an "e-referral" process, which typically requires an appropriate level of agreement and collaboration between the two parties prior to the actual transfer of clinical information being initiated.

Preconditions: The referring provider has an EMR system with capability to write notes and manage data elements, and share information. The specific data elements managed by the providers EMR are expected to be the source for the information used in creating the medical summary document related to this transfer of care. A variety of EMR implementations and usage by clinicians may result in some variability in the content of the medical summary. The receiving ED provider has an EDIS system with the capability to share information.

Events: A provider sees a patient, or has spoken with the patient or a family member, and has decided to refer the patient to an ED. The provider creates an ED Referral summary document, and shares it. The detailed content of the medical summary to support this use case is detailed as part of the document content profile specification.

Post conditions: The ED physician retrieve the Documents and views them, optionally importing data. Import assumes the specialist has an EDIS system with the capability for managing those discrete data elements.

Steps to identify the ED and obtain insurance preauthorization have been placed out of scope for this Integration Profile.

4.17 Grouping with Other Profile Actors

4.17.1 Cross Enterprise Document Sharing, Media Interchange and Reliable Messaging

Actors from the ITI XDS, XDM and XDR profiles embody the Content Creator and Content Consumer sharing function of this profile. A Content Creator or Content Consumer may be grouped with appropriate actors from the XDS, XDM or XDR profiles to exchange the content described therein. The metadata sent in the document sharing or interchange messages has specific relationships or dependencies (which we call bindings) to the content of the clinical document described in the content profile.

The Patient Care Coordination Technical Framework defines the bindings to use when grouping the Content Creator of this Profile with actors from the IHE ITI XDS, XDM or XDR Integration Profiles.

Content	Binding	Actor	Optionality
ED Referral	Medical Document Binding to XDS, XDM and XDR	Content Creator	R
		Content Consumer	R

Table 4.17-1 EDR Content Binding

4.18 Requirements of EDR Actors

This section describes the specific requirements for each Actor defined within this profile. Specific details can be found in Volume 1 and Volume 2 of the technical framework.

4.18.1 Content Creator

1. A Content Creator shall be able to create an ED Referral according to the specification for that content profile found in PCC TF-2.
2. A Content Creator implementing the Update option shall be able to create a PHR Update according to the specification for that content profile found in PCC TF-2.
3. A Content Creator shall be grouped with the Time Client Actor, and shall synchronize its clock with a Time Server.
4. A Content Creator shall be grouped with the Secure Node or Secure Application Actor of the ATNA profile.
5. All activity initiated by the application implementing the Content Creator shall generate the appropriate audit trail messages as specified by the ATNA Profile. The bare minimum requirements of a Content Creator are that it be able to log creation and export of clinical content.
6. A Content Creator shall use secure communications for any document exchanges, according to the specifications of the ATNA profile.

4.18.2 Content Consumer

1. A Content Consumer shall implement the View Option or Discrete Data import option, or both.
2. A Content Consumer that implements the Document Import or Section Import Option shall implement the View Option as well.
3. A Content Consumer that implements the View option shall be able to:
   c. Demonstrate rendering of the document for display.
   d. Print the document.
   e. Display the document with its original stylesheet.
   f. Support traversal of any links contained within the document.
4. A Content Consumer that implements the Document Import Option shall:
   a. Store the document.
   b. Demonstrate the ability to access the document again from local storage.
5. A Content Consumer that implements the Section Import Option shall offer a means to import one or more document sections into the patient record as free text.
6. A Content Consumer that implements the Discrete Data Import Option shall offer a means to import structured data from one or more sections of the document.
7. A Content Consumer Actor shall be grouped with the Time Client Actor, and shall synchronize its clock with a Time Server.
8. A Content Consumer shall be grouped with the Secure Node or Secure Application Actor of the ATNA profile.
9. All activity initiated by the application implementing the Content Consumer shall generate the appropriate audit trail messages as specified by the ATNA Profile. The bare minimum requirements of a Content Consumer are that it be able to log views or imports of clinical content.
10. A Content Consumer shall use secure communications for any document exchanges, according to the specifications of the ATNA profile.

5 Preprocedure History and Physical Integration Profile (PPHP)

The PPHP Profile is not being released for trial implementation. Components of this profile have been incorporated into the technical framework for use with other content profiles, and these remain in Volume II. It is expected that this profile will be withdrawn from the next revision of the final text.

6 Antepartum Summary Integration Profile (APS)

Obstetric patients in labor and admitted to Labor and Delivery must have a complete summary of their antepartum ambulatory care available at the time of admission to evaluate and / or ameliorate risk. This same data is required at any visit to Labor and Delivery for any other problems or special needs a patient may require.

During the 40 weeks of a typical pregnancy duration, the patient will have an initial History and Physical Examination, followed by repetitive office visits with multiple laboratory studies, imaging (usually ultrasound) studies, and serial physical examinations with recordings of vital signs, fundal height, and the fetal heart rate. As the patient is seen over a finite period in the office, aggregation of specific relevant data important to the evaluation of the obstetric patient upon presentation to Labor and Delivery is caputured on paper forms. The antepartum record contains the most critical information needed including the ongoing Medical Diagnoses, the Estimated Due Date, outcomes of any prior pregnancies, serial visit data on the appropriate growth of the uterus and assessments of fetal well being, authorizations, laboratory and imaging studies. This data must all be presented and evaluated upon entry to the Labor and Delivery Suite to ensure optimal care for the patient and the fetus.

Although the patient and her care provider may plan for a vaginal (natural) method of delivery, there is a substantive chance the delivery route may be surgical, requiring anesthesia and post-surgical care.

Current practice is to copy the patient's (paper) chart at various times during the pregnancy (as at 28 weeks and at 36 weeks of completed gestation), and transport the copies of the chart to the hospital the patient intends to use for delivery. Should the patient arrive prior to the chart copy arriving, or if the chart (or information within the chart) is missing on presentation of the patient to Labor and Delivery (a frequent occurrence), the staff or clinicians repeat laboratory or imaging studies. This results in unwarranted and duplicative tests, is wasteful of time and resources, and leads to dissatisfied patients.

Further, missing or incomplete information about the patient’s clinical status may create a situation where critical information is unavailable to clinicians, which may ultimately result in an injury, inadequate aftercare or other undesirable outcome.

Significantly, a large portion of patients arrive in L&D without complete documentation. In one recent U.S. study , ~70% of patients (with paper charts) arrived in L&D without their current medical record being available. While only one hospital was involved in this study, one can see the extent of the issue, with pregnant patients possibly going to a different hospital than planned (preterm labor, rapid labor and unable to make it to the planned delivery hospital, or visiting a distant city), moving mid-care, or with a covering physician (rather than the primary obstetrician) on call.

In a Swedish study done in the 1990’s, critical data on paper records were incomplete from 45 to 87.5% of the time. Thus, availability of current medical records remains a significant problem for most hospital Labor and Delivery units; availability of key information electronically will significantly enhance patient safety.

6.1 Technical Approach

The Antepartum Summary is is a content profile that is intended to eventually sit within a larger folder structure that contains documents related to Antepartum care which will be defined in future years called the Antepartum Record. In addition to the APS content, related content profiles would include (existing and new):

- Intake patient questionnaire
- Intake History and Physical (including surgical and relevant social history)
- Summary of OB-specific Ambulatory Visit Data (this profile)
- Obstetric related Laboratory Reports
- Obstetric related Imaging Reports
- Obstetric related Consultation Reports
- Non Stress Test (NST) Reports
- NST Waveforms (may be covered by DICOM)
- Patient Consent Forms for Performance of Procedures
- Payer Authorization Forms

Although the scope of this content profile is limited to the Antepartum Ambulatory Prenatal Care, this discussion illustrates the need to view the aggregation of documents for L&D as the center of multiple related documents and to include in the content profile the mechanisms for specifically referencing these document types.

6.2 Stakeholders

The stakeholders who use this document for decision making in the course of patient care include:

- Obstetrician
- Perinatologist
- Certified Nurse Midwives
- Anesthesiologist
- Labor and Delivery and Peri-operative personnel (L&D staff, surgical coordinator, scheduling, surgical nursing)
- Post-op and Post-Partum Nursing
- Social Work (discharge planning)
- Obstetrician (after discharge)

6.3 Use Cases

6.3.1 Use Case: Antepartum Care Delivery

Pre-condition

The patient's obstetrician sees the patient for her pregnancy in the ambulatory (office) setting. During the pregnancy, the patient is noted to have a medical problem requiring consultation with a Maternal-Fetal Medicine specialist (perinatologist). The office obtains pre-authorization from the insurance payer for the consult, and for the intended or anticipated route of delivery, and transmits that information to both the consultant and to the hospital.

Events

The patient is seen in the obstetrician's office where a complete medical and relevant social history are taken by the nurse and recorded in the office EHR, incorporating data from the perinatologist's consultation report as appropriate. Laboratory and imaging reports ordered by the perinatologist as well as the perinatologist's consultation report are displayed electronically to the obstetrician. The obstetrician reviews the consultation report from the perinatologist's office and imaging studies ordered by the perinatologist along with data recorded by the nurse. Physical exam reveals some abnormalities. The obstetrician orders additional laboratory studies, and sends the patient to the hospital to Labor and Delivery.

When the laboratory results return, the physician completes the admission H&P, Allergies, Medications, includes the data prepared or ordered by the perinatologist, and makes it available to L&D. This data includes an assessment of the patient's health status, and the requisite data summarized from the antepartum care given. The charge nurse for L&D documents that the complete collection of documents needed is available. The Post-Partum discharge planning is notified and assures that there is a suitable environment with appropriate support for post-delivery after-care.

Post-condition

The Pre-delivery H&P and Antepartum Summary with appropriate relationships to the Perinatologist Consultation, and all the antepartum laboratory and imaging studies are available to the obstetrician and the birthing center personnel for incorporation into their respective EHRs. The H&P is also available to the patient for viewing and incorporation into the patient's PHR, and into the newborn baby's PHR. For the APS profile, summary content is available to the obstetrician, with a plan for full content to be added in future years through other content profiles that share this use case.

6.4 Actors/Transaction

There are two actors in the APS profile, the Content Creator and the Content Consumer. Content is created by a Content Creator and is to be consumed by a Content Consumer. The sharing or transmission of content from one actor to the other is addressed by the appropriate use of IHE profiles described below, and is out of scope of this profile. A Document Source or a Portable Media Creator may embody the Content Creator Actor. A Document Consumer, a Document Recipient or a Portable Media Importer may embody the Content Consumer Actor. The sharing or transmission of content or updates from one actor to the other is addressed by the use of appropriate IHE profiles described in the section on Content Bindings with XDS, XDM and XDR.

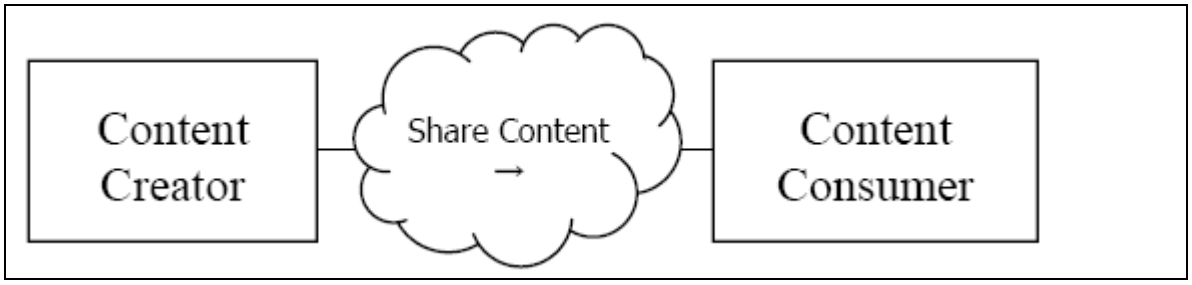


Figure 6.4-1 APS Actor Diagram

6.5 Options

Actor	Option
Content Consumer	View Option (1)
	Document Import Option (1)
	Section Import Option (1)
	Discrete Data Import Option (1)

Table 6.5-1 APS Options

Note 1: The Actor shall support at least one of these options.

6.6 Content Consumer Options

6.6.1 View Option

This option defines the processing requirements placed on Content Consumers for providing access, rendering and management of the medical document. See the View Option in PCC TF-2 for more details on this option.

6.6.1.1 Display Transform

A Content Creator Actor should provide access to a style sheet that ensures consistent rendering of the medical document content as was displayed by the Content Consumer Actor.

The Content Consumer Actor must be able to present a view of the document using this style sheet if present.

6.6.2 Document Import Option

This option defines the processing requirements placed on Content Consumers for providing access, and importing the entire medical document and managing it as part of the patient record. See the Document Import Option in PCC TF-2 for more details on this option.

6.6.3 Section Import Option

This option defines the processing requirements placed on Content Consumers for providing access to, and importing the selected section of the medical document and

managing them as part of the patient record. See the Section Import Option in PCC TF-2 for more details on this option.

6.6.4 Discrete Data Import Option

This option defines the processing requirements placed on Content Consumers for providing access, and importing discrete data from selected sections of the medical document and managing them as part of the patient record. See the Discrete Data Import Option in PCC TF-2 for more details on this option.

6.7 Coded Terminologies

This profile supports the capability to record entries beyond the IHE required coding associated with structured data. Content Creators and Content Consumers may choose to utilize coded data, but interoperability at this level requires an agreement between the communicating parties that is beyond the scope of this Profile.

To facilitate this level of interoperability, the applications that implement actors within this profile shall provide a link to their HL7 conformance profile within their IHE Integration statement. The conformance profile describes the structure of the information which they are capable of creating or consuming. The conformance profile shall state which templates are supported by the application (as a Content Creator or Content Consumer), and which vocabularies and/or data types are used within those templates. It should also indicate the optional components of the entry that are supported.

See the HL7 Refinement Constraint and Localization for more details on HL7 conformance profiles.

6.8 Antepartum Summary Content Module

An Antepartum Summary is a type of medical summary, and also incorporates the constraints defined for medical summaries found in a Medical Summary as described in PCC TF-2. In addition, the Antepartum Summary content profile includes additional information to support recording information specific to the ongoing care of a pregnant patient.

6.9 Grouping

6.9.1 Cross Enterprise Document Sharing, Media Interchange and Reliable Messages

Actors from the ITI XDS, XDM and XDR profiles embody the Content Creator and Content Consumer sharing function of this profile. A Content Creator or Content Consumer may be grouped with appropriate actors from the XDS, XDM or XDR profiles to exchange the content described therein. The metadata sent in the document sharing or interchange messages has specific relationships or dependencies (which we call bindings) to the content of the clinical document described in the content profile.

The Patient Care Coordination Technical Framework defines the bindings to use when grouping the Content Creator of this Profile with actors from the IHE ITI XDS, XDM or XDR Integration Profiles.

Content	Binding	Actor	Optionality
Antepartum Summary	Medical Document Binding to XDS, XDM and XDR	Content Creator	R
		Content Consumer	R

Table 6.9-1 APS Bindings

6.9.2 Notification of Document Availability (NAV)

A Document Source should provide the capability to issue a Send Notification Transaction per the ITI Notification of Document Availability (NAV) Integration Profile in order to notify one or more Document Consumer(s) of the availability of one or more documents for retrieval. One of the Acknowledgement Request options may be used to request from a Document Consumer that an acknowledgement should be returned when it has received and processed the notification. A Document Consumer should provide the capability to receive a Receive Notification Transaction per the NAV Integration Profile in order to be notified by Document Sources of the availability of one or more documents for retrieval. The Send Acknowledgement option may be used to issue a Send Acknowledgement to a Document Source that the notification was received and processed.

6.9.3 Document Digital Signature (DSG)

When a Content Creator Actor needs to digitally sign a document in a submission set, it shall support the Digital Signature (DSG) Content Profile as a Document Source. When a Content Consumer Actor needs to verify a Digital Signature, it shall support the Digital Signature (DSG) Content Profile as a Document Consumer.

6.10 Requirements of APS Actors

This section describes the specific requirements for each Actor defined within this profile. Specific details can be found in Volume 1 and Volume 2 of the technical framework.

6.10.1 Content Creator

1. A Content Creator shall be able to create an Antepartum Summary according to the specification for that content profile found in PCC TF-2.
2. A Content Creator shall be grouped with the Time Client Actor, and shall synchronize its clock with a Time Server.

3. A Content Creator shall be grouped with the Secure Node or Secure Application Actor of the ATNA profile.
4. All activity initiated by the application implementing the Content Creator shall generate the appropriate audit trail messages as specified by the ATNA Profile. The bare minimum requirements of a Content Creator are that it be able to log creation and export of clinical content.
5. A Content Creator shall use secure communications for any document exchanges, according to the specifications of the ATNA profile.

6.10.2 Content Consumer

1. A Content Consumer shall implement the View Option or Discrete Data import option, or both.
2. A Content Consumer that implements the Document Import or Section Import Option shall implement the View Option as well.
3. A Content Consumer that implements the View option shall be able to:
   a. Demonstrate rendering of the document for display.
   b. Print the document.
   c. Display the document with its original stylesheet.
   d. Support traversal of any links contained within the document.
4. A Content Consumer that implements the Document Import Option shall:
   a. Store the document.
   b. Demonstrate the ability to access the document again from local storage.
5. A Content Consumer that implements the Section Import Option shall offer a means to import one or more document sections into the patient record as free text.
6. A Content Consumer that implements the Discrete Data Import Option shall offer a means to import structured data from one or more sections of the document.
7. A Content Consumer Actor shall be grouped with the Time Client Actor, and shall synchronize its clock with a Time Server.
8. A Content Consumer shall be grouped with the Secure Node or Secure Application Actor of the ATNA profile.
9. All activity initiated by the application implementing the Content Consumer shall generate the appropriate audit trail messages as specified by the ATNA Profile. The bare minimum requirements of a Content Consumer are that it be able to log views or imports of clinical content.
10. A Content Consumer shall use secure communications for any document exchanges, according to the specifications of the ATNA profile.

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7 Emergency Department Encounter Summary Integration Profile (EDES)

Emergency Department Encounter Summary (EDES) as a summary of the patient's current health status and a summary of care rendered in the ED between arrival and ED departure. The EDES is not intended to replace the ED Chart as a complete, legal document of care, but is a collection of medical summaries with focused scope that can be used to fulfill a number of collaborative transfers of care. The ED Encounter Summary may include diagnostic tests performed during the ED encounter, as well as documentation of initial ED referral (a 2006 IHE work product), prehospital (EMS) records (IHE roadmap 2008), and the consultations of other providers.

Data released by the Centers for Disease Control and Prevention (CDC) estimates that there were over 110 million emergency department visits in 2004, making the emergency department chart (hereafter called Encounter Summary) one of the most common medical summaries in use today. Currently, the ED Encounter Summary remains largely a paper based artifact, and when produced by an Emergency Department information system (EDIS) is almost exclusively delivered as unstructured or loosely structured text. The ED chart is used to communicate the details of an emergency department visit in a variety of ways. The chart is most frequently faxed or mailed to primary care providers, and is increasingly archived electronically to hospital clinical data repositories. The original (or a copy) must accompany the patient to the ward upon hospital admission where is can be reviewed by hospital providers, or a copy may be sent with the patient on transfer from ED to ED or from ED to other medical treatment facilities. Unfortunately, these frequently become lost or misplaced. ED Encounter Summarys have no standardized format, and may be frequently be difficult to read by users unfamiliar with their formatting. None yet carry any semantic meaning that could be consumed by a receiving EHR system (EHR-S).

The production and delivery of the ED Encounter Summary solves a number of problems, including:

- Communication with and transfer of care back to the patient's primary care physician.
- Communication with care providers in the inpatient setting for patients admitted to the hospital from the emergency department.

The ED Encounter Summary could also be employed in:

- Transfer of information to hospital and provider billing systems.
- Transfer of information to regulatory and public health agencies requesting data from emergency department encounters.

7.1 Technical Approach

The Emergency Department Encounter Summary is a folder in XDS that defines a collection of documents. Several content profiles must be incuded to represent the various kinds of documents that might be found in the EDES Folder.

These content profiles include:

- **ED Triage Note** – this documents contains data compiled during the ED triage process.
- **ED Nursing Note** – this document contains data complied during the on-going care (after initial triage) of the ED patient.
- **Composite ED Triage and ED Nursing Note** – this document can be used in lieu of individual triage and ED Nursing notes by implementers where both above documents may be consolidated into a single document.
- **ED Physician Note** – this document is a summary view of ED physician documentation.
- **Prehospital Care Report** – this document has been identified as a future work product and is on the PCC Roadmap for 2008.
- **EDR (Emergency Department Referral)** – this document was developed in the 2006 IHE cycle to support referral of a patient to the emergency department.
- **Diagnostic Imaging Reports** – shall be shared using XDS-I.
- **Lab Reports** – Laboratory reports shall be shared using XD*-LAB.
- **Consultations** – future document type specification.
- **Transfer Summary** – future document type specification.
- **Summary of Death** – future document type specification.

7.1.1 Authorship and Attestation

Each of the documents described above may have different authors. In some cases a single document can have multiple authors. Local policies may require certain documents to be attested to (signed) by the responsible provider, which may again be different from the author or authors. The content profiles allow for multiple authors to be recorded, and for the attestation (signature) to be provided according to the local policy.

7.2 Use Case -- Emergency Department Visit

This use case presumes the patient is cared for at a hospital facility with an EDIS as well as a hospital information system. Additionally, the patient's primary care provider is also assumed to posses an interoperable EHR system. This use case begins upon the arrival of the patient to the emergency department. Data including mode of arrival, chief complaint, and other arrival data are manually entered into the EDIS. Additional data including past medical problems, medications and allergies, are obtained in one of the following ways:

1. Entered manually into the EDIS by the triage nurse
2. Imported from a legacy ED encounter within the EDIS
3. Imported from the hospital information system or CDR, perhaps using Query for Existing Data.

4. Imported from an Emergency Department Referral (IHE 2006-2007)
5. Imported using PHR extract from portable media (IHE 2006-2007).
6. Imported from a prehospital EMS report (Emergency Medical Services (EMS) to Emergency Dept Data Transfer, PCC Roadmap 2008-2009)

The patient undergoes assessments by a triage nurse, is assigned a triage category (i.e. emergent, urgent, non-urgent). The patient is then registered and demographic data is obtained. One taken to the treatment area, the patient undergoes additional assessments by a primary RN, and seen by an ED physician who performs a history and physical, orders various diagnostic tests, determines a course of therapy, orders medications to be administered in the ED and performs procedures on the patient. Upon completion of ED care, the patient is either admitted to the hospital, discharged from the ED, or transferred to another facility. Hence, the use case can take one of three branches:

1. If admitted, the EDES is sent to the hospital information system where it can be viewed by providers, or read by the EHR system so that medical summary data and details of care rendered in the ED available to inpatient providers.
2. If the patient is discharged the EDES is sent to the patients primary care physician as a summary of care rendered during the ED encounter.
3. If the patient is transferred to another facility, the EDES is posted to the RHIO and made available for providers at the receiving facility.

7.3 Example

Mr. John Smith, a longstanding patient of Dr. Mark Klein, is 62 year old man with hypertension and diabetes who awoke with acute onset of fever, right-sided chest pain and cough. He presents to the IHE ED via EMS where he is triaged by nurse Karen Ross who collects his past medical history, medications, allergies, mode of arrival, and inputs this data into the EDIS. Mr. Smith is taken directly to the treatment area where he is assigned to nurse Barbara Reiter who obtains vital signs, baseline pulse oximetry, places the patient on oxygen, and obtains IV access. She documents her assessments and interventions in the EDIS. The patient is seen by Dr. William Reed who performs and records a history and physical examination, orders an ECG, chest radiograph, CBC, electrolytes, and blood cultures. The chest radiograph reveals bi-lobar pneumonia and the ECG is slightly abnormal. Ceftriaxone 1gm IV plus Azythromycin 500mg PO are administered. After multiple attempts by Dr. Reed to contact Dr. Klein, Mr. Smith is admitted to a intermediate care bed under the care of Dr. Herman Edwards the IHE hospitalist. Upon hospital admission, Dr. Reed completes the record and, as the responsible attending physician, electronically signs the ED chart authenticating the EDES. In this institution, the initial ED attending physician to see the patient is the legal authenticator for all documents, and may only delegate this responsibility to another provider through a formal transfer of care. The EDES is posted to the RHIO and also sent to the hospital information system. Using the HIS, the nurse on the intermediate care ward accesses the record and notes the time and administration of antibiotics. When Dr. Klein reaches the office in the morning, his office EHR-S notifies him that his patient was seen in the IHE ED the previous night, and displays the ED Encounter Summary.

7.4 Actors/Transaction

There are two actors in the APS profile, the Content Creator and the Content Consumer. Content is created by a Content Creator and is to be consumed by a Content Consumer. The sharing or transmission of content from one actor to the other is addressed by the appropriate use of IHE profiles described below, and is out of scope of this profile. A Document Source or a Portable Media Creator may embody the Content Creator Actor. A Document Consumer, a Document Recipient or a Portable Media Importer may embody the Content Consumer Actor. The sharing or transmission of content or updates from one actor to the other is addressed by the use of appropriate IHE profiles described in the section on Content Bindings with XDS, XDM and XDR.

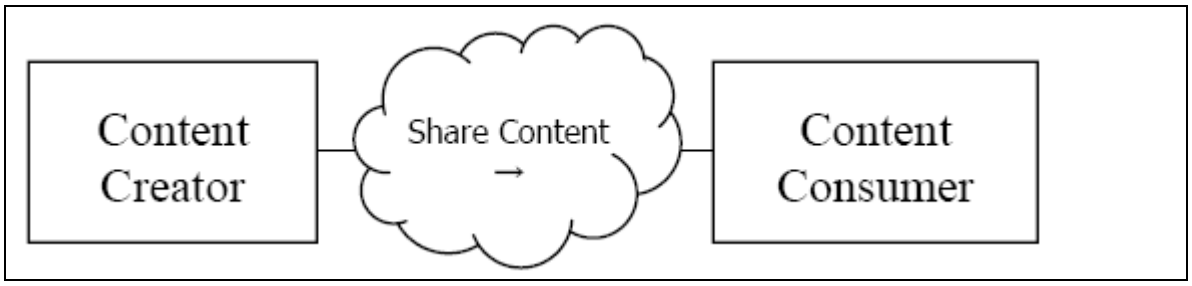

Figure 7.4-1 APS Actor Diagram

7.5 Options

Actor	Option
Content Consumer	View Option (1)
	Document Import Option (1)
	Section Import Option (1)
	Discrete Data Import Option (1)

Table 7.5-1 APS Options

Note 1: The Actor shall support at least one of these options.

7.6 Content Consumer Options

7.6.1 View Option

This option defines the processing requirements placed on Content Consumers for providing access, rendering and management of the medical document. See the View Option in PCC TF-2 for more details on this option.

7.6.1.1

A Content Creator Actor should provide access to a style sheet that ensures consistent rendering of the medical document content as was displayed by the Content Consumer Actor.

The Content Consumer Actor shall be able to present a view of the document using this style sheet if present.

7.6.2 Document Import Option

This option defines the processing requirements placed on Content Consumers for providing access, and importing the entire medical document and managing it as part of the patient record. See the Document Import Option in PCC TF-2 for more details on this option.

7.6.3 Section Import Option

This option defines the processing requirements placed on Content Consumers for providing access to, and importing the selected section of the medical document and managing them as part of the patient record. See the Section Import Option in PCC TF-2 for more details on this option.

7.6.4 Discrete Data Import Option

This option defines the processing requirements placed on Content Consumers for providing access, and importing discrete data from selected sections of the medical document and managing them as part of the patient record. See the Discrete Data Import Option in PCC TF-2 for more details on this option.

7.7 Coded Terminologies

This profile supports the capability to record entries beyond the IHE required coding associated with structured data. Content Creators and Content Consumers may choose to utilize coded data, but interoperability at this level requires an agreement between the communicating parties that is beyond the scope of this Profile.

To facilitate this level of interoperability, the applications that implement actors within this profile shall provide a link to their HL7 conformance profile within their IHE Integration statement. The conformance profile describes the structure of the information which they are capable of creating or consuming. The conformance profile shall state which templates are supported by the application (as a Content Creator or Content Consumer), and which vocabularies and/or data types are used within those templates. It should also indicate the optional components of the entry that are supported.

See the HL7 Refinement Constraint and Localization for more details on HL7 conformance profiles.

7.8 EDES Content Modules

7.8.1 Triage Note

The triage note is a CDA document that may be submitted to an ED Folder in order to record the act of triaging a patient upon presentation to the emergency department. The triage note is designed to support a comprehensive triage assessment, although it is recognized that providers may not capture the entire list of sections, owing to patient presentation, acuity or time constraints.

7.8.2 Nursing Note

The nursing note is a CDA document that may be submitted to an ED Folder in order to record the act of nursing care delivered to a patient in the emergency department. The ED nursing note is designed to support documentation sufficient to support transfer of care. It is recognized that the ED Nursing Note specification is not sufficient to document all medicolegal facets of care, and conversely that providers may not capture the entire list of sections, owing to patient presentation, acuity or time constraints.

7.8.3 Composite Triage and Nursing Note

The composite triage and nursing note is a CDA document that may be submitted to an ED Folder in order to record the act of both triage and nursing care delivered to a patient in the emergency department. The ED nursing note is designed to support documentation sufficient to support transfer of care. It is recognized that the specification is not sufficient to document all medicolegal facets of care, and conversely that providers may not capture the entire list of sections, owing to patient presentation, acuity or time constraints.

7.8.4 ED Physician Note

The ED Physician Note is a CDA document that may be submitted to an ED Folder in order to record the care delivered to a patient in the emergency department. The ED physician note is designed to support documentation sufficient to support transfer of care. It is recognized that the specification is not sufficient to document all medicolegal facets of care, and conversely that providers may not capture the entire list of sections, owing to patient presentation, acuity or time constraints.

7.9 Grouping

7.9.1 Cross Enterprise Document Sharing, Media Interchange and Reliable Messages

Actors from the ITI XDS, XDM and XDR profiles embody the Content Creator and Content Consumer sharing function of this profile. A Content Creator or Content Consumer may be grouped with appropriate actors from the XDS, XDM or XDR profiles to exchange the content described therein. The metadata sent in the document sharing or interchange messages has specific relationships or dependencies (which we call bindings) to the content of the clinical document described in the content profile.

The Patient Care Coordination Technical Framework defines the bindings to use when grouping the Content Creator of this Profile with actors from the IHE ITI XDS, XDM or XDR Integration Profiles.

Content	Binding	Actor	Optionality
Triage Note	Medical Document Binding to XDS, XDM and XDR	Content Creator	R
		Content Consumer	R
Nursing Note	Medical Document Binding to XDS, XDM and XDR	Content Creator	R
		Content Consumer	R
Composite Triage and Nursing Note	Medical Document Binding to XDS, XDM and XDR	Content Creator	R
		Content Consumer	R
ED Physician Note	Medical Document Binding to XDS, XDM and XDR	Content Creator	R
		Content Consumer	R

Table 7.9-7 Content Bindings for grouped profiles/actors

7.9.2 Notification of Document Availability (NAV)

A Document Source should provide the capability to issue a Send Notification Transaction per the ITI Notification of Document Availability (NAV) Integration Profile in order to notify one or more Document Consumer(s) of the availability of one or more documents for retrieval. One of the Acknowledgement Request options may be used to request from a Document Consumer that an acknowledgement should be returned when it has received and processed the notification. A Document Consumer should provide the capability to receive a Receive Notification Transaction per the NAV Integration Profile in order to be notified by Document Sources of the availability of one or more documents for retrieval. The Send Acknowledgement option may be used to issue a Send Acknowledgement to a Document Source that the notification was received and processed.

7.9.3 Document Digital Signature (DSG)

When a Content Creator Actor needs to digitally sign a document in a submission set, it shall support the Digital Signature (DSG) Content Profile as a Document Source. When a Content Consumer Actor needs to verify a Digital Signature, it shall support the Digital Signature (DSG) Content Profile as a Document Consumer.

7.10 Requirements of EDES Actors

This section describes the specific requirements for each Actor defined within this profile. Specific details can be found in Volume 1 and Volume 2 of the technical framework.

7.10.1 Content Creator

1. A Content Creator shall be able to create:
   a. a Triage Note, ED Nursing Note and an ED Physician Note, OR

b. a Composite Triage and Nursing Note and an ED Physician Note, according to the specifications for those content profiles found in PCC TF-2.

2. A Content Creator shall be grouped with the Time Client Actor, and shall synchronize its clock with a Time Server.

3. A Content Creator shall be grouped with the Secure Node or Secure Application Actor of the ATNA profile.

4. All activity initiated by the application implementing the Content Creator shall generate the appropriate audit trail messages as specified by the ATNA Profile. The bare minimum requirements of a Content Creator are that it be able to log creation and export of clinical content.

5. A Content Creator shall use secure communications for any document exchanges, according to the specifications of the ATNA profile.

7.10.2 Content Consumer

1. A Content Consumer shall be able to consume a Triage Note, Nursing Note, Composite Triage and Nursing Note and an ED Physician Note.

2. A Content Consumer shall implement the View Option or Discrete Data import option, or both.

3. A Content Consumer that implements the Document Import or Section Import Option shall implement the View Option as well.

4. A Content Consumer that implements the View option shall be able to:

   a. Demonstrate rendering of the document for display.

   b. Print the document.

   c. Display the document with its original stylesheet.

   d. Support traversal of any links contained within the document.

5. A Content Consumer that implements the Document Import Option shall:

   a. Store the document.

   b. Demonstrate the ability to access the document again from local storage.

6. A Content Consumer that implements the Section Import Option shall offer a means to import one or more document sections into the patient record as free text.

7. A Content Consumer that implements the Discrete Data Import Option shall offer a means to import structured data from one or more sections of the document.

8. A Content Consumer Actor shall be grouped with the Time Client Actor, and shall synchronize its clock with a Time Server.

9. A Content Consumer shall be grouped with the Secure Node or Secure Application Actor of the ATNA profile.

10. All activity initiated by the application implementing the Content Consumer shall generate the appropriate audit trail messages as specified by the ATNA Profile. The bare minimum requirements of a Content Consumer are that it be able to log views or imports of clinical content.

11. A Content Consumer shall use secure communications for any document exchanges, according to the specifications of the ATNA profile.

8 Functional Status Assessment Integration Profile (FSA)

The Functional Status Assessment Profile (FSA) supports the transfer of assessment information between practictioners during transfers of care across enterprises.

In the context of clinical documentation, the functional status assessment describes the patient's current level of functioning at the time the document was created.

Functional status includes information concerning:

- Skin assessment
- Physical Functioning Assessment
- Assessment of Activities of Daily Living (bathing, feeding, dressing and grooming)
- Pain Management
- Mood and behavior patterns

The Institute of Medicine[1] has determined that a high risk for medical errors occurs during the transfers of patient care between practitioners, cross-enterprise or intra-enterprise. Continuity of care requires provision of assessments to be available to the receiving practitioner for critical decision making. The transfer of physician documentation provides much of the medical/physiologic condition information. Transfer of nursing documentation provides human response (psychological, social, emotional, physiological and spiritual) of patient/family to changing conditions. Both types of documentation support continuity of patient care as each patient moves through the continuum.

This profile describes how to convey functional status information using four scales which support assessments and comparison of assessments over time. This information informs caregivers making critical decisions. The functional status assessments are conveyed using medical summary documents that have been previously defined by IHE in the XDS-MS, XPHR and EDR profiles.

This profile includes an initial interoperable entry to manage continuity of care with the use of four scales which support recording of assessments and comparisons of those with prior assessments. This information provides caregivers information required for critical decision making. The profile demonstrates the collection and exchange of standardized assessment information as it is exchanged across a variety of cross-enterprise and care settings.

[1] See http://books.nap.edu/execsumm_pdf/9728.pdf

8.1 Options

Actor	Option
Content Consumer	No Options Defined
Content Creator	Braden Scale Option[1]
	Geriatric Depression Score Option[1]
	Minimum Data Set[1]

Table 8.1-1 Functional Status Assessment Options

Note 1: At least one of these options must be implemented.

8.2 Coded Terminologies

This profile supports the capability to record entries beyond the IHE required coding associated with structured data. Content Creators and Content Consumers may choose to utilize coded data, but interoperability at this level requires an agreement between the communicating parties that is beyond the scope of this Profile.

To facilitate this level of interoperability, the applications that implement actors within this profile shall provide a link to their HL7 conformance profile within their IHE Integration statement. The conformance profile describes the structure of the information which they are capable of creating or consuming. The conformance profile shall state which templates are supported by the application (as a Content Creator or Content Consumer), and which vocabularies and/or data types are used within those templates. It should also indicate the optional components of the entry that are supported.

See the HL7 Refinement Constraint and Localization for more details on HL7 conformance profiles.

8.3 Content Modules

Content modules describe the content of a payload found in an IHE transaction. Content profiles are transaction neutral. They do not have dependencies upon the transaction that they appear in.

8.3.1 Coded Functional Status Assessment

The coded functional status assessment section contains one or more subsections that include coded functional status assessment information. This is a section content profile that is intended to be used in Medical Documents of various type, including those described in the XDS-MS, EDR, XPHR and EDER profiles. The subsections that are defined by this content profile are further described below.

8.3.1.1 Numeric Pain Scale

Using the Numeric Pain Scale (NRS 11), a Patient rates his/her pain from 0 to 10, with 0 representing no pain and 10 representing the worst possible pain. This scale is used for

age 5 years and older and is the preferred pain scale for many older healthy adults. The References section below provides more information regarding various research and evaluations of this measure.

This content profile describes how a Pain Scale assessment is reported in a CDA Document.

8.3.1.2 Braden Scale For Predicting Pressure Sore Risk

The Braden Scale For Predicting Pressure Sore Risk is a summated rating scale made up of six subscales scored from 1-3 or 4, for total scores that range from 6-23. The subscales measure impact of functional capabilities of the patient that contribute to either higher intensity and duration of pressure or lower tissue tolerance for pressure. A lower Braden Scale Score indicates lower levels of functioning and, therefore, higher levers of risk for pressure ulcer development. A copy of the Braden Scale For Predicting Pressure Sore Risk can be found in Appendix D below.

This content profile illustrates how to record the Braden Score within a CDA document.

8.3.1.3 Geriatric Depression Scale

While there are many instruments available to measure depression, the Geriatric Depression Scale (GDS), first created by Yesavage et al., (Stanford University) has been tested and used extensively with the older population. It is a brief questionnaire in which participants are asked to respond to the 30 questions by answering yes or no in reference to how they felt on the day of administration. Scores of 0 - 9 are considered normal, 10 - 19 indicate mild depression and 20 - 30 indicate severe depression. The GDS may be used with healthy, medically ill and mild to moderately cognitively impaired older adults. It has been extensively used in community, acute and long-term care settings. As for evidence-based research the GDS was found to have 92% sensitivity and 89% specificity when evaluated against diagnostic criteria per the Hartford Institute for Geriatric Nursing. The validity and reliability of the tool have been supported through both clinical practice and research.

This content profile illustrates how to record the Geriatric Depression Scale within a CDA document.

8.3.1.4 Physical Function

The **Minimum Data Set for Long Term Care Version 2.0 (MDS 2.0)** is a federally mandated (in the United States) standard assessment form. This instrument is specified by the Centers for Medicare and Medicaid Services, and requires nursing facilities to conduct a comprehensive, accurate, standardized, reproducible assessment of each resident's functional capacity. Section G Physical Functioning and Structural Problems are included in this profile.

8.4 Process Flow

Three use cases are described in futher detail below.

1. Long-Term Care to Acute Care - describes a use case for assessment information during transfers of care from long term to acute care.
2. Home or Ambulatory Care into Acute Care - describes a use case for assessment information during multiple care transfers.
3. Behavioral - describes a use case for assessment information during transfers of care where information about depression in an older patient is used.

Note:	Italicized text in the use cases below denote information in the use case that provides details regarding patient condition and workflow, but will not be included as part of the content integration profile.

8.4.1 Long-Term Care to Acute Care

This use case describes how the Functional Status Assessment profile impacts the care provided to a nursing home patient who is transferred to an acute care hospital and then back to the long term care environment. It is based on a detailed use case that can be found here: http://wiki.ihe.net/index.php?title=Nursing_Use_Cases#uc1

Primary Actor(s): Discharge nurse in LTC facility, Admitting nurse in acute care facility

Stakeholder(s): Primary Care Physician, Hospitalist

Use Case Overview: A diabetic nursing home patient is transferring from the LTC environment to an in-patient acute care hospital based on deteriorating functional status assessments.

Use Case Scenario

1. A 76 year old resident/patient of a LTC facility has become increasingly weak, lethargic and has a low-grade fever. Resident refuses to get out of bed and is complaining of chills and the nurse noted reddened area on coccyx during assessment. Resident's glucose level is elevated and the maximum sliding-scale dose indicated in medication order is not controlling blood sugar.
    a. Nurse documents current functional assessment.
    b. Nurse documents Braden score.
2. The patient's baseline and serial functional assessment data is sent to the acute care hospital as part of the patient's medical summary.
3. Patient's medical issues are addressed during course of hospitalization (5 days).
4. PCP notified of transfer back to LTC facility and review of patient status including unresolved issues. Patient readied for discharge, EHR documents completed, including current functional status assessment information.
    a. EHR discharge documents sent to LTC.
    b. Patient returns to LTC.

8.4.2 Home or Ambulatory Care into Acute Care

This use case describes how the Functional Status Assessment profile impacts the care provided to an assisted living patient who is transferred to acute care hospital, rehabilitation, and then back to the assisted living environment. It is based on a detailed use case that can be found here:
http://wiki.ihe.net/index.php?title=Nursing_Use_Cases#uc2

Primary Actor(s)

ED Nurse, ED Doctor, Surgeon, Orthopedic nurse in acute care facility, Nurse in rehab facility, Clinical staff in assisted living facility

Secondary Actor(s)

Paramedics, Physical Therapist

Stakeholder(s)

Primary Care Physician, Hospitalist

Use Case Overview

A normally active, older adult in an assisted living community has an accidental fall requiring admission to an acute care facility. Alteration in functional status requires the patient discharge to a nursing home for rehabilitation with the long term goal of returning to assisted living.

Use Case Scenario

1. A 69 year old single male, living in an assisted community, is normally very active and self sufficient and requires only minimal assistance from staff for medication management. While walking outside, the patient falls, right lower extremity alignment changes noted. The patient has a large 10 cm hematoma on his side with bruising that extends down his right hip and leg. A laceration on his forehead noted, possibly from his glasses breaking during the fall. The patient is pale, and complaining of severe pain in his right hip. The patient is unable to move and an ambulance is called. Patient is transferred from the assisted living community to the emergency department at an acute care facility. There is no baseline functional assessment data available from the assisted living community. Medical information is maintained on EHR in assisted living.
    a. Nurse documents functional assessment.
    b. Nurse documents Braden Score.
    c. Nurse documents Numeric Pain Scale. Primary Care Physician is notified of ambulance transfer to acute care facility. ED Referral is created by primary care physician including functional status assessment, Braden Score and Numeric Pain Scale, and sent to acute care facility.
2. After several days of care post total hip surgery, the patient is progressing, but still not able to function independently (at previous baseline). The surgeon

recommends the patient be transferred to a rehabilitation facility for more intense therapy.

a. Series of functional assessments and overall progress reviewed by interdisciplinary team.

b. Plan of care is updated in the electronic health record.

c. Primary care physician is notified of plan to transfer.

d. Patient is prepared for discharge to rehabilitation facility with final assessment completed.

3. The patient's baseline and recent functional status assessments are sent in the discharge summary to the rehabilitation facility.

4. Patient regains strength and is able to transfer, toilet and ambulate with minimal assistance after one week and has not required pain medicine the last 3 days. Surgeon recommends patient for transfer back to assisted living facility.

a. Series of functional assessments and overall progress reviewed by care providers.

b. Primary care physician is notified of plan to transfer patient back to assisted living facility.

c. Patient is prepared for discharge to assisted living facility with final assessment completed.

d. Patient regains strength and is able to transfer, toilet and ambulate with minimal assistance after one week and has not required pain medicine the last 3 days. Surgeon recommends patient for transfer back to assisted living facility.

5. Series of functional assessments and overall progress reviewed by care team. The patient's baseline and recent functional status assessments are sent to the assisted living facility with the discharge summary. Note: Early transfer of health information and plan of care facilitates maximum planning for safety and patient's arrival.

8.4.3 Behavioral

This use case describes how the Functional Status Assessment profile impacts the care provided to a patient who is admitted to a behavioral health facility, and then returns to the home. It is based on a detailed use case that can be found here: http://wiki.ihe.net/index.php?title=Nursing_Use_Cases#uc3

Primary Actor(s)

Psychiatric nurse, Attending physician/hospitalist, Home health nurse

Stakeholder(s)

Primary Care Physician, Outpatient psychiatrist

Use Case Overview

A recently widowed 75 year old woman is admitted to an adult inpatient floor of a behavior health hospital for depression post suicide attempt

1. A 75 year old woman who lives alone and has become increasingly withdrawn since the sudden death of her husband 6 weeks ago took several days worth of medication at one time from her pill pack. A neighbor found the confused elderly woman in the woman's home, and immediately took her to her psychiatrists office. Patient was diagnosed as depressed by her psychiatrist, and was a direct admission by ambulance from her doctor's office to an adult inpatient floor in a behavioral health facility.
2. Psychiatrist notes patient issue regarding depression into electonic health record notes. Patient screened by adult inpatient admission nurse using the geriatric depression scale. Her initial score was 26, indicating severe depression. Patient information was entered into the electronic health record. Nurse documents geriatric depression scale results in the electronic health record.
3. After 5 days, patient is progressing well and responding to therapy. Most recent geriatric depression scale score documented in the electronic health record is 15, indicating mild depression. Nurse documents depression assessment.
4. Patient care conference is done with patient, nurse, social worker and physician. Based on progress, patient will be discharged to home with home health referral.
5. Patient is discharged home with referral including assessments sent to to home health provider.
6. Home health nurse reviews patient status electronically and prepares for visit to patient home.

8.5 Grouping with Other Profile Actors

The Content Creator actor of the FSA profile shall be grouped with a Content Creator actor from either the XDS-MS, XPHR, or EDR Integration profile. The Content Consumer actor of the FSA profile shall be grouped with a Content Consumer actor from either the XDS-MS, XPHR, or EDR Integration profile. The medical summaries created or consumed by these grouped actors shall include a Functional Status section that has been created according to the specifications set forth by this profile.

In requiring a grouping of this profile's actors with actors from other profiles, we are also including all requirements of those actors within this profile.

8.6 Requirements of FSA Actors

This section describes the specific requirements for each Actor defined within this profile. Specific details can be found in Volume 1 and Volume 2 of the technical framework.

8.6.1 Content Creator

1. A Content Creator from the FSA Profile shall be grouped with a Content Creator of the XDS-MS, XPHR or EDR Integration Profiles.
2. A Content Creator shall be able to create Functional Status Assessment according to the specifications for those content profiles found in PCC TF-2.
3. A Content Creator shall be grouped with the Time Client Actor, and shall synchronize its clock with a Time Server.
4. A Content Creator shall be grouped with the Secure Node or Secure Application Actor of the ATNA profile.
5. All activity initiated by the application implementing the Content Creator shall generate the appropriate audit trail messages as specified by the ATNA Profile. The bare minimum requirements of a Content Creator are that it be able to log creation and export of clinical content.
6. A Content Creator shall use secure communications for any document exchanges, according to the specifications of the ATNA profile.

8.6.2 Content Consumer

1. A Content Consumer from the FSA Profile shall be grouped with a Content Consumer of the XDS-MS, XPHR or EDR Integration Profiles.
2. A Content Consumer shall implement the View Option or Discrete Data import option, or both.
3. A Content Consumer that implements the Document Import or Section Import Option shall implement the View Option as well.
4. A Content Consumer that implements the View option shall be able to:
   a. Demonstrate rendering of the document for display.
   b. Print the document.
   c. Display the document with its original stylesheet.
   d. Support traversal of any links contained within the document.
5. A Content Consumer that implements the Document Import Option shall:
   a. Store the document.
   b. Demonstrate the ability to access the document again from local storage.
6. A Content Consumer that implements the Section Import Option shall offer a means to import one or more document sections into the patient record as free text.
7. A Content Consumer that implements the Discrete Data Import Option shall offer a means to import structured data from one or more sections of the document.

8. A Content Consumer Actor shall be grouped with the Time Client Actor, and shall synchronize its clock with a Time Server.
9. A Content Consumer shall be grouped with the Secure Node or Secure Application Actor of the ATNA profile.
10. All activity initiated by the application implementing the Content Consumer shall generate the appropriate audit trail messages as specified by the ATNA Profile. The bare minimum requirements of a Content Consumer are that it be able to log views or imports of clinical content.
11. A Content Consumer shall use secure communications for any document exchanges, according to the specifications of the ATNA profile.

8.7 References

8.7.1 Numerical Rating Scale

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Staton, L. J., Panda, M., Chen, I., Genao, I., Kurz, J, Pasanen, M., Mechaber, A.J., Menon, M., O'Rorke, J., Wood, J., Rosenberg, E., Faeslis, C., Carey, T., Calleson, D., Cykert, S. (2007). When Race Matters: Disagreement in Pain Perception between Patients and their Physicians in Primary Care. *Journal of National Medical Association, 99*(5), 532-538.

Williamson, A., Hoggart, B. (2005). Pain: a review of three commonly used pain rating scales. *Journal of Clinical Nursing*, *14*(7), 798-804.

8.7.2 Braden Scale For Predicting Pressure Sore Risk

A copy of the Braden Scale For Predicting Pressure Sore Risk can be found on the web at http://wiki.ihe.net/images/1/11/Braden.pdf, and also appears in Appendix D of this volume.

A bibliography on the Braden Scale for Predicting Pressure Sore Risk can be found here on the web: http://www.bradenscale.com/bibliography.htm

8.7.3 Geriatric Depression Score

A bibliography on the Geriatric Depression Score can be found here on the web: http://www.stanford.edu/~yesavage/GDS.html

8.7.4 Minimum Data Set

More information on the Minimum Data Set be found here on the web: http://www.cms.hhs.gov/MinimumDataSets20/

9 Query for Existing Data Profile Integration Profile (QED)

The Query for Existing Data Profile (QED) supports dynamic queries for clinical data, , including vital signs, problems, medications, immunizations, diagnostic results, procedures and visit history. A wide variety of systems often need access to dynamic clinical information stored and maintained in an EMR system or other clinical data repository. This profile makes the information widely available to other systems within and across enterprises to support provision of better clinical care. The information made available by this profile can be used to support clinical care, quality reporting, financial transactions, public health reporting, clinical trials, drug interaction checking, and patient qualification for various protocols.

9.1 Technical Approach

The QED profile leverages the existing content modeling defined previously in other IHE document profiles and the HL7 CCD implementation guide to deliver information that is sematically equivalent as a web service using the IHE ITI web services and HL7 web services guidelines.

Classification of Information

The QED profile classifies information into six different categories for the purpose of determining where it might be found.

Common Observations

These are a collection of simple measurements or reported values that can be determined using simple measuring devices (e.g., Height, Weight), or which can be reported by the patient (date of last menstrual period). These measurements do NOT include anything that might be recorded as a problem, allergy, risk, or which requires interpretation, clinical decision making, or diagnostic quality equipment or procedures for performing the measurement.

Diagnostic Results

These are a collection of observations made or performed using laboratory testing equipment, imaging procedures, vision examinations, et cetera.

Problems and Allergies

These are a collection of diagnoses, clinical findings, allergies, or other risk factors that are recorded for the patient. The information may be obtained from patient reports, or through clinical decision making. It includes such information as would be found in social and family history sections of clinical reports. This classfication can be further subdivided into three groups.

Conditions

This is a collection of disease conditions for the patient.

Intolerances

This is a collection of the patient's allergies and other intolerances.

Risk Factors

This is a collection of the patients significant risk factors, as might be established based on a review of family history, social history, occupational exposures, et cetera. By themselves, they may not be indicitave of a disease condition, but could contribute to one.

Medications

This is a collection of the medications that a patient is or has been taking for treatment of one or more conditions.

Immunizations

This is a collection of immunizations that have been given, or which are planned to be given to the patient.

Professional Services

This is a collection of procedures and/or encounters which the patient has participated in, or is expected to participate in.

Each of these major classifications of information can often be found in distinct repositories of information. For example, patient vital signs, problems and allergies may be recorded in simple EHR sytem; diagnostic results in a laboratory or radiology information system; medications in a pharmacy information system, immunizations in an immunization registry, and professional services in a practice management system.

9.2 Actors/Transaction

There are seven actors in this profile, the Clinical Data Consumer, and six different repositories of clinical data, including vitals, problems and allergies, diagnostic results, medications, immunizations, and procedures and visits.

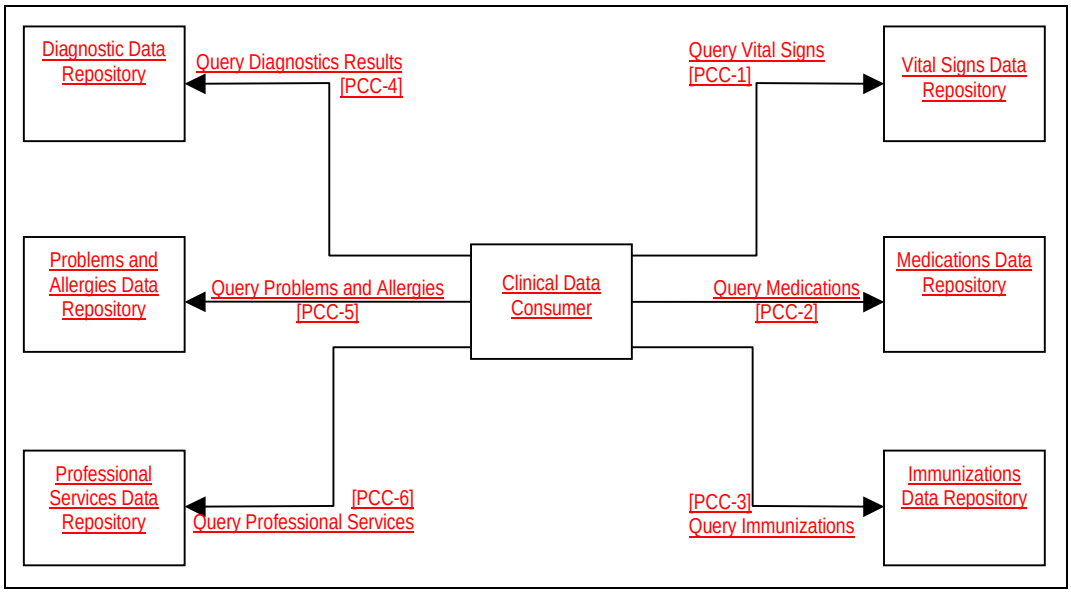

Figure 9.2-1 Query for Existing Data Actor Diagram

The table below lists the transactions for each actor directly involved in the Query for Existing Data Profile. In order to claim support of this Integration Profile, an implementation must perform the required transactions (labeled 'R'). Transactions labeled 'O' are optional. A complete list of options defined by this Integration Profile and that implementations may choose to support is listed below under Options.

Actor	Name	Optionality	Transaction
Clinical Data Consumer	Query Vital Signs	O[1]	PCC-1
	Query Problems and Allergies	O[1]	PCC-2
	Query Diagnostic Data	O[1]	PCC-3
	Query Medications	O[1]	PCC-4
	Query Immunizations	O[1]	PCC-5
	Query Professional Services	O[1]	PCC-6
Vital Signs Data Repository	Query Vital Signs	R	PCC-1
Problems and Allergies Repository	Query Problems and Allergies	R	PCC-2
Diagnostic Data Repository	Query Diagnosic Data	R	PCC-3
Medications Repository	Query Medications	R	PCC-4
Immunizations Repository	Query Immunizations	R	PCC-5
Professional Services Repository	Query Professional Services	R	PCC-6

Table 9.2-1 Query for Existing Data Actors and Transactions

Note [1]: The Actor shall support at least one of these transactions.

9.3 Options

Actor	Option
Vital Signs Data Repository	None Defined
Problems and Allergies Data Repository	
Diagnostic Data Repository	
Medications Data Repository	
Immunizations Data Repository	
Professional Services Repository	
Clinical Data Consumer	Vital Signs Option[1]
	Problems and Allergies Option[1]
	Diagnostic Data Option[1]
	Medications Option[1]
	Immunizations Option[1]
	Professional Services Option[1]

Table 9.3-1 Query for Existing Data Options

Note [1]: The Actor shall support at least one of these options.

9.3.1 Vital Signs Option

A Clinical Data Consumer that implements the Vital Signs Option implements the Query Vital Signs transaction.

9.3.2 Problems and Allergies Option

A Clinical Data Consumer that implements the Problems and Allergies Option implements the Query Problems and Allergies transaction.

9.3.3 Diagnostic Data Option

A Clinical Data Consumer that implements the Diagnostic Data Option implements the Query Diagnostic Data transaction.

9.3.4 Medications Option

A Clinical Data Consumer that implements the Medications Option implements the Query Medications transaction.

9.3.5 Immunizations Option

A Clinical Data Consumer that implements the Immunizations Option implements the Query Immunizations transaction.

9.3.6 Professional Services Option

A Clinical Data Consumer that implements the Immunizations Option implements the Query Professional Services transaction.

9.4 Grouping

9.4.1 Clinical Data Repositories

Any of the repository actors of this profile can be grouped with other repository actors. For example, an EMR might implement all of the repository actors of this profile, while a pharmacy system might implement only the Immunizations and Medications Repository actors.

When actors are grouped in this fashion, it is expected that they will provide appropriate **join** fields to show relationships between different records. For example, when a EMR groups together the Medication Data Repository and Problems and Allergies Data Repository, and recieves a request for Medications, it should also return the Problems, and internal references to those problems that are the reason for prescribing the medication.

9.4.2 Audit Trail and Node Authentication and Consistent Time

All actors of this profile shall be grouped with either the Secure Node or the Secure Application actor, to ensure the security of the information being exchanged. These actors shall also implement Time Client to ensure that consistent time is maintained across systems.

9.4.3 Retrieve Form for Data Capture

When grouped with an Form Filler or Form Manager actor, a Clinical Data Consumer actor shall appropriately populate forms with recently gathered clinical data.

9.4.4 Cross Enterprise Document Sharing

A Repository actor may be grouped with a Cross Enterprise Document Repository actor. Data gathered from clinical documents submitted to the Document Repository can be a source of information returned by the Repository actor. Information returned by the Repository shall include references to all documents used in generating the results.

9.4.5 Content Integration Profiles

A Content Creator may be grouped with a Clinical Data Consumer to obtain some or all of the information necessary to create a Medical Summary based on information found in a Repository.

A Content Creator may be grouped with a Data Repository. When grouped with a Data Repository, the Data Repository Actor shall respond to queries containing the relevant vocabulary codes used by the Content Creator.

9.4.6 Patient Identity Cross Referencing and Patient Demographics Query

A clinical data consumer may be grouped with a Patient Identifier Cross-reference Consumer or a Patient Demographics Consumer actor to resolve patient identifiers prior to submitting queries to a Repository.

Within an enterprise, the need to cross-reference patient identifiers may not be necessary. However, once enterprise boundaries are crossed, these identifiers will need to be resolved. In that case either PIX or PDQ shall be used.

9.5 Process Flow

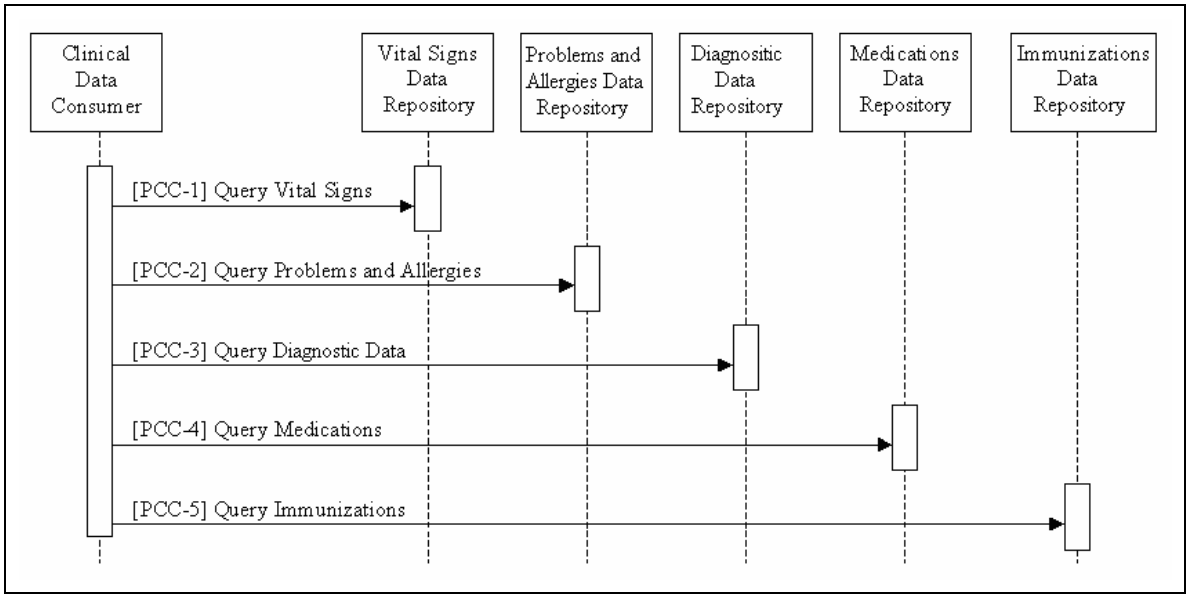

Figure 9.5-1 Query for Existing Data Process Flow

9.5.1 Clinical Trials

A patient participating in a clinical trial arrives for a trial-related visit to a physician office. The physician completes a report in his/her EMR gathering information relevant to the trial. Upon completion of the visit, a research assistant gathers the data relevant to the trial and submits it to the clinical trial information system.

Among the data needed to gather are the patient's current medications. During the information gathering process, forms are populated with the list of the patient's current medications viaby a query of the EMR where the patient data is stored using [PCC-4].. Information gathered by these forms in then stored in the clinical trial information system.

9.5.2 Claims

A claims administrator begins a claim for treatment of a patient who is pregnant. They log into their practice management system to begin processing the claim. Since this claim is for services provided during pregnancy, a patient measurement is needed to complete the claim. The practice management / billing system queries the EMR for the date of last

menstruation for the patient using [PCC-1], and completes the claim. It may also query the EMR for details of the procedures performed using [PCC-6].

9.5.3 Drug Safety

Medication to be administered for a radiology procedure may cause an allergic reaction in some patients. The RIS can query the EMR for current problems and allergies and medications using PCC-3 and PCC-4 to enable display of this information to the operator, or to send to a decision support system to determine if this medication is OK to administer.

A CPOE system needs to generate a medication order for a patient for a medication whose dosage is based on weight. Prior to generating the order, the system will query the EMR for the most recent weight measurements of the patient to determine the correct dose using [PCC-1]. The system also request information about the patient's current problems and allergies using [PCC-3], and medications using [PCC-4] to perform drug interaction checking before completing the order.

9.5.4 Public Health, Biosurveillance, and Disease Registries

During a routine pediatric visit, an EMR queries an immunization registry for the immunization history for the patient using [PCC-5]. Upon review of the information, it appears that on a recent visit, the patient was scheduled for immunization, but the immunization was not given due to a current fever. The fever is not longer present, so the immunization is given to the patient.

Upon completion of the visit, a reporting application is notified. The reporting application queries the EMR visit data to see if any immunizations were given during the just completed visit using [PCC-5]. If an immunization was given during the visit, the reporting application collects the appropriate data and submits it to an immunization registry.

9.5.5 Identifying Qualifying Patients

Decision support systems can query the EMR to obtain specific data elements for a patient, and use that information to determine if the patient qualifies for a clinical trial, or if the visit is one that requires additional reporting.

Upon completion of a visit, the EMR activates a decision support system. The decision support system queries the EMR for patient diagnoses using PCC-3. Upon determining that the patient has been diagnosed with Diabetes, the decision support system notifies the EMR that it needs to activate protocols for diabetic care. This use case could be continued as described in the section below.

9.5.6 Quality Reports and Disease Management

Upon completion of a visit, certain quality measures need to be gathered in order to produce an aggregate measure. A quality system can query the EMR to determine for each patient the values that need to be measured.

A diabetic patient completes a routine visit. The EMR queries a Lab Result Repository using PCC-2 to determine if a recent HgA1C result is available from the last six months using [PCC-2]. Upon failing to find one the EMR system notifies the physician that an updated HgA1C test is required.

9.5.7 Disease Management

A physician wants to monitor a patient's blood sugar levels and body mass index. She requests a graph of the patient's blood sugar lab results (lab) and BMI (vital signs) for the past 9 months from a desktop application. The desktop application queries the EMR for the selected vital signs for the indicated time period using PCC-1, and graphs the data appropriately.

Appendix A - Actor Descriptions

Actors are information systems or components of information systems that produce, manage, or act on information associated with operational activities in the enterprise.

Content Creator

The Content Creator Actor is responsible for the creation of content and transmission to a Content Consumer.

Content Consumer

A Content Consumer Actor is responsible for viewing, import, or other processing of content created by a Content Creator Actor.

Clinical Data Consumer

A clinical data consumer makes use of clinical patient data.

Vital Signs Data Repository

A Vital Signs Data Repository maintains patient vital signs data.

Problems and Allergies Repository

A Problems and Allergies Repository maintains patient problem and allergy data.

Diagnostic Data Repository

A Diagnostic Data Repository Repository maintains results from diagnostic tests (e.g., Lab, Imaging, or other test results).

Medications Data Repository

A Medications Data Repository maintains patient medication data.

Immunizations Data Repository

An Immunizations Data Repository maintains patient immunization data.

Professional Services Data Repository

A Professional Services Data Repository maintains data about historical or planned visits and procedures.

Appendix B - Transaction Descriptions

Transactions are interactions between actors that transfer the required information through standards-based messages.

Query Vital Signs

Request information about recent patient measurements, usually used to obtain vital signs measurements. The query may request all measurements, or those taken for a specific encounter, or date range, or may be for a specific set of measurements.

Query Problems and Allergies

Request information about problems or allergies known for a patient, usually to determine the patients current problems and allergies. The query may request information about all problems, all allergies, or may request information on a specific problem or allergy entry, entered during a specific encounter or date range.

Query Diagnostic Data

Request information about diagnostic results known for a patient. The query may request information about all diagnostic results, or may request information on a specific diagnostic result entry, or one entered for a specific encounter or date range.

Query Medications

Request information about medications given to, or being taken by a patient. The query may request information about all medications or may request information on a specific kind of medication or immunization, or one entered for a specific encounter or date range.

Query Immunizations

Request information about immunizations given to a patient. The query may request information about all immunizations, all immunizations or may request information on a specific kind of medication or immunization, or one entered for a specific encounter or date range.

Query Professional Services

Request information about procedures or visits relevant for a patient. The query may request information about procedures or visits, or may request information on a specific procedure or type of visit, or one entered for a specific encounter or date range.

Appendix C - IHE Integration Statements

C.1 How to Prepare an IHE Integration Statement

IHE Integration Statements are documents prepared and published by vendors to describe the conformance of their products with the IHE Technical Framework. They identify the specific IHE capabilities a given product supports in terms of IHE actors and integration profiles described in the technical frameworks of each domain.

Users familiar with these concepts can use Integration Statements to determine what level of integration a vendor asserts a product supports with complementary systems and what clinical and operational benefits such integration might provide. Integration Statements are intended to be used in conjunction with statements of conformance to specific standards (e.g. HL7, IETF, DICOM, W3C, etc.).

IHE provides a process for vendors to test their implementations of IHE actors and integration profiles. The IHE testing process, culminating in a multi-party interactive testing event called the Connect-a-thon, provides vendors with valuable feedback and provides a baseline indication of the conformance of their implementations. The process is not intended to independently evaluate, or ensure, product compliance. In publishing the results of the Connect-a-thon and facilitating access to vendors' IHE Integration Statements, IHE and its sponsoring organizations are in no way attesting to the accuracy or validity of any vendor's IHE Integration Statements or any other claims by vendors regarding their products.

IMPORTANT -- PLEASE NOTE: Vendors have sole responsibility for the accuracy and validity of their IHE Integration Statements. Vendors' Integration Statements are made available through IHE simply for consideration by parties seeking information about the integration capabilities of particular products. IHE and its sponsoring organizations have not evaluated or approved any IHE Integration Statement or any related product, and IHE and its sponsoring organizations shall have no liability or responsibility to any party for any claims or damages, whether direct, indirect, incidental or consequential, including but not limited to business interruption and loss of revenue, arising from any use of, or reliance upon, any IHE Integration Statement.

C.2 Structure and Content of an IHE Integration Statement

An IHE Integration Statement for a product shall include:

1. The Vendor Name
2. The Product Name (as used in the commercial context) to which the IHE Integration Statement applies.
3. The Product Version to which the IHE Integration Statement applies.
4. A publication date and optionally a revision designation for the IHE Integration Statement.

5. The following statement: "This product implements all transactions required in the IHE Technical Framework to support the IHE Integration Profiles, Actors and Options listed below:"

6. A list of IHE Integration Profiles supported by the product and, for each Integration Profile, a list of IHE Actors supported. For each integration profile/actor combination, one or more of the options defined in the IHE Technical Framework may also be stated. Profiles, Actors and Options shall use the names defined by the IHE Technical Framework Volume I. (Note: The vendor may also elect to indicate the version number of the Technical Framework referenced for each Integration Profile.)

Note that implementation of the integration profile implies implementation of all required transactions for an actor as well as selected options.

The statement shall also include references and/or internet links to the following information:

1. Specific internet address (or universal resource locator [URL]) where the vendor's Integration Statements are posted

2. URL where the vendor's standards conformance statements (e.g., HL7, DICOM, etc.) relevant to the IHE transactions implemented by the product are posted.

3. URL of the IHE Initiative's web page for general IHE information www.himss.org/ihe.

An IHE Integration Statement is not intended to promote or advertise aspects of a product not directly related to its implementation of IHE capabilities.

C.3 Format of an IHE Integration Statement

Each Integration Statement shall follow the format shown below. Vendors may add a cover page and any necessary additional information in accordance with their product documentation policies.

IHE Integration Statement	Date	12 Oct 2005
Vendor	**Product Name**	**Version**
Any Medical Systems Co.	IntegrateRecord	V2.3
This product implements all transactions required in the IHE Technical Framework to support the IHE Integration Profiles, Actors and Options listed below:		
Integration Profiles Implemented	**Actors Implemented**	**Options Implemented**
Cross-Enterprise Sharing of Medical Summaries	Document Consumer	View Option
Audit Trail and Node Authentication	Secure Node	none
Patient Identity Cross-referencing	Patient Identifier Cross-reference Consumer	PIX Update Notification
Internet address for vendor's IHE information: www.anymedicalsystemsco.com/ihe		
Links to Standards Conformance Statements for the Implementation		
HL7	www.anymedicalsystemsco.com/hl7	
Links to general information on IHE		
In North America: www.ihe.net	In Europe: www.ihe-europe.org	In Japan: www.jira-net.or.jp/ihe-j

The assumption of an integration statement is that all actors listed are functionally grouped and conform to any profile specifications for such groupings. In case of exceptions the vendor must explicitly describe the functional groupings.

Appendix D - Braden Scale for Predicting Pressure Sore Risk

BRADEN SCALE FOR PREDICTING PRESSURE SORE RISK

Patient's Name _____ Evaluator's Name _____ Date of Assessment

SENSORY PERCEPTION ability to respond meaningfully to pressure-related discomfort	**1. Completely Limited** Unresponsive (does not moan, flinch, or grasp) to painful stimuli, due to diminished level of consciousness or sedation. OR limited ability to feel pain over most of body	**2. Very Limited** Responds only to painful stimuli. Cannot communicate discomfort except by moaning or restlessness OR has a sensory impairment which limits the ability to feel pain or discomfort over ½ of body.	**3. Slightly Limited** Responds to verbal commands, but cannot always communicate discomfort or the need to be turned. OR has some sensory impairment which limits ability to feel pain or discomfort in 1 or 2 extremities.	**4. No Impairment** Responds to verbal commands. Has no sensory deficit which would limit ability to feel or voice pain or discomfort.		
MOISTURE degree to which skin is exposed to moisture	**1. Constantly Moist** Skin is kept moist almost constantly by perspiration, urine, etc. Dampness is detected every time patient is moved or turned.	**2. Very Moist** Skin is often, but not always moist. Linen must be changed at least once a shift.	**3. Occasionally Moist:** Skin is occasionally moist, requiring an extra linen change approximately once a day.	**4. Rarely Moist** Skin is usually dry, linen only requires changing at routine intervals.		
ACTIVITY degree of physical activity	**1. Bedfast** Confined to bed.	**2. Chairfast** Ability to walk severely limited or non-existent. Cannot bear own weight and/or must be assisted into chair or wheelchair.	**3. Walks Occasionally** Walks occasionally during day, but for very short distances, with or without assistance. Spends majority of each shift in bed or chair	**4. Walks Frequently** Walks outside room at least twice a day and inside room at least once every two hours during waking hours		
MOBILITY ability to change and control body position	**1. Completely Immobile** Does not make even slight changes in body or extremity position without assistance	**2. Very Limited** Makes occasional slight changes in body or extremity position but unable to make frequent or significant changes independently.	**3. Slightly Limited** Makes frequent though slight changes in body or extremity position independently.	**4. No Limitation** Makes major and frequent changes in position without assistance.		
NUTRITION usual food intake pattern	**1. Very Poor** Never eats a complete meal. Rarely eats more than ⅓ of any food offered. Eats 2 servings or less of protein (meat or dairy products) per day. Takes fluids poorly. Does not take a liquid dietary supplement OR is NPO and/or maintained on clear liquids or IV's for more than 5 days.	**2. Probably Inadequate** Rarely eats a complete meal and generally eats only about ½ of any food offered. Protein intake includes only 3 servings of meat or dairy products per day. Occasionally will take a dietary supplement. OR receives less than optimum amount of liquid diet or tube feeding	**3. Adequate** Eats over half of most meals. Eats a total of 4 servings of protein (meat, dairy products per day. Occasionally will refuse a meal, but will usually take a supplement when offered OR is on a tube feeding or TPN regimen which probably meets most of nutritional needs	**4. Excellent** Eats most of every meal. Never refuses a meal. Usually eats a total of 4 or more servings of meat and dairy products. Occasionally eats between meals. Does not require supplementation.		
FRICTION & SHEAR	**1. Problem** Requires moderate to maximum assistance in moving. Complete lifting without sliding against sheets is impossible. Frequently slides down in bed or chair, requiring frequent repositioning with maximum assistance. Spasticity, contractures or agitation leads to almost constant friction	**2. Potential Problem** Moves feebly or requires minimum assistance. During a move skin probably slides to some extent against sheets, chair, restraints or other devices. Maintains relatively good position in chair or bed most of the time but occasionally slides down.	**3. No Apparent Problem** Moves in bed and in chair independently and has sufficient muscle strength to lift up completely during move. Maintains good position in bed or chair.			
						Total Score

Glossary

The following terms are used in various places within this technical framework, and are defined below. The complete IHE Glossary is available on the IHE Wiki at http://wiki.ihe.net/index.php/IHE_Glossary .

Actor

An entity within a use case diagram that can perform an action within a use case diagram. Possible actions are creation or consumption of a message

Acuity Assessment

Also known as triage category, this is the acuity of the patient assigned during the process of ED triage. A number of evidenced based triage scales exist, including the Emergency Severity Index (ESI), Canadian Triage and Acuity Scale (CTAS), the Australasian Triage Scale (ATS), and the Manchester Triage System. In many emergency departments, patients may simply be classified as *emergent*, *urgent* or *non-urgent*.

ADT

Admit, Discharge & Transfer.

Affinity Domain Policy

Affinity Domain Policy that clearly defines the appropriate uses of the XDS Affinity Domain. Within this policy is a defined set of acceptable use Privacy Consent Policies that are published and understood.

ASTM

Formerly the American Society of Testing and Materials, now ASTM International. An SDO that develops a number of standards across a wide variety of industries, including healthcare.

ATNA

Audit Trail and Node Authentication. An IHE ITI profile.

Care Context

The participations surrounding the care provision act, and the attributes of that act. Everything in the document header. Data history, links to clinical reasoning.

Continuity of Care Document(CCD)

An HL7 Clinical Document Architecture (CDA) implementation alternative to ASTM ADJE2369 for institutions or organizations committed to HL7 standards. This specification was developed as a collaborative effort between ASTM and HL7. More information is available from http://www.hl7.org.

Continuity of Care Record (CCR)

A core data set of the most relevant administrative, demographic, and clinical information facts about a patient's healthcare, covering one or more encounters. The CCR is Designation E2369-05 of the ASTM (American Society for Testing and Materials, International). More information is available from http://www.astm.org.

Clinical Document Architecture (CDA)

An HL7 standard for the exchange for clinical documents. It specifies the structure and semantics of clinical documents. More information is available from http://www.hl7.org.

Content Binding

A content binding describes how the payload used in an IHE transaction is related to and/or constrained by the data elements contained within the content sent or received in those transactions.

CRS

Care Record Summary. An implementation guide that constrains CDA Release 2 for Care Record Summary documents.

CT

Consistent Time Integration Profile.

DICOM

Digital Imaging and Communication in Medicine

DSG

Digital Signatures. An IHE ITI Profile.

EDIS

An Emergency Department Information System (EDIS) is an extended EHR system used to manage data in support of Emergency Department patient care and operations. The functions of an EDIS may be provided by a single application or multiple applications.

eMPI

Enterprise Master Patient Index.

EMR

Electronic Medical Record, an Electronic Health Record system used within an enterprise to deliver care (also called EHR-CR by IHE-XDS).

Estimated Time of Arrival

the time the patient being referred can be expected to arrive in the emergency department.

EUA

Enterprise User Authentication Integration Profile.

Expected Actions

Actions which should occur as the result of a trigger event.

HIMSS

Healthcare Information and Management Systems Society.

HL7

Health Level Seven

HIS

Hospital Information System.

IHE

Integrating the Healthcare Enterprise.

Interaction Diagram

A diagram that depicts data flow and sequencing of events.

IT

Information Technology.

Logical Observation Identifiers Names and Codes(LOINC®)

A vocabulary developed by the Regenstrief Institute aimed at standardizing laboratory and clinical codes for use in clinical care, outcomes management, and research. Additional information found at [4].

Mode of Arrival

The method of transportation used to transport the patient to the Emergency Department.

MPI

Master Patient Index.

MRN

Medical Record Number.

NAV

Notification of Document Availability

OID

Object Identifier. (See also 'Globally Unique Identifier').

Patient Identifier Cross-reference Domain

Consists of a set of Patient Identifier Domains known and managed by a Patient Identifier Cross-reference Manager Actor. The Patient Identifier Cross-reference

Manager Actor is responsible for providing lists of "alias" identifiers from different Patient Identifier Domains.

Patient Identifier Domain

A single system or a set of interconnected systems that all share a common identification scheme for patients. Such a scheme includes: (1) a single identifier-issuing authority, (2) an assignment process of an identifier to a patient, (3) a permanent record of issued patient identifiers with associated traits, and (4) a maintenance process over time. The goal of Patient Identification is to reduce errors.

PDF

Portable Document Format.

PIX

Patient Identifier Cross Referencing. An IHE ITI Profile.

PDQ

Patient Demographics Query. An IHE ITI Profile.

PHR

Personal Health Record

Procedure

In the context of a "Pre-procedure History and Physical," the "procedure" is a surgery or an invasive examination of a patient that is required by quality review organizations to be preceded by a pre-procedure assessment of procedure risk and anesthesia risk. This assessment is typically referred to as a "Pre-operative" or "Pre-procedure History and Physical."

Process Flow Diagram

A graphical illustration of the flow of processes and interactions among the actors involved in a particular example.

Proposed disposition

the intended disposition (i.e. admission to ICU, discharge to home, transfer to psychiatric hospital), if known, that the referring provider expects the patient will end up after the emergency department intervention.

Referral Source

An individual, group, or agency that determined the patient should seek care at the ED. Referral source may be used to determine appropriate discharge referrals and services, or to provide surveillance data for program and service planning, or to examine referral patterns.

Role

The actions of an actor in a use case.

RSNA

Radiological Society of North America.

sig.

A Latin abbreviation for signetur used to represent the instruction following the medication name.

Scope

A brief description of the transaction.

SNOMED-CT®

A comprehensive clinical terminology, originally created by the College of American Pathologists (CAP) and, as of April 2007, owned, maintained, and distributed by the International Health Terminology Standards Development Organisation (IHTSDO), a non-for-profit association in Denmark. The CAP continues to support SNOMED CT operations under contract to the IHTSDO and provides SNOMED-related products and services as a licensee of the terminology. More information available from [5] or the United States National Library of Medicine at [6]

Transport Mode

the method the patient employs, or is provided to get to the emergency department.

Trigger Event

An event such as the reception of a message or completion of a process, which causes another action to occur.

UID

Unique Identifier (See also Globally Unique Identifier).

Universal ID

Unique identifier over time within the UID type. Each UID must belong to one of specifically enumerated species. Universal ID must follow syntactic rules of its scheme.

Use Case

A graphical depiction of the actors and operation of a system.

XUA

Cross Enterprise User Authentication

XDS

Cross Enterprise Document Sharing