Foreign Exam Management

Standards Selection Guide

Standards Selection Guide

Represents a collection of the recommended Standards, Resources, Implementation Guides created to satisfy a specific set of Clinical Requirement *at a moment in time*, following the discovery process presented in the guidance section of this site.

Maturity Level

- [ ] Under Development
- [ ] Pilot
- [ ] Draft For Use
- [x] **Normative**
- [ ] Superseded (by...)
- [ ] Retired

Market Guidance

PAN-CANADIAN RECOMMENDED

Guide Status:

- [ ] Draft
- [x] **Published**

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Maturity	Normative
Status	Published
Standards	IHE®, DICOM®, HL7® v2, SNOMED CT®
Domain	Diagnostic Imaging
Jurisdiction	National

Key Contributors

The following individuals/organizations contributed to the initial creation of the Canadian XDS Affinity Domain Implementation Guide, the basis of the content summarized in this resource:

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Purpose

This guide provides an overview of the available standards and a recommended approach to support the Foreign Exam Management requirements as identified below. The intent is to simplify standards selection decisions in future projects and, in turn, to promote standardization of solutions across projects by providing useful information to support decision making in a readily consumable format.

Content in this guide was summarized from the Canadian XDS Affinity Domain Implementation Guide to provide an accessible overview of the standards selected to support the listed Use Cases.

Business Context

The Foreign Exam Management (FEM) use cases in this Guide relate to a subset Diagnostic Imaging related document sharing requirements which were addressed by the Cross-Enterprise Document Sharing (XDS) Affinity domain and which are summarized in the XDS Affinity Domain Implementation Guide.

Foreign Exam Management (FEM) relates to those scenarios where a health care provider organization with local Radiology Information System (RIS) and Picture Archiving and Communication System (PACS) needs to allow users to retrieve and view an “imaging exam that was ordered, acquired, and reported on at some site external to the one where the study is currently being imported.” *(IHE Import Reconciliation Workflow Supplement for Trial Implementation)*

Although existing systems provide the means to import Foreign Exams from external sources manually, the integration of local systems with shared Diagnostic Imaging Repositories (DI-R) introduces new workflows and requirements in need of standardization, including:

- Automated import (fetching) of prior exams, and
- Rules for local management of content which is maintained within and readily available from alternate source systems.

Typical Use Cases

The following requirements help frame the need for standardization to support Foreign Exam Management. They assume integration between local RIS / PACS and a shared DI-R already exists.

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- UC-2 Identification of Relevant Prior Exams
- UC-3 Retention of Foreign Information

UC-1 Workflow

The focus of FEM use cases is acquisition (“fetching”) of relevant foreign exams for display and use by health care providers during the course of a current patient encounter. Image sets can be very large and therefore the ability to “pre-fetch” images before they are required for viewing is desired to improve user productivity.

The XDS Affinity Domain Implementation Guide identifies a number of use cases which are summarized here:

UC-1.1 Pre-Fetching

- Patient related events at the local facility trigger an automatic search for relevant prior exams on the DI-R:
  - Basic example: request related prior images when an exam is ordered, initiate query on patient arrival to radiology,
  - Non-radiology example: patient arrival at clinic (e.g. oncology, neurology) triggers search for relevant exams, or
  - Report only example: similar to examples above but return reports only.
- Relevant image sets and reports are automatically retrieved and brought in to the local hospital system for review.
- Information retrieved should not be archived locally as it remains available from the DI-R.

UC-1.2 Ad-Hoc or On-Demand Image Fetch

- A user at the local facility manually initiates a query to find existing relevant prior images for a specified patient and selects image sets of interest from a list of results.
- Relevant image sets and reports are retrieved and brought in to the local hospital system for review.
- Information retrieved should not be archived locally as it remains available from the DI-R.

UC-1.3 Amendments

- Identifies steps to replace foreign report when a report is amended after pre-fetch.
- Identifies steps to replace an image set when an image is added or changed after pre-fetch.

UC-1.4 Emergency Patients

- Identifies options to use DI-R / FEM to improve workflow when patient arrives at hospital via ambulance.

UC-2 Identification of Relevant Prior Exams

Fetching or pre-fetching of relevant information requires consistent use of metadata to determine relevance.

- Identifiers used to specify the acquisition modality and anatomic region of the study need to be standardized.

UC-3 Retention of Foreign Information

Foreign content should be identifiable within local systems and should not be archived or retained long term.

Evaluated Standards

Foreign Exam Management use cases cover three main areas requiring standardization:

- Document and Image Sharing
- Imaging Report Format
- Anatomic Region Code

Listed below are the available standards considered for each standardization category, the chosen alternative being highlighted.

Document and Image Sharing

Foreign Exam Management will be implemented by an organization participating a jurisdictions' shared Diagnostic Imaging Repository (DI-R) system. The DI-R will provide for registration and long term storage of sets of images and reports and standards based services that will be leveraged and, possibly, upgraded to support the FEM use case(s).

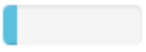
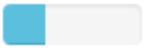
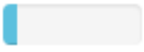
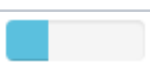
Standard	Fit for Purpose			Stewardship		Quality		
	Fits Requirements	Implementation Type	Vendor Support	Canadian Steward	SDO Maintained	Complexity	Standard Maturity	Training, Support and Tooling
IHE Cross-Enterprise Document Sharing - Imaging (XDS/XDS-I)		Production in Canada		Yes	Yes		High	
DICOM / HL7 v2 and Clinical Document Architecture (CDA)		Production in Canada		No	Yes		High	
Architectural Constraints and Considerations				**Secondary Benefits**				
None of these standards impose significant architectural constraints								
Recommendation				**Supporting Rationale**				
IHE Cross-Enterprise Document Sharing - Imaging (XDS/XDS-I)				The IHE XDS-I.b profile specifies the use of existing standards including HL7 v2/CDA and DICOM to enable registration and sharing of images and reports. A Canadian XDS Affinity domain guide is available to support implementation of the profile.				

Note:

The IHE XDS/XDS-I profile builds upon the foundational HL7 and DICOM standards by identifying the roles of different actors participating in the information exchange and specifying how data exchange transactions and applicable standards enable document sharing. It also prescribes an affinity domain process that was employed by the Canadian Diagnostic Imaging Community to constrain areas of optionality in the IHE XDS/XDS-I profile to Canadian requirements. The XDS Affinity Domain Implementation Guide is the work product of this group.

Report Format

XDS/XDS-I supports a range of report formats through the use of different transaction and reporting

Standard	Fit for Purpose			Stewardship		Quality		
	Fits Requirements	Implementation Type	Vendor Support	Canadian Steward	SDO Maintained	Complexity	Standard Maturity	Training, Support and Tooling
Clinical Document Architecture (CDA) R2		Limited in Canada		No	Yes		Normative	
Portable Document Format (PDF)		Production in Canada		No	N/A		N/A	
DICOM Structured Reporting (SR) / Secondary Capture (SC)		Production in Canada		No	Yes		Normative	
Raw Text		Production in Canada		No	No		N/A	
Architectural Constraints and Considerations				**Secondary Benefits**				

Use of CDA document allows content to be rendered in all other formats. Raw text based HL7 v2 ORU and DICOM SR are widely used and present in DI-R systems and require support.	PDF may *preclude* secondary use, while the structured data of a CDA document supports machine readability and may enable secondary use of clinical data, clinical decision support or application of administrative/demographic data to analytics /business intelligence.
Recommendation	**Supporting Rationale**
Clinical Document Architecture (CDA) R2	It is the goal of the Canadian XDS Affinity domain that reports will be stored in HL7 CDA format (using the pan-Canadian header format) as these reports (a) support required metadata, and (b) can be transformed to all other formats.

Anatomic Region Code

Metadata plays an important role in the identification of relevant priors during the fetch and pre-fetch use cases. The significant coded metadata elements for the FEM use case are the acquisition modality of image and the anatomical region being studied. Acquisition modality was adopted as prescribed.

Standard	Fit for Purpose			Stewardship		Quality		
	Fits Requirements	Implementation Type	Vendor Support	Canadian Stewardship	SDO Maintained	Complexity	Standard Maturity	Training, Support and Tooling
Coarse Body Parts (SNOMED CT subset)		Production in Canada		No	Yes (IHE)		Normative	
Anatomic Region (DICOM CID 4)		International		No	Yes		Normative	
Architectural Constraints and Considerations				**Secondary Benefits**				
Both terminology subsets referenced are published as flat lists with descriptions and codes.				Using pan-Canadian terminology subsets supports inter-jurisdictional interoperability. SNOMED CT's terminology model can be leveraged to support aggregation and analysis of the information captured within vaccination records.				
Recommendation				**Supporting Rationale**				
Coarse Body Parts (SNOMED CT subset)				The DICOM CID 4 value set is very detailed and generally inconsistent with the general approach of "casting a wide net" employed when fetching content within the FEM use cases.				

Note:

Anatomic Region was localized for Canadian use.

Recommended Standards

The following standards and related specifications were identified as the recommended approach to support the in-scope requirements. The table lists the summary with the rationale.

Standardization Requirement	Options	Choice	Rationale
Document and Image Sharing	IHE Cross-Enterprise Document Sharing - Imaging (XDS/XDS-I)	X	The IHE XDS-I.b profile specifies the use of existing standards including HL7 v2/CDA and DICOM to enable registration and sharing of images and reports. A Canadian XDS Affinity domain guide is available to support implementation of the profile.
	DICOM / HL7 v2 and Clinical Document Architecture (CDA)		
Imaging Report Format	Clinical Document Architecture (CDA) R2	X	It is the goal of the Canadian XDS Affinity domain that reports will be stored in HL7 CDA format (using the pan-Canadian header format) as these reports (a) support required metadata, and (b) can be transformed to all other formats.
	Portable Document Format (PDF)		
	DICOM SR / SC*		* Raw text based HL7 v2 ORU and DICOM SR are widely used and present in DI-R systems.
	Raw Text*		
Anatomic Region Code	Coarse Body Parts (SNOMED CT subset)	X	The DICOM CID 4 value set is very detailed and generally inconsistent with the general approach of "casting a wide net" employed when fetching content within the FEM use cases.
	Anatomic Region (DICOM Context Identifier/CID 4)		

Implementation Resources

Community Pages

Matters related to Foreign Exam Management in Canada are handled through an active Diagnostic Imaging Community on InfoCentral.

InfoCentral - Community Page
Diagnostic Imaging - Community Site

Implementation Guides

The latest XDS Affinity Domain Implementation Guide is available on InfoCentral.

For further technical support please contact Canada Health Infoway.

Existing Implementations

The following organizations are known to have implemented the FEM solution outlined in this guide:

Implementing Organization	Notes
Southwestern Ontario Diagnostic Imaging Network (SWODIN)	SWODIN did a successful FEM pilot, however, they are now moving to a large regional PACS/DI-R for LHIN 1-2-3-4 that will eliminate the need for FEM
Hospital Diagnostic Imaging Repository Services (HDIRS)	
Northern and Eastern Ontario Diagnostic Imaging Network (NEODIN)	
Greater Toronto Area (GTA) West	