Ontario Immunizations

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

			Guide Status:
☐ Under Development	**Market Guidance**		☑ **Draft**
☑ **Pilot**			
☐ Draft For Use	**PENDING**		☐ Published
☐ Normative			
☐ Superseded (by...)			
☐ Retired			

Effective Date

July, 2016

Maturity	Pilot
Status	Draft
Standards	FHIR®, SNOMED CT®, OAuth 2.0
Domain	Public Health
Jurisdiction	Ontario
Clinical	N/A
Business	Business Requirements
Technical	Specifications

Key Contributors

The following individuals/organizations contributed to the creation of this resource:

Name	Title	Organization	Contact Information

Purpose

This guide provides an overview of the available standards and a recommended approach to support the Immunization 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 provides an overview of the standards selected to support the listed Use Cases.

Business Context

The use cases outlined in this Guide reflect the activities involved in tracking and managing immunizations, with a particular focus on public health. As such, many applications requiring a standard for the exchange of immunization data will be used outside of traditional care settings such as hospitals or physicians' offices.

Typical Use Cases

The use cases outlined below are intended to provide additional context and frame the needs that candidate standards must meet. The use cases here are summarized and excerpted from a discussion document of the Canada Health Infoway Immunization Interoperability Working Group[1].

For a detailed use case list and required business rules please visit the Business Requirements space:

Business Requirements
Business Interoperability

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These use cases do not make any assumptions about the setting in which care is being delivered (e.g. primary care physician's office, mobile immunization clinic, hospital, etc.). Although some references to software applications are specific, the preferred candidate standards should, where possible, support and enable the delivery of care in any setting, and the viewing or recording of immunization data on different hardware devices.

UC-1 Patient or Delegate Retrieves Immunization History (Yellow Card)

A user, typically a parent with a school age child, retrieves a patient's immunization history form the Immunization Connect Ontario (ICON) online or mobile application.

- User enters a patient's Ontario Immunization ID and PIN to request proof of immunization (Yellow Card) from ICON.
- ICON (and related services):
    - authenticates request,
    - queries panorama to retrieve patient immunization history, and
    - displays yellow card to user to print or download.

UC-2 Patient or Delegate Records Immunization History

A user, typically a parent with a school age child, enters a patient's immunization history into the Immunization Connect Ontario (ICON) online or mobile application.

- User enters information into ICON:
    - Identifying information about self (submitter),
    - Identifying information about patient, and
    - Information about one or more immunizations.
- ICON (and related services):
    - authenticates request,
    - stores information for validation by Public Health.
- Health care provider or Public Health reviews and validates information in ICON and submits information to Panorama. (Alternate flow on UC-4?)

UC-3 Health Care Provider Retrieves Immunization History

A health care provider retrieves a patient's immunization history using a clinical viewer, EMR or mobile application.

- User logs in to application, looks up patient and requests immunization history.
- Application (and related services):
    - authenticates user using ONEID
    - queries panorama to retrieve patient immunization history, and
    - displays immunization history.

UC-4 Health Care Provider Records Immunization Event(s)

A health care provider enters information about a new immunization event using a clinical viewer, EMR or mobile application.

- User logs in to application, looks up patient and enters information about one or more immunization events.
- Application (and related services):
    - authenticates user using ONEID, and
    - stores information about immunization event in Panorama.

UC-5 Update Existing Immunization Record

A health care provider updates a patient's immunization history using a clinical viewer, EMR or mobile application.

- User logs in to application, looks up patient and immunization history, updates information about an immunization event.
- Application (and related services):
    - authenticates user using ONEID, and
    - stores information about the updated immunization event in Panorama.

UC-6 View Immunization History (With Forecast)

Extends reports in UC-1 and UC-3 to include information about the patient's outstanding and upcoming immunizations.
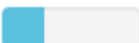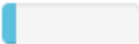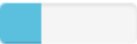
Evaluated Standards

Immunization use cases cover three main areas requiring standardization:

- Messaging
- Terminology
- Single Sign On (SSO)

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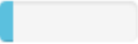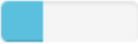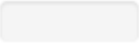
Messaging

The following messaging standards were evaluated to support the exchange of information between front end applications and Panorama.

Standard	Fit for Purpose			Stewardship		Quality		
	Fits Requirements	Implementation Type	Vendor Support	Canadian Steward	SDO Maintained	Complexity	Standard Maturity	Training, Support and Tooling
FHIR Immunization		Pilot in Canada		No	Yes		Draft for Use	
pan-Canadian Immunization Messaging Standard (Public Health MR 02.05)		Production in Canada		Yes	Localized		Normative	

Architectural Constraints and Considerations	Secondary Benefits
FHIR's modular components, foundation on web standards and support for RESTful architectures make the standard generally less complex and more accessible to developers of client applications than the pan-Canadian standards which are based on HL7 v3.	No notable secondary benefits.

Recommendation	Supporting Rationale
It is recommended that Panorama based new implementations adopt FHIR.	FHIR supports the use cases described above without further extension or localization. In the event that extension is required to support future requirements, FHIR provides a straightforward mechanism for creating extensions. Canada-specific terminology value sets can be used while remaining "FHIR conformant", as the FHIR Immunization resource only specifies examples; implementers are free to use any value set they choose. FHIR has significant momentum among vendors and developers, meaning the long-term sustainability of FHIR-based implementations will likely be superior. There is a substantial ecosystem of open-source tools and reference implementations for FHIR that implementers can leverage to accelerate their projects.

Terminology

The following terminology standards were evaluated to support the exchange of information between front end applications and Panorama.

Standard	Fit for Purpose			Stewardship		Quality		
	Fits Requirements	Implementation Type	Vendor Support	Canadian Steward	SDO Maintained	Complexity	Standard Maturity	Training, Support and Tooling
pan-Canadian Public Health Immunization Subsets (SNOMED-CT)		Production in Canada		Yes	Localized		Normative	
iTerm ValueSet		Custom		Yes	No		N/A	

Architectural Constraints and Considerations	Secondary Benefits
Both options were designed to support Panaroma's data model.	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

| It is recommended that new implementations adopt the custom reference value sets developed by Ontario. | The pan-Canadian Public Health Immunization Subsets reflect Canadian requirements (e.g. Canadian vaccine lists), and is aligned with the PHAC Canadian Immunization Guide. It is being adopted in additional projects across Canada (including AB, SK, MB, Canadian Forces, CIHI), so additional implementations that adopt the Ontario standard will be well positioned for interoperability with these groups or organizations. |

Single Sign On (SSO)

The following security frameworks were considered to provide SSO access to protected data through via FHIR resources.

Standard	Fit for Purpose			Stewardship		Quality		
	Fits Requirements	Implementation Type	Vendor Support	Canadian Steward	SDO Maintained	Complexity	Standard Maturity	Training, Support and Tooling
OAuth 2.0	▰▰▰	Production	▰▰▰	No	Yes	▰▱▱	Normative	▰▰▰
SAML 2.0	▰▰▱	Production	▰▰▰	No	Yes	▰▰▱	Normative	▰▰▰
Architectural Constraints and Considerations				**Secondary Benefits**				
OAuth 2.0 provides better support for mobile applications.								
Recommendation				**Supporting Rationale**				
It is recommended that OAuth 2.0 be used to provide SSO access to protected data through FHIR resources.				Better support for mobile applications.				

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
Messaging	FHIR Immunization	x	The FHIR Immunization Resource supports the use cases described above without further extension or localization. In the event that extension is required to support future requirements, FHIR provides a straightforward mechanism for creating extensions.
	Canada Health Infoway pan-Canadian Immunization Standard		Canada-specific terminology value sets can be used while remaining "FHIR conformant", as the FHIR Immunization resource only specifies examples; implementers are free to use any value set they choose.
			FHIR has significant momentum among vendors and developers, meaning the long-term sustainability of FHIR-based implementations will likely be superior.
			There is a substantial ecosystem of open-source tools and reference implementations for FHIR that implementers can leverage to accelerate their projects.
Terminology	pan-Canadian Public Health Immunization Subsets (SNOMED-CT)	x	The pan-Canadian Public Health Immunization Subsets reflect Canadian requirements (e.g. Canadian vaccine lists), and is aligned with the PHAC Canadian Immunization Guide. It is being adopted in additional projects across Canada (including AB, SK, MB, Canadian Forces, CIHI), so additional implementations that adopt the Ontario standard will be well positioned for interoperability with these groups or organizations.
	iTerm value sets		
Single Sign On (SSO)	OAuth 2.0	x	OAuth provides better support for mobile applications.
	SAML 2.0		

Implementation Resources

Community Pages

Immunization related work is handled through an active Community on InfoCentral. Please visit their sites to learn more.

InfoCentral - Community Pages
Public Health Surveillance - Community
Immunization Interoperability - Working Group
Immunization Terminology - Working Group

Interoperability Specifications

For detailed Implementation Specifications please visit the InfoScribe space:

InfoScribe - Specifications
[Immunization Connect - Specifications](#)

Implementation Guides

For FHIR Resource and Profile Definitions related to this implementation please consult the "Panorama ICON FHIR Implementation Guide":

InfoScribe - Implementation Guides
[FHIR Implementation Guide for Immunization Connect](#)

Technical Resources

Documentation and implementation resources are available directly from HL7 International through the [FHIR website.](#)

- FHIR
  - Test Servers
    - [http://fhirtest.uhn.ca/](#) - University Health Network public FHIR test server
    - [http://fhir3.healthintersections.com.au/open](#) - Grahame Grieve's (FHIR creator) public FHIR test server

- Open source reference implementations
  - [https://github.com/jamesagnew/hapi-fhir](#) - Java
  - [https://github.com/ewoutkramer/fhir-net-api](#) - .NET
  - [https://github.com/smart-on-fhir/client-js](#) - JavaScript

For further technical support please contact project teams listed in the header section or seek support through the community site.

Existing Implementations

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

Implementing Organization	Contact Information	Notes
Ontario Ministry of Health and Long Term Care (MOHLTC)	Chris Pentleton (FHIR), Karen Hay (Terminology)	MOHLTC is using FHIR to provide interoperability between Panorama and mobile or web apps supporting public health immunization programs. MOHLTC is also responsible for developing the Ontario vaccine terminology standard