

EMR Certification

eHealth_hub - Immunization Query Service Specification

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Version 1.2



Shared health
Soins communs
Manitoba

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1 Introduction

The purpose of this document is to provide an overview of the eHealth_hub - Immunization Query Service (hereafter referred to as the “Immunization Query Service”). The document will describe the high-level architecture of the data retrieval model, as well as the technical details and requirements regarding the Immunization Query Service integration and authorization.

1.1 Glossary

The following defines key business terms and acronyms used throughout this document.

Table 1: Terms and Acronyms

TERM OR ACRONYM	DEFINITION
API	An API, or application programming interface, is a set of rules that define how applications or devices can connect to and communicate with each other.
Patient	A patient is an individual seeking and receiving health-care services.
CodeableConcept	A value that is usually supplied by providing a reference to one or more terminologies or ontologies but may also be defined by the provision of text.
Consent to Disclose Directive	An indication on a patient record in PHIMS that patient consent is required in order to disclose immunization information. Patients with this directive in PHIMS will not have their PHIMS immunization information available through this service.
eHealth_hub	A Business Service that enables electronic delivery of data between Shared Health source systems and authorized health-care providers who are using a Manitoba Certified EMR Product.
EMR ID	A unique identifier assigned to each EMR instance by Shared Health.
family	Patient last name
FHIR	Fast Healthcare Interoperability Resources is an interoperability standard designed to enable health data, including clinical and administrative data, to be quickly and efficiently exchanged.
Health Information Access Layer (HIAL)	Shared Health’s core integration service which provides the environment and capabilities necessary to establish interoperability between systems. For example, HIAL is a Shared Health Service that enables Business Services such as eHealth_hub.
Immunization History	Collection of a patient’s immunization records.
IQS	Immunization Query Service
JSON	JSON stands for JavaScript Object Notation. JSON is a lightweight format for storing and transporting data.
JWT	JSON Web Token. See https://www.rfc-editor.org/rfc/rfc7519 for further information on the JWT standard.
Manitoba Certified EMR Product (EMR)	An Electronic Medical Record product that has achieved Certification in Manitoba , and is referred to throughout this document as “EMR”.

PHIMS Client ID	Unique identifier assigned to each patient in PHIMS. Equivalent to Patient.id.
PHIN	A Personal Health Information Number is the unique identifier assigned to individuals eligible for ensured benefits within Manitoba. PHIN is the Patient Identifier when Patient Identifier Type is “JHNMB” (Manitoba).
Public Health Information Management System (PHIMS)	A secure, integrated electronic public health record developed to improve and support communicable disease case management, outbreak management, immunization management, and inventory management in Manitoba.
REST API	A REST API is an API that conforms to the design principles of the REST, or <i>representational state transfer</i> architectural style.
Unique Patient Identifier	Patient.id or [PHIN and birthDate].

1.2 Business Objectives & Benefits Summary

The objective of the Immunization Query Service is to provide users of Manitoba Certified EMR Products (EMR) with a secure method to retrieve patient immunization history from Manitoba’s Public Health Information Management System (PHIMS). The benefits of the Immunization Query Service are:

- Improves access to patient immunization history
- Provides ability to search and view immunization history from PHIMS directly from a patient record in the EMR
- Provides ability to select and incorporate immunization history from PHIMS into the EMR record without overwriting local data
- Enables analysis of incorporated immunization history from PHIMS independently or in combination with existing EMR immunization data
- Improves patient safety through access to comprehensive immunization history
- Reduces the potential for duplicate immunizations to be administered
- Reduces administrative burden by reducing manual data entry into EMR
- Supports continuity of care

1.3 Related Documents

This document references the following companion documents:

Table 2: Related Documents

DOCUMENT
Manitoba EMR Certification – Baseline EMR Requirements Specification
Manitoba EMR Certification – Primary Care Quality Indicator Reminders and Data Extract

Upon application for EMR Certification to this specification, Vendors can email EMR@sharedhealthmb.ca or contact their EMR Product Lead to request the additional assessment addendum containing additional configuration and connectivity details necessary for assessment.

2 Immunization Query Service Overview

PHIMS is a secure, integrated electronic public health record developed to improve and support communicable disease case management, outbreak management, immunization management, and inventory management.

The Immunization Query Service enables Certified EMR Products to query PHIMS for a specific patient and incorporate that patient's historic immunization records into their system.

Other key solution features in scope include:

- Configuration of the service for the EMR instance
- EMR User initiated request for PHIMS immunization history for a patient in their EMR
- Ability for EMR to search PHIMS for patients and allow EMR User to select which PHIMS patient to retrieve immunization history for
- Ability for EMR to retrieve and display PHIMS immunization history for a patient
- Ability for EMR User to incorporate PHIMS immunization records into their EMR
- Ability to update and/or un-incorporate currently incorporated PHIMS immunization records
- Ability for EMR User to view and analyze incorporated PHIMS immunization records alongside local immunization records

3 High-level Architecture

The architecture of the Immunization Query Service allows registered clinics to query PHIMS through the provincial Health Information Access Layer (HIAL) for the retrieval of patient immunization history (see Figure 1). The integration service exposes a secure, synchronous mechanism to query PHIMS using standardized message formats.

The querying of PHIMS from within an EMR certified to this specification is intended to be optional for the end user.

The immunization history returned by the query may be incorporated into the local patient record, at the user's discretion.

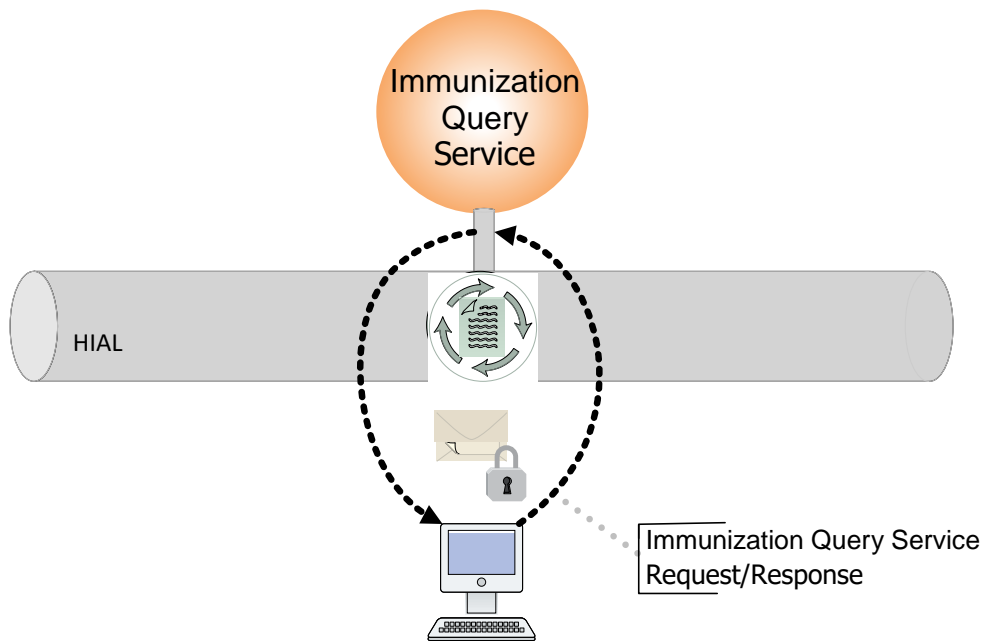


FIGURE 1: IMMUNIZATION QUERY SERVICE OVERVIEW

The sequence diagram in Figure 2 describes the synchronous request and response mechanism used to interface with the Immunization Query Service:

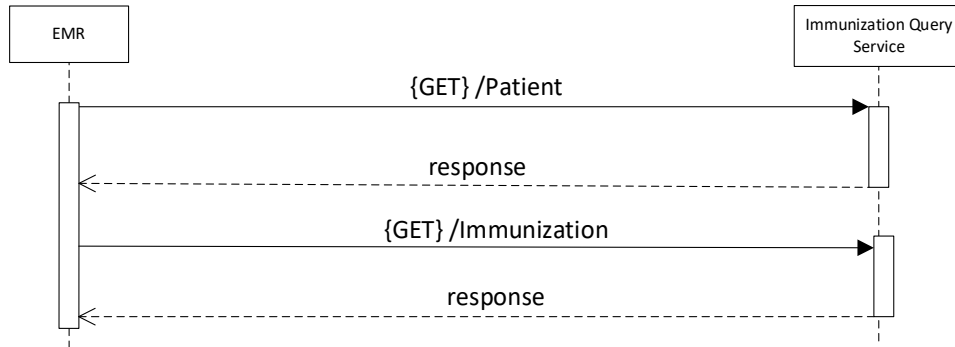


FIGURE 2: IMMUNIZATION QUERY SERVICE SEQUENCE DIAGRAM

- When a user wishes to retrieve immunization history from PHIMS for a patient, they would trigger this activity in their EMR.
 - The EMR will attempt to find the correct patient and retrieve the PHIMS immunization history from the Immunization Query Service.
 - If the EMR is initially unable to find the correct patient, it will be able to perform a demographic search of PHIMS and ask the user to confirm which patient to retrieve immunization history for from a list of possible patient matches.
 - The EMR will then retrieve immunization history for the selected patient.
- This will return the patient's PHIMS immunization history, of which the user may select some or all records to incorporate into their EMR.

To ensure the security and privacy of the service, the interface will require authorization through an Authorization Service (see [Appendix A: Authorization Service](#)).

Each EMR instance will require a unique authorization client_id and a temporary client_secret, issued by Shared Health.

4 Use Cases

The use cases in this section describe functionality required of the EMR related to the Immunization Query Service. They are supported by the requirements detailed in this specification.

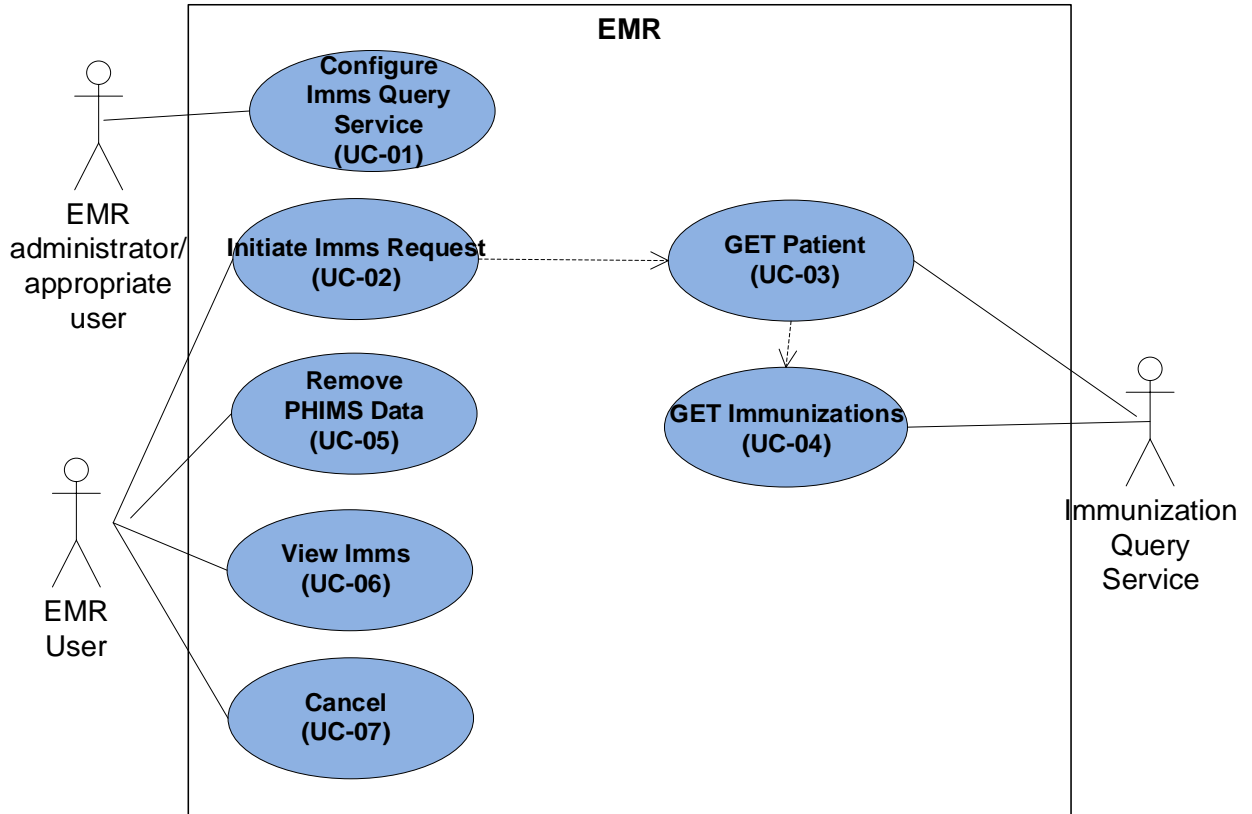


FIGURE 3: USE CASES

4.1 Configure Immunization Query Service (UC-01)

This use case describes the process to configure the Immunization Query Service functionality in the EMR.

PRIMARY ACTORS
<ul style="list-style-type: none"> • EMR • EMR administrator/appropriate user
TRIGGER(S)
<ul style="list-style-type: none"> • EMR administrator/appropriate user is ready to configure the Immunization Query Service integration
PRE-CONDITIONS / INPUTS
<ul style="list-style-type: none"> • EMR functionality has met all provincial requirements for the Immunization Query Service • Service connection information has been made available to the EMR administrator/appropriate user
POST-CONDITIONS / OUTPUTS
<ul style="list-style-type: none"> • Immunization Query Service is configured in the EMR • Users and/or roles are configured for Immunization Query Service access, as appropriate
MAIN SUCCESS SCENARIO (BASIC FLOW)
<ol style="list-style-type: none"> 1. EMR administrator/appropriate user accesses the appropriate Immunization Query Service details function in the EMR. 2. EMR displays Immunization Query Service function details. 3. EMR administrator/appropriate user sets and saves the following information: <ul style="list-style-type: none"> ○ Data elements from Table 8: System Data Elements. ○ client_id and client_secret ○ Enables the Immunization Query Service in the EMR
ALTERNATE FLOWS
<p>A1 – Configure Immunization Query Service Access</p> <ol style="list-style-type: none"> 1. EMR administrator/appropriate user configures EMR Users and/or roles for Immunization Query Service access, as appropriate. <p>A2 – Disable the Immunization Query Service</p> <ol style="list-style-type: none"> 1. EMR administrator/appropriate user accesses the appropriate Immunization Query Service details function in the EMR. 2. EMR displays Immunization Query Service function details. 3. EMR administrator/appropriate user disables Immunization Query Service functionality in the EMR.

4.2 Initiate Imms Request (UC-02)

This use case describes the initiation of a PHIMS immunization history request for a patient in the EMR.

PRIMARY ACTORS
<ul style="list-style-type: none"> • EMR • EMR User
TRIGGER(S)
<ul style="list-style-type: none"> • EMR User wants to retrieve PHIMS immunization history for a patient
PRE-CONDITIONS / INPUTS
<ul style="list-style-type: none"> • Immunization Query Service is configured and enabled in the EMR • Patient in context in the EMR
POST-CONDITIONS / OUTPUTS
<ul style="list-style-type: none"> • <i>GET Patient</i> request is generated
MAIN SUCCESS SCENARIO (BASIC FLOW)
<ol style="list-style-type: none"> 1. EMR User initiates retrieval of PHIMS immunization history for the patient in context. 2. EMR generates <i>GET Patient</i> request.
EXCEPTION FLOWS
<p>E1 - Patient does not have minimum search criteria</p> <p><i>Start Exception Flow at:</i></p> <ul style="list-style-type: none"> • <i>Basic Flow – Before or After Step 1</i> <ol style="list-style-type: none"> 1. EMR displays notification and/or prevents initiating retrieval of PHIMS immunization history for the patient.

4.3 GET Patient (UC-03)

This use case describes submitting a *GET Patient* request to the Immunization Query Service.

PRIMARY ACTORS
<ul style="list-style-type: none"> • EMR • Immunization Query Service
TRIGGER(S)
<ul style="list-style-type: none"> • A valid <i>GET Patient</i> request has been created
POST-CONDITIONS / OUTPUTS

- *GET Immunization?patient* request is generated

MAIN SUCCESS SCENARIO (BASIC FLOW)

1. EMR submits and logs *GET Patient/id* request (Patient.id is known).
2. Immunization Query Service receives the request and sends response.
3. EMR:
 - a) Receives response containing unique patient resource where Patient.active=true.
 - b) Generates *GET Immunization?patient* request.

ALTERNATE FLOWS

A1 – EMR Patient record does not have Patient.id

1. EMR submits and logs *GET Patient* request using PHIN, birthDate (if known).
2. Immunization Query Service receives the request and sends response.
3. EMR:
 - a) Receives response containing unique patient resource where *Patient.active=true*.
 - b) Stores Patient.id to the patient record.
 - c) Generates *GET Immunization?patient* request.

A2 – EMR Patient record does not have Unique Patient Identifier

1. EMR submits and logs *GET Patient* request using family (last name), birthDate, gender.
2. Immunization Query Service receives the request and sends response.
3. EMR:
 - a) Receives response containing matching patient resources.
 - b) Displays list of matching patient resources and their corresponding demographics contained in the response and Consent to Disclose Directive message (if applicable).
4. EMR User selects a patient from the list.
5. EMR:
 - a) Stores Patient.id to the patient record.
 - b) Generates *GET Immunization?patient* request.

EXCEPTION FLOWS

E1 - Immunization Query Service is unavailable (timeout)

Start Exception Flow at either:

- *Basic Flow – After Step 1*
 - *Alternate Flow A1 – After Step 1*
 - *Alternate Flow A2 – After Step 1*
1. EMR logs and displays Immunization Query Service unavailable event.

E2 – Error was encountered

Start Exception Flow at:

- *Basic Flow – After Step 2*
 - *Alternate Flow A1 – After Step 2*
 - *Alternate Flow A2 – After Step 2*
1. EMR:
 - a) Receives response containing error.
 - b) Logs and displays the error.

E3 – Merged Away Patient is returned

Start Exception Flow at:

- *Basic Flow – After Step 2*
1. EMR:
 - a) Receives response containing unique patient resource where *Patient.active=false*.
 - b) Replaces the previous Patient.id in the patient record with the *replaced-by* reference (id).
 - c) Generates *GET Patient/id* request using the *replaced-by* patient.
 2. Rejoin Basic Flow at Step 1.

E4 – Consent to Disclose Directive

Start Exception Flow at:

- *Basic Flow – After Step 2*
 - *Alternate Flow – After Step 2*
1. EMR:
 - a) Receives response containing Consent Disclose Directive.
 - b) Provides notification of Consent to Disclose Directive and indicates that any currently incorporated immunization resources for the patient may be out of date.

E5 – No records found (PHIN, birthDate)

Start Exception Flow at:

- *Alternate Flow – After Step 2*
1. EMR:
 - a) Receives response containing no records.
 - b) Displays and logs that the request could not find a patient
 - c) Provides EMR User options to either:
 - i. Continue with patient search using family (last name), birthDate, gender.
 - ii. Cancel (end flow).
 2. EMR generates *GET Patient* request using family, birthDate, gender.
 3. Rejoin Alternate Flow A2 at Step 1.

E6 – No records found (family, birthDate, gender)

Start Exception Flow at:

- *Alternate Flow A2 – After Step 2*
1. EMR:
 - a) Receives response containing no records.
 - b) Displays and logs that the request could not find a patient, and includes Consent to Disclose Directive (if present).

4.4 GET Immunizations (UC-04)

This use case describes submitting the *GET Immunization?patient* request to the Immunization Query Service.

PRIMARY ACTORS
<ul style="list-style-type: none"> • EMR • Immunization Query Service
TRIGGER(S)
<ul style="list-style-type: none"> • A valid <i>GET Immunization?patient</i> request has been created
POST-CONDITIONS / OUTPUTS
<ul style="list-style-type: none"> • Patient’s PHIMS immunization history from the response is displayed
MAIN SUCCESS SCENARIO (BASIC FLOW)
<ol style="list-style-type: none"> 1. EMR submits and logs <i>GET Immunization?patient</i> request. 2. Immunization Query Service receives the request and sends response.

3. EMR:
 - a) Receives response containing PHIMS immunization resources.
 - b) Updates and retains audit trail of any previously incorporated records.
 - c) Un-incorporates and retains audit trail of any records not found in the response.
 - d) Notifies EMR User of updated and un-incorporated records.
 - e) Displays patient information and list of PHIMS immunization resources contained in the response.
4. EMR User selects PHIMS immunization resources(s) from the list to incorporate.
5. EMR incorporates the selected PHIMS immunization resources(s) into the patient record.

EXCEPTION FLOWS

E1 - Immunization Query Service is unavailable (timeout)

Start Exception Flow at either:

- *Basic Flow – After Step 1*
 1. EMR logs and displays Immunization Query Service unavailable event.

E2 – Error was encountered

Start Exception Flow at:

- *Basic Flow – After Step 2*
 1. EMR logs and displays the error.

E3 – No new records incorporated

Start Exception Flow at:

- *Basic Flow – After Step 3*
 1. EMR User cancels (end flow).

4.5 Remove Imms (UC-05)

This use case describes the process of a user removing PHIMS data from their EMR.

PRIMARY ACTORS

- EMR
- EMR User

TRIGGER(S)

- EMR User has a desire to remove PHIMS data from the EMR for patient in context

POST-CONDITIONS / OUTPUTS

- PHIMS data is removed from EMR

MAIN SUCCESS SCENARIO (BASIC FLOW)

1. EMR User selects incorporated PHIMS immunization resource(s) to un-incorporate.
2. EMR un-incorporates selected resources(s) and retains audit trail.

ALTERNATE FLOWS

A1 – Remove all PHIMS data for a patient

1. EMR User chooses to remove all PHIMS data for the patient.
2. EMR removes all PHIMS data for the patient and retains audit trail.
 - a) Un-incorporates all PHIMS immunization resources for the patient.
 - b) Removes Patient.id from patient record.

4.6 View Imms (UC-06)

This use case describes viewing of immunizations in the EMR.

PRIMARY ACTORS

- EMR
- EMR User

TRIGGER(S)

- EMR User wishes to view immunizations in their EMR for the patient in context

POST-CONDITIONS / OUTPUTS

- Immunization records are displayed

MAIN SUCCESS SCENARIO (BASIC FLOW)

1. EMR User opens the area of the EMR where patient immunizations can be viewed.
2. EMR displays all immunization records associated to the patient, including:
 - Immunization records previously entered into the EMR (e.g. manually entered by an EMR User); and
 - Immunization resources denoted as being incorporated from PHIMS.

4.7 Cancel (UC-07)

This use case describes the process to cancel an immunizations process.

PRIMARY ACTORS
<ul style="list-style-type: none"> • EMR • EMR User
TRIGGER(S)
<ul style="list-style-type: none"> • EMR User has a need to cancel an existing flow
PRE-CONDITIONS / INPUTS
<ul style="list-style-type: none"> • Flow is in progress
POST-CONDITIONS / OUTPUTS
<ul style="list-style-type: none"> • EMR exits the flow
MAIN SUCCESS SCENARIO (BASIC FLOW)
<ol style="list-style-type: none"> 1. EMR User cancels the flow.

5 Requirements

This section includes mandatory requirements and guidelines for configuring an EMR to integrate with the Immunization Query Service.

5.1 Requirement Column Definition

For ease of review and understanding, requirements are documented in a manner consistent with previous EMR Certification documentation. For each requirement, the following information is provided:

- **ID** – a unique identifier assigned to the requirement by Manitoba.
- **Requirement** – a concise statement describing the requirement.
- **Guidelines** – these additional instructions constitute part of the requirement and are relevant to implementation of the requirement in the EMR product. As such, these guidelines form part of the assessment criteria and are included in the planned product assessment.
- **Additional Notes** – relevant information or examples intended to give additional context to the requirement and to improve understanding.
- **Status** – each requirement is clearly identified as:
 - New (not included in previous specifications);
 - Updated (modification to intent of the requirement from a previous version); or
 - Previous (unchanged from last issuance of core requirements).

Assessment – The method of assessment is stated in the “Assessment” column for each requirement. All requirements will be assessed using the following method:

- **Assertion** – Vendors will make an assertion (Yes or No) based on their self-assessment of the product’s ability to meet the requirement. Manitoba may choose to audit Vendor assertions as part of the certification process, as authorized within the Agreement.
- **Verification** – leveraging the Certification Environment, Manitoba will verify the product’s ability to meet requirements. Clinical and administrative resources may be involved in the verification process.
- **Demonstration** – Vendors will demonstrate key functions within their EMR product. Demonstrations may be conducted in person, by remote means (e.g. teleconference and Internet) or through recorded video.
- **System Integration Testing** – this most comprehensive assessment method requires an end-to-end test of key functions such as interoperability between the EMR and other systems (e.g. eChart Manitoba Launch or eHealth_hub).

5.2 Authorization Requirements

Table 3: Authorization Requirements

ID	REQUIREMENT	GUIDELINES	ADDITIONAL NOTES	STATUS	ASSESSMENT
AUTH01	Uses TLS 1.2 or 1.3 protocol.	<p>HTTPS is required for all requests to the service.</p> <p>TLS versions less than 1.2 will not be supported.</p> <p>TLS cipher suites will be limited to specific cipher suites supported by TLS 1.2 and TLS 1.3.</p>	<p>Transport and Encryption</p> <ul style="list-style-type: none"> • HTTP is a protocol used to transfer data in between the client and the API server. An HTTPS transfer to the API is simply an HTTP call over a connection secured by TLS. • Transport Layer Security (TLS), previously known as Secure Socket Layer (SSL) - is the process of securing communication between the client and the API server. <p>TLS 1.3 is the preferred protocol.</p> <p>Current supported cipher suites will be listed in the Immunization Query Service Assessment Addendum.</p>	Previous	System Integration Testing
AUTH02	Interfaces with the Authorization service.	<p>For a description of the Authorization Service see: Appendix A: Authorization Service.</p> <p>All request headers must specify:</p>		Previous	System Integration Testing

		<ul style="list-style-type: none"> • Content-Type: application/json 			
AUTH03	Stores a client_id.	The client_id must provide the ability to be updated manually by an EMR administrator/appropriate user.	Shared Health will provide a client_id.	Previous	System Integration Testing
AUTH04	Gets and stores a client_secret.	<p>The client_secret must be able to be updated both programmatically by the EMR and manually by an EMR administrator/appropriate user.</p> <p>All <i>Update Client Secret</i> request headers must include Authorization with "Bearer " followed by a valid access_token.</p> <p>Required request and response elements needed to get a client_secret listed in:</p> <ul style="list-style-type: none"> • Section 6.2.3: Update Client Secret Request • Section 6.2.4: Update Client Secret Response 	Shared Health will provide a new temporary client_secret.	Previous	System Integration Testing
AUTH05	Gets and stores and access_token.	<p>Required request and response elements to get and maintain an access_token listed in:</p> <ul style="list-style-type: none"> • Section: 6.2.1 Login Request • Section: 6.2.2 Login Response <p>Reaching a maximum failed attempt limit to get an access_token will result in a service locking which will require</p>	Failed attempt limit is 5 attempts.	Previous	System Integration Testing

		Shared Health assistance to resolve.			
AUTH06	Maintains a valid access_token and client_secret for all resource requests.	<p>The EMR should</p> <ul style="list-style-type: none"> • Follow the workflow in Section: 6.1 Authorization Workflow • Use the JSON Web token payload Claims to determine access_token expiry and scope. (See Section 6.3.4 Payload Claims) • Use client_secret_expires element to determine client_secret expiry (See Section 6.2.4: Update Client Secret Response) 	If client_secret expires a new temporary client_secret must be obtained by contacting Shared Health.	Previous	System Integration Testing
AUTH07	Provides an error logging and handling mechanism for errors encountered in the message retrieval process.	<p>Error messages must be notified / reported to the EMR administrator/appropriate user, as well as be maintained in a system interface log.</p> <p>The logging/notification/reporting must be able to identify the date and time of attempt, error code, and error message.</p>	For error codes and samples error responses See: Section: 6.4 Error Responses	Previous	System Integration Testing
AUTH08	Maintains the client_id and client_secret is secure and non-transferable.	The client_id and the client_secret is for each given EMR instance and are not transferable to other sites, machines, or people.		Previous	Assertion
AUTH09	Secures requests to the Authorization and Resource services.	All requests must be logged and mediated through the EMR User access permissions.		Previous	System Integration Testing

		<p>The EMR secures service access information (client_id, client_secret, and access_token).</p> <p>At a minimum, securing service access information includes:</p> <ul style="list-style-type: none"> • Not exposing the service access information to the EMR User when making requests • Clearing traces of service access information from any memory or cache stores when expired or not in use <p>It is not acceptable to expose the service access information where an EMR User can access it. (e.g. configuration file which the EMR User has access, static and dynamic code, cookies, etc.)</p>			
AUTH10	Secures all third-party components.	At minimum, any third-party library, dependency, and/or integration must have its integrity verified against a trusted origin and must be routinely checked for updates or known vulnerabilities.		Previous	Assertion

5.3 Immunization Query Service Requirements

Unless otherwise stated, all functions must be able to be performed by a typical end-user. EMR administrator/appropriate user privileges should not require vendor intervention.

Table 4: Immunization Query Service Requirements

ID	REQUIREMENT	GUIDELINES	ADDITIONAL NOTES	STATUS	ASSESSMENT
IQS001	Integrates with the Immunization Query Service.	<p>Must support interfacing with the Immunization Query Service at the EMR instance level.</p> <p>For a description of the service see Appendix B: Immunization Query Service.</p> <p>All request headers must include:</p> <ul style="list-style-type: none"> • Authorization: "Bearer" followed by a valid access_token that has an immsapi scope • Content-Type: application/json • auditInfo (see Request Attributes) <p>All requests must be UTF-8 encoded.</p>		Previous	System Integration Testing
IQS002	Supports the Immunization Query Service resource search parameters.	See Supported Search Parameters.		Previous	System Integration Testing
IQS003	Provides and logs details of the user invoking the Immunization Query Service.	<p>Details include:</p> <ul style="list-style-type: none"> • User ID • User last name • User first name • Immunization Query Service request 		Previous	System Integration Testing
IQS004	Stores system level data elements.	<p>System level data elements are described in Table 8: System Data Elements.</p> <p>System level data elements must be included in the auditInfo header of all requests.</p>		Previous	System Integration Testing
IQS005	Provides access to the Immunization Query Service for EMR Users via their existing user credentials and privileges.			Previous	System Integration Testing

ID	REQUIREMENT	GUIDELINES	ADDITIONAL NOTES	STATUS	ASSESSMENT
IQS006	Provides the ability for an EMR administrator/appropriate user to grant or limit Immunization Query Service access to specific users or roles.	Provides the ability to prevent the user from making a request to the Immunization Query Service.	E.g. Hide the UI element for triggering the service or provide error message E.g. Specific user's access needs to be revoked	Previous	System Integration Testing
IQS007	Provides the ability for EMR administrators/appropriate users to enable or disable the Immunization Query Service for at the EMR instance level.			Previous	System Integration Testing
IQS008	Provides a mechanism for a user to trigger retrieval of Immunization History from the service on demand for a selected/in-context patient.	<p>Upon user trigger, retrieval of Immunization History must always occur in the following order:</p> <ol style="list-style-type: none"> a) Retrieve a patient resource b) Retrieve PHIMS immunization resources for the retrieved patient resource <p>Minimum data required to trigger retrieval Immunization History is either:</p> <ul style="list-style-type: none"> • Unique Patient Identifier; or • family (last name), birthDate and gender <p>It is not acceptable to allow user generated queries outside of a patient in context or editing of the data elements within the request.</p>	E.g. Button, link, menu item etc.	Previous	System Integration Testing

ID	REQUIREMENT	GUIDELINES	ADDITIONAL NOTES	STATUS	ASSESSMENT
IQS009	Displays EMR demographic data elements when Immunization Query Service is invoked.	At minimum, must include: <ul style="list-style-type: none"> • PHIN • Last Name • Date of Birth • Administrative Sex 	Existing patient data elements that are visible on the patient chart when service request is made is acceptable.	Previous	System Integration Testing
IQS010	Retrieves patient resource.	Invokes <i>GET Patient</i> request using EMR demographic data elements (see Supported Search Parameters). Must attempt to use one of the following sets of parameters (if available), in the following order: <ol style="list-style-type: none"> 1. Patient.id 2. PHIN, birthDate; else 3. family (last name), birthDate, gender EMR must retrieve <i>replaced-by</i> patient resource if <i>GET Patient/id</i> response contains a merged away patient (<i>Patient.active=false</i>) that contains a link to a <i>replaced-by</i> patient. EMR must store the Patient.id returned from a <i>GET Patient</i> (Unique Patient Identifier) response in the EMR patient record.		Previous	System Integration Testing
IQS011	Provides user option to invoke <i>GET Patient</i> request using family, birthDate, gender.	If a <i>GET Patient</i> request (PHIN, birthDate) indicates a patient could not be found, and if the patient has a Last Name, Date of Birth, Administrative Sex the option to invoke a <i>GET Patient</i> request using family, birthDate, gender or Cancel must be given to the user.	Example notification to user: "Patient not found using PHIN and birthDate.	Previous	System Integration Testing

ID	REQUIREMENT	GUIDELINES	ADDITIONAL NOTES	STATUS	ASSESSMENT
			Please review patient record, ensure information is correct, and resubmit request; or perform a search using last name, gender and date of birth."		
IQS012	Logs errors contained in a response.	Errors must also be presented to the user. See Immunization Query Service Error Responses.		Previous	System Integration Testing
IQS013	Notifies user of results that were blocked due to Consent to Disclose Directive when a <i>GET Patient</i> response is received.	<p>Consent to Disclose Directive exists when <i>GET Patient</i> response contains <i>OperationOutcome.issue.code=suppressed</i></p> <p>Must notify the user with the text from the error response (<i>OperationOutcome.issue.details.text</i> and <i>OperationOutcome.issue.diagnostics</i>), as well as an indication that any currently incorporated immunization resources for the patient may be out of date.</p>	Responses may contain both patient resources and a Consent to Disclose Directive.	Updated	System Integration Testing
IQS014	Provides a mechanism for the user to select a PHIMS patient from the list of <i>GET Patient</i> (family, birthDate, gender) results to retrieve immunization history for.	<p>Presents PHIMS patient resources returned from a <i>GET Patient</i> (family, birthDate, gender) response to the user.</p> <p>The following demographics returned must be viewable by the user:</p> <ul style="list-style-type: none"> • identifier 	Empty fields need not be displayed.	Previous	System Integration Testing

ID	REQUIREMENT	GUIDELINES	ADDITIONAL NOTES	STATUS	ASSESSMENT
		<ul style="list-style-type: none"> • name.given • name.family • birthDate • deceasedDateTime • gender • telecom.value • address <p>Even if there is only one result, the user must still select the patient.</p> <p>Must store the selected Patient.id in the EMR patient record.</p>			
IQS015	Retrieves PHIMS immunization resources.	<p>Invokes <i>GET Immunization?patient</i> request.</p> <p><i>GET Immunization?patient</i> request invoked following:</p> <ol style="list-style-type: none"> i. Successful <i>GET Patient</i> request using Unique Patient Identifier; or ii. User selection of a patient from <i>GET Patient</i> (family, birthDate, gender) results <p>Request must use Patient.id from the <i>GET Patient</i> response.</p> <p>Must <u>not</u> retrieve individual PHIMS immunization resources (e.g. Using Immunization.id).</p>		Previous	System Integration Testing

ID	REQUIREMENT	GUIDELINES	ADDITIONAL NOTES	STATUS	ASSESSMENT
IQS016	Displays the returned PHIMS patient demographics when a <i>GET Immunization?patient</i> response is received.	<p>Must display the following (if present):</p> <ul style="list-style-type: none"> • identifier • name.given • name.family • birthDate • deceasedDateTime • gender 	Allows the user to compare returned patient demographics to those on the EMR patient record in context.	Previous	System Integration Testing
IQS017	Displays the PHIMS immunization resources from a <i>GET Immunization?patient</i> response.	<p>Must display:</p> <ul style="list-style-type: none"> • All PHIMS immunization resources in the order received • All fields required to display, as per Table 22: Immunization Profile • Indication of which PHIMS immunization resources are currently incorporated (or un-incorporated) • Which incorporated PHIMS immunization resources have been updated since last retrieval • End-of-line characters “\n” translated into line breaks 	It is acceptable to allow user to filter/sort records after initial display.	Previous	System Integration Testing
IQS018	Displays a description of immunization CodeableConcept elements.	<p>At minimum, must display either:</p> <ul style="list-style-type: none"> • Description associated with the code from corresponding coding system/version (if available); or • CodeableConcept.text 	<p>Table 21: Patient Profile</p> <p>Table 22: Immunization Profile</p>	Previous	System Integration Testing

ID	REQUIREMENT	GUIDELINES	ADDITIONAL NOTES	STATUS	ASSESSMENT
IQS019	Provides the ability for the user to select which PHIMS immunization resources to incorporate into the EMR patient record.	<p>PHIMS immunization resources must <u>not</u> be automatically incorporated into the EMR without the involvement of the EMR user.</p> <p>Must not allow currently incorporated PHIMS immunization resources to be duplicated.</p> <p>Must not overwrite locally captured immunizations.</p>		Previous	System Integration Testing
IQS020	Provides the ability to create and execute queries related to immunization data in the EMR.	<p>Queries of immunization data include both locally created immunizations and incorporated PHIMS immunization resources.</p> <p>At a minimum, must provide the ability to:</p> <ul style="list-style-type: none"> • Select specific fields • Filter based on “AND”, “OR”, and “NOT” logic • Filter based on time period <p>Must allow user to select specific fields to display in query results.</p>	e.g. Create a query using vaccination details to generate a list of patients	Previous	System Integration Testing
IQS021	Displays incorporated PHIMS immunization resources.	<p>Incorporated PHIMS immunization resources must:</p> <ul style="list-style-type: none"> • Be displayed in the same location as locally created immunizations • Be identifiable as having originated from PHIMS • Not be editable by a user <p>Values must be displayed unaltered as originally received from the Service.</p>		Previous	System Integration Testing

ID	REQUIREMENT	GUIDELINES	ADDITIONAL NOTES	STATUS	ASSESSMENT
		Must display all elements marked as such in Table 22: Immunization Profile			
IQS022	Overwrites incorporated PHIMS immunization resources that have been updated in the <i>GET Immunization?patient</i> response.	<p>Must overwrite all incorporated PHIMS immunization resources that have been updated.</p> <p>An updated incorporated PHIMS immunization resource is determined by comparing the immunization resources contained in the response using both the:</p> <ul style="list-style-type: none"> • <i>Immunization.id</i> • <i>Immunization.meta.lastUpdated</i> <p>Must notify user of this activity.</p>		Previous	System Integration Testing
IQS023	Un-incorporates PHIMS immunization resources that cannot be found in the <i>GET Immunization?patient</i> response.	<p>Must un-incorporate all PHIMS immunization resources that cannot be found.</p> <p>An incorporated PHIMS immunization resource cannot be found if the <i>Immunization.id</i> does not exist in the immunization resources contained in the response.</p> <p>Must notify the user of this activity.</p>		Previous	System Integration Testing
IQS024	Removes all PHIMS data from the EMR patient record if the requested patient could not be found or has a Consent to Disclose Directive.	<p>EMR must remove all PHIMS data if:</p> <ul style="list-style-type: none"> • <i>GET Patient (Patient.id)</i> response contains <i>OperationOutcome.issue.code=not-found</i> • <i>GET Patient (Unique Patient Identifier)</i> response contains <i>OperationOutcome.issue.code=suppressed</i> <p>Removal of all PHIMS data includes:</p>		Retired	System Integration Testing

ID	REQUIREMENT	GUIDELINES	ADDITIONAL NOTES	STATUS	ASSESSMENT
		<ul style="list-style-type: none"> Any incorporated immunization resources Patient.id <p>Must notify the user of this activity.</p>			
IQS025	Retains audit trail of updated/un-incorporated PHIMS immunization resources.	<p>Must retain audit trail of the previous version of the resource.</p> <p>Must clearly reflect that it is either out of date or has been un-incorporated.</p> <p>See Table 22: Immunization Profile</p>		Previous	System Integration Testing
IQS026	Allow the user to remove all PHIMS data from the EMR patient record.	<p>At a minimum, includes:</p> <ul style="list-style-type: none"> Any incorporated PHIMS immunization resources Patient.id 		Previous	System Integration Testing
IQS027	Allows the user to un-incorporate individual PHIMS immunization resources from the EMR patient record.			Previous	System Integration Testing
IQS028	Allows the user to cancel Immunization Query Service related processes at any time.			Previous	System Integration Testing
IQS029	Provides the ability to continue existing EMR workflows in the event the Immunization Query Service is not available.			Previous	System Integration Testing

ID	REQUIREMENT	GUIDELINES	ADDITIONAL NOTES	STATUS	ASSESSMENT
IQS030	Displays error messages to the user based on the exception scenarios outlined under Immunization Query Service Error Responses.	See Immunization Query Service Error Responses.		Previous	System Integration Testing

5.4 Information Sharing Requirements

EMRs must satisfy the following information sharing requirements.

Table 5: Information Sharing Requirements

ID	REQUIREMENT	GUIDELINES	ADDITIONAL NOTES	STATUS	ASSESSMENT
INFS01	Provides Manitoba with notification in advance of planned changes to the EMR that relate to this specification.	Notification must include, at minimum, what has been changed in the EMR, and when the changes are planned.		Previous	Assertions
INFS02	Provides Manitoba with the ability to test planned changes to the EMR that relate to this specification.			Previous	Assertions
INFS03	Follow a documented process to track issues and problems during development and ongoing support of the EMR.			Previous	Assertions
INFS04	Follow a documented process to track changes to the EMR.		E.g. Process may include versioning information and how changes are logged.	Previous	Assertions

5.5 Baseline and Legacy Requirements

EMRs must satisfy all requirements listed in the [Baseline EMR Requirements Specification](#). In the context of this specification, the following selected Baseline requirements will be re-assessed using the assessment methods noted below.

Table 6: Baseline Requirements

BASILINE CATEGORY	RELEVANT REQUIREMENT	ASSESSMENT METHOD
Immunizations	08-001	Assertion
Immunizations	08-002	Assertion
Security	17-001	Assertion
Security	17-002	Assertion

EMR Products certified to the Primary Care Quality Indicator (PCQI) Reminder and Data Extract Specification must continue to satisfy that full specification, including:

Table 7: PCQI Requirements

PCQI CATEGORY	RELEVANT REQUIREMENT	ASSESSMENT METHOD
General	PCG-03	Assertion

5.6 Data Capture Requirements

The following table contains the data elements required of the EMR to support usage of the Service. System data elements for requests to the Service are defined in Table 8.

Table 8: System Data Elements

ID	DATA ELEMENT	DESCRIPTION	GUIDELINES	STATUS	ASSESSMENT
IQSSYS-01	Organization Name		Display of this data element to the EMR User is not required. Must provide the ability to be updated manually by an EMR administrator/appropriate user.	Previous	System Integration Testing
IQSSYS-02	Organization ID	Unique organization identifier. Shared Health will provide this value.	Display of this data element to the EMR User is not required.	Previous	System Integration Testing

ID	DATA ELEMENT	DESCRIPTION	GUIDELINES	STATUS	ASSESSMENT
			Must provide the ability to be updated manually by an EMR administrator/appropriate user.		
IQSSYS-03	System Name	The EMR product name.	Display of this data element to the EMR User is not required. Must be identical for all instances of an EMR product (i.e. Not configurable per instance).	Previous	System Integration Testing
IQSSYS-04	System ID	ID of the system instance. Shared Health will provide this value.	Display of this data element to the EMR User is not required. Must provide the ability to be updated manually by an EMR administrator/appropriate user.	Previous	System Integration Testing
IQSSYS-05	User ID	ID of the EMR user invoking the service.	Display of this data element to the EMR User is not required.	Previous	System Integration Testing

6 Appendix A: Authorization Service

The Authorization Service is designed for a machine-to-machine non-interactive manner (i.e. no user interaction). The following diagram and description describe the authorization service to facilitate requesting a resource from the API (aka Resource Server). **Note: The diagram below and description does not infer a specific sequence of events.**

Machine 2 Machine Non-interactive Authorization

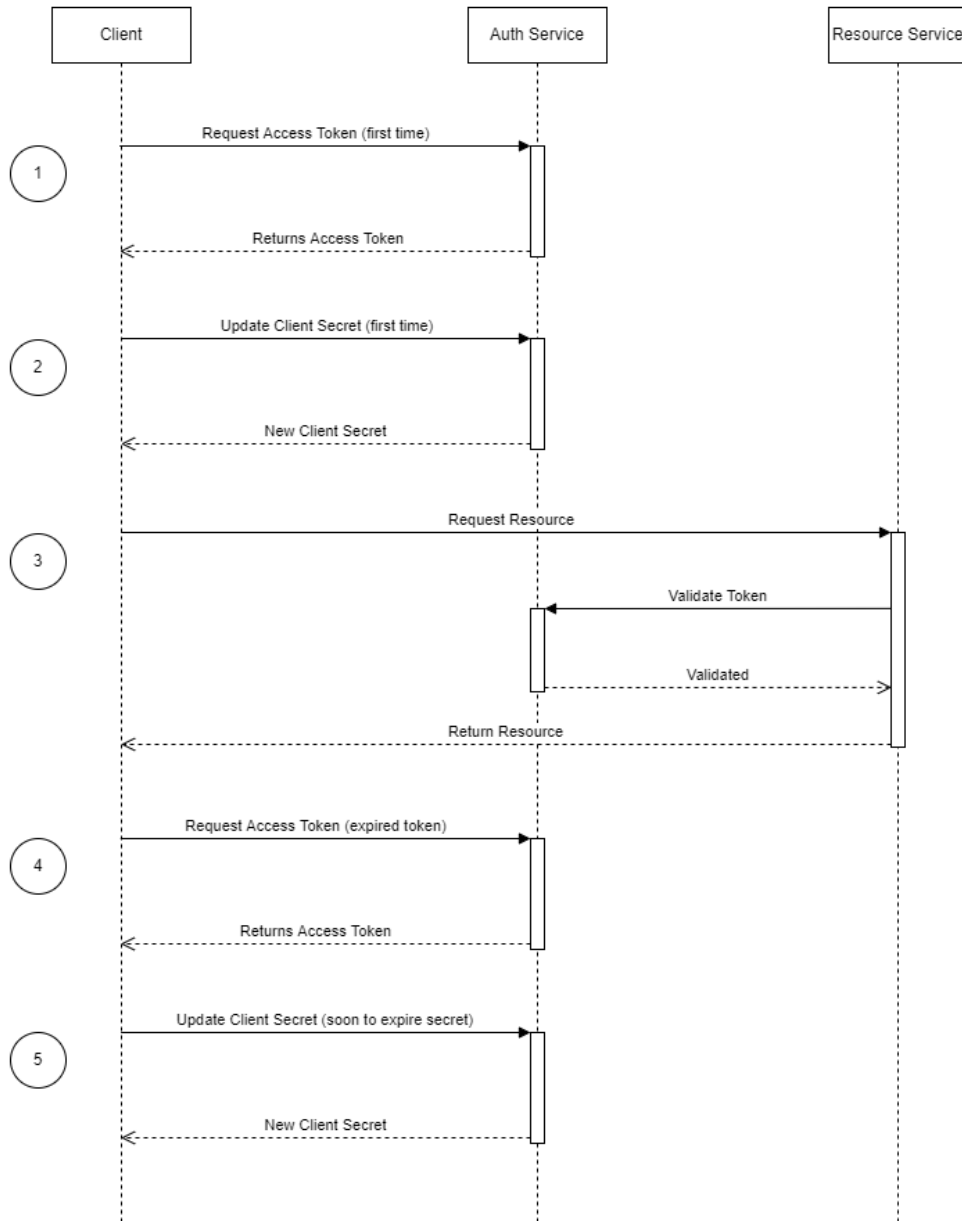


FIGURE 4: MACHINE-TO-MACHINE NON-INTERACTIVE AUTHORIZATION

1. Request Access Token (first time)
 - Request an access token passing in the client_id, a new temporary client_secret. If successful, the response will return an access_token that can only be used to request an updated client_secret.
2. Update Client Secret (first time)
 - Request an updated client secret, passing in the access_token. The response will contain a new client_secret. Using the new client_secret the EMR can get a new access_token for resource requests.
3. Request Resource
 - The resource service can be accessed by making a request with a valid access_token. The resource service validates the access_token on each request.
4. Request Access Token (expired token)
 - When the access token is expired or at any time before the access token is expired, a new token can be requested. This access token will provide access to the resource service.
5. Update Client Secret (soon to be expired client_secret)
 - At any time before the client_secret expires a new client_secret can be requested using a valid access_token
 - If the client_secret expires a new temporary client_secret must be obtained by contacting Shared Health

6.1 Authorization Workflow

The EMR should follow the Authorization Workflow below to maintain a valid access token and client_secret. In addition to the workflow below, a separate system-based management of a valid client_secret may be encouraged to remove a dependency on resource requests.

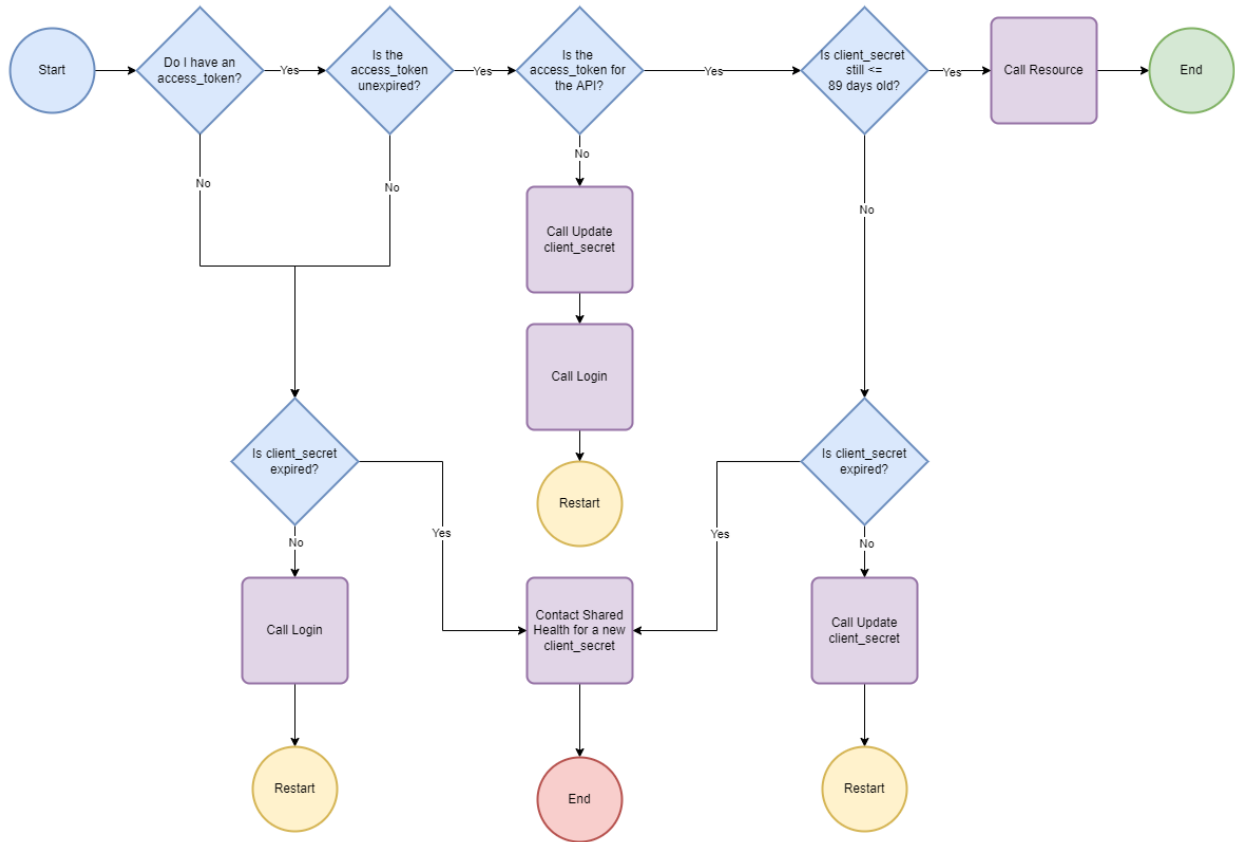


FIGURE 5: AUTHORIZATION WORKFLOW

Workflow prerequisite: EMR has a client_id and a temporary client_secret

1. **Do I have an access_token?**
 - **No** - Is client_secret expired?
 - **No** – Call Login and restart
 - **Yes** – Contact Shared Health for a new client_secret
 - **Yes** - Continue
2. **Is the access_token unexpired?**
 - **No** - Is client_secret expired?
 - **No** – Call Login and restart
 - **Yes** – Contact Shared Health for a new client_secret
 - **Yes** - Continue
3. **Is the access token for the API?**
 - **No**
 - Call Update client_secret request to get client_secret
 - Call Login request to get access_token and restart
 - **Yes** - Continue
4. **Is client_secret still <= 89 days old?**

- **No** - *Is client_secret expired?*
 - **No** – *Call Update client_secret and restart*
 - **Yes** – *Contact Shared Health for a new client_secret*
 - **Yes** - Continue
5. **Call Resource**
- **End**

6.2 Request / Response Definitions

Table 9: Authorization Requests

NAME	END POINT	OPERATION
<i>Login</i>	https://<auth service hostname>/auth/v1/login	POST
<i>Update Client Secret</i>	https://<auth service hostname>/auth/v1/update-client-secret	GET

6.2.1 Login Request

This request retrieves an access_token using a client_id and client_secret.

6.2.1.1 Elements

Table 10: Login Request Elements

ELEMENT ID	CARD.	TYPE	DESCRIPTION
client_id	1..1	string	Supplied by Shared Health
client_secret	1..1	string	A new temporary client_secret will be supplied by Shared Health

6.2.1.2 Body Sample

```
{
  "client_id": "53ABCD58C87D2129333A5E91",
  "client_secret": "1nmts@Xf9Yd[YpH0m59vZgLHE"
}
```

Table 11: Login Response Elements

ELEMENT ID	CARD.	TYPE	DESCRIPTION
access_token	1..1	string	JSON Web Token (JWT). See Section: 6.3 JSON Web Token
token_type	1..1	string	Returns "Bearer"
expires_in	1..1	number	Seconds when the access_token will expire
client_secret_expires	1..1	number	Date the secret will expire. UNIX epoch time format.
scope	1..1	string	Describes the use of the access_token: <ul style="list-style-type: none"> • auth – access to the auth API • immsapi - access to the IQS API <p>If scope only contains auth you will need to get a new client_secret.</p>

6.2.2.1 Body Sample

```
{
  "access_token": "eyJ0eXAiOiJKV1QiLCJhbGciOiJIeS4uIiwiaWF0IjoiIj09Lm9aQSGWIO4uYQwM72E0tMRnOVckIOF",
  "token_type": "Bearer",
  "expires_in": 28800,
  "client_secret_expires ": 1667596992,
  "scope": "auth immsapi"
}
```

6.2.3 Update Client Secret Request

This request uses the access_token obtained from a *Login* request to request a client secret.

6.2.4 Update Client Secret Response

6.2.4.1 Elements

Table 12: Update Client Secret Response Elements

ELEMENT ID	CARD.	TYPE	DESCRIPTION
client_secret	1..1	string	New client secret
client_secret_expires	1..1	number	Date the secret will expire. UNIX epoch time format.

6.2.4.2 Body Sample

```
{
  "client_secret": "rYJQGuvkP9DM8ukuRU[Pkj/V5]",
  "client_secret_expires ": 1667596992
}
```

6.3 JSON Web Token

The access_token used by this service is a JSON Web Token (JWT). A JWT is an authentication token with 3 parts. The Header, Payload and Signature. The three parts are delimited by a "." (e.g. [header.payload.signature](#)). See sample below:

```
eyJ0eXAiOiJKV1QiLCJhbGciOiJIUzI1NiJ9.eyJzdWIiOiI1M0FCQ0RCNThDODdEMjEyOTMzM0E1RTkxIiwiaWF0IjoiIj09Lm9aQSGWIO4uYQwM72E0tMRnOVckIOFhdCI6MTY2NzUzODU0Mn0.Ajl0g0t1FyrAU1iGqztVKhVffiu4FFUSOCLTzdYU9yg
```

The following sections shows the decoded parts of the token

The EMR can base64 decode the header and payload to extract important information. Use the payload section to extract information about when the token was issued and when the token will expire.

See <https://www.rfc-editor.org/rfc/rfc7519> for further information on the JWT standard

6.3.1 Decoded Header

```
{
  "alg": "HS256",
  "typ": "JWT"
}
```

6.3.2 Decoded Payload

```
{
  "sub": "53ABCDB58C87D2129333A5E91",
  "auth": true,
  "immsapi": true,
  "scope": "auth",
  "iss": "hial-sharedhealth-mb-ca",
  "exp": 1667596992,
  "iat": 1667568192
}
```

6.3.3 Signature

The signature will be used by the authorization service to verify the integrity of the token.

6.3.4 Payload Claims

The EMR can use the payload claims to determine required actions to maintain a valid access_token.

Table 13: Payload Claims

CLAIM ITEM	CARD.	TYPE	DESCRIPTION
sub	1..1	string	client_id
iss	1..1	string	Name of the issuer
iat	1..1	number	Date the token was issued. UNIX epoch time format.
exp	1..1	number	Date the token will expire. UNIX epoch time format.
scope	1..1	string	Describes the use of the access_token
Auth	0..1	boolean	Representation of the auth scope access
immsapi	0..1	boolean	Representation of the immsapi scope access

6.4 Error Responses

The response errors are produced in the case of an error scenario.

Table 14: Error Response Elements

ELEMENT ID	CARD.	TYPE	DESCRIPTION
statusCode	1..1	string	Error code
error	1..1	string	Description of the error category
message	0..*	string	Additional information about the type of error message

6.4.1.1 Error Codes

The following list is a sample of the most common error scenarios that may occur:

Table 15: Error Codes

STATUS CODE	ERROR	NOTES
401	Unauthorized	Either the original username/password credentials are invalid, or the authentication token is invalid or expired. Remediation steps: Try logging in again with the username and password. Contact Shared Health Support if the problem persists.
5xx	An unknown internal error has occurred.	Contact Shared Health Support

6.4.1.2 Response Body Sample

```
{
  "statusCode": 401,
  "error": "Unauthorized"
}
```

7 Appendix B: Immunization Query Service

This section describes the Immunization Query Service request, response, and error details. Complete definitions available in the swagger file, which will be included in the Assessment Addendum.

The Immunization Query Service request and response definitions are modeled after the FHIR R4 specification.

7.1 Request Attributes

Table 16 contains auditInfo elements that are part of every service request header.

Table 16: auditInfo Elements

ELEMENT ID	CARD.	TYPE	MAX LENGTH	DESCRIPTION
orgName	1..1	string	100	Name of organization
orgID	1..1	string	100	ID of organization
sysName	1..1	string	100	Name of the EMR
sysID	1..1	string	100	ID of the system instance. Equivalent to EMR ID
userID	1..1	string	100	ID of the user making the request
userFirstName	0..1	string	1000	First Name of the user making the request
userLastName	0..1	string	1000	Last Name of the user making the request

7.2 Request Definitions

End points are preceded by the URL found in the Assessment Addendum.

Table 17: Requests

END POINT	DESCRIPTION	OPERATION
/Patient/{id}	Returns a single patient resource from PHIMS.	GET
/Patient	Returns a list of matching patient resources in PHIMS. Criteria is either: <ul style="list-style-type: none"> - PHIN and birthDate (returns bundle with up to a single patient resources) - family, birthDate, gender (may return bundle with many patient resources) 	GET
/Immunization	Returns a list of PHIMS immunization resources for the given patient resource.	GET

7.2.1 Supported Search Parameters

- Get Patient
 - Search by Patient's Manitoba PHIMS Client ID (Patient.id)
 - Manitoba PHIMS Client ID is the identifier parameter
 - Example: Patient/1234
 - Search by Patients PHIN and birthDate
 - PHIN is the identifier parameter
 - PHIN and Date of Birth must be included
 - No other parameters are permitted

- Example: Patient?identifier=https://fhir.infoway-inforoute.ca/NamingSystem/ca-mb-patient-healthcare-id|123456789&birthDate=2001-12-23
 - Search by Patient's family, birthDate, gender
 - Family, birthDate, gender must be included
 - No other parameters are permitted
 - Example: Patient?family=PatientLastName&birthDate=2001-12-23&gender=female
 - Any other combination of search parameters will return an error
- Get Immunization
 - Search by Patient's PHIMS Client ID (Patient.id).
 - Manitoba PHIMS Client ID is the identifier parameter
 - Example: Immunization?patient=1234

7.3 FHIR Profiles

For some elements, cardinality has a superscripted asterisk symbol to the right (e.g. 0..1*). It means this element has been constrained from “repeating” in the general FHIR spec (e.g. 0..*) to a single instance. Despite this constraint, this element should still be represented as an array in a FHIR JSON message (e.g. “element [{}]”).

7.3.1 Identifier Variables

The base for global identifier namespaces will be referred to as “[id-system-global-base]” in the sections below.

The base for local identifier namespaces or code systems will be referred to as “[system-local-base]” in the sections below.

Table 18: Identifier Variables

VARIABLE	VALUE
[id-system-global-base]	https://fhir.infoway-inforoute.ca/NamingSystem
[system-local-base]	http://healthproviders.sharedhealthmb.ca/services/his/him

7.3.2 Bundle Resource

Based on <http://hl7.org/fhir/R4/bundle.html>

A special type of resource for a collection of resources.

A set of search results (type – “searchset”) consists of a series of zero or more entries. Each entry element will contain a resource (e.g. patient, immunization, operation outcome).

Bundle.total may be used to return the total number of resources that match the search, and that may be returned by following the “next” link.

Table 19: Bundle Resource Definition

NAME	CARD.	TYPE	VALUE/VOCAB	DESCRIPTION	COMMENTS
resourceType	1..1	code	Fixed: “bundle”		
type	1..1	code	Fixed: “searchset”	Type of bundle	
total	1..1	unsignedInt		Total number of matches	
link	0..*	BackboneElement		Links related to this bundle	Optional element, might be returned by a server
-relation	1..1	code	“self” for the link to the Bundle “next” for the link to the next page		ValueSet: http://www.iana.org/assignments/link-relations/link-relations.xhtml

-url	1..1	uri		Reference details for the link	
entry	0..*	BackboneElement		Entry in the bundle – will have a resource, or information	
-fullUrl	1..1	uri		Absolute URL for resource (server address, or UUID/OID)	The fullUrl element must be present when a resource is present, and not present otherwise
-resource	1..1	Resource	fhirImmunization fhirPatient fhirOperationOutcome	A resource in the bundle	
-search	0..1	BackboneElement		Search related information	
--mode	0..1	code		match include - why this is in the result set	

7.3.3 *OperationOutcome Resource*

Based on <http://hl7.org/fhir/R4/operationoutcome.html>

Operation Outcomes are sets of error, warning and information messages that provide detailed information about the outcome of some attempted system operation. They are provided as a direct system response, or component of one, where they provide information about the outcome of the operation.

OperationOutcomes are used in the following circumstances:

- When a RESTful operation fails
- As the response on a validation operation, to provide information about the outcomes
- As part of a message response, usually when the message has not been processed correctly

This resource is not used for reporting clinical or workflow issues associated with a proposed or ongoing action. The resource is not designed to be persisted or referenced from other parts of the workflow.

Table 20: OperationOutcome Resource Definition

NAME	CARD.	TYPE	VALUE/VOCAB	DESCRIPTION
resourceType	1..1	code	Fixed: "fhirOperationOutcome"	
issue	1..*	BackboneElement		
-severity	1..1	code	ValueSet: http://hl7.org/fhir/ValueSet/issue-severity	
-code	1..1	code	ValueSet: http://hl7.org/fhir/ValueSet/issue-type	Error or warning code
-details	0..1	CodeableConcept		Additional details about the error
--coding	0..1*	coding		A reference to a code defined by a terminology system
---system	0..1	uri		Identity of the terminology system

---code	0..1	code		Symbol in syntax defined by the system
---display	0..1	string		Representation defined by the system
--text	0..1	string		Plain text representation of the concept
-diagnostics	0..1	string		Additional details about the error

7.3.4 *Consent to Disclose Directive in OperationOutcome*

The OperationOutcome resource may be included in the response bundle, in response to a patient search request. This may indicate that there are additional patient resources available for retrieval, but were not included due to a Consent to Disclose Directive. The OperationOutcome resource will have the following values:

- severity = warning
- code = suppressed

The code “suppressed” from Value Set <http://hl7.org/fhir/valueset-issue-type.html> is used in OperationOutcome.issue.code (Required).

7.3.5 Patient Profile

Patient Profile based on <http://www.hl7.org/fhir/R4/patient.html>

Table 21: Patient Profile

NAME	CARD.	TYPE	VALUE/VOCAB	DESCRIPTION
resourceType	1..1	code	Fixed: “Patient”	
meta	0..1	object		
-lastUpdated	1..1	dateTime		When the patient last changed (YYYY-MM-DDThh:mm:ssZ format) in the PHIMS database
id	1..1	string		The unique identifier for the patient in PHIMS
Identifier	0..2	Identifier		Identifier for this patient
-type	1..1	CodeableConcept		
--coding	1..1*	Coding		
---system	1..1	uri	Fixed: "http://terminology.hl7.org/CodeSystem/v2-0203"	
---code	1..1	code	“JHN” or “MR”	

---display	1..1	string		
-system	1..1	uri	See Table 25	
-value	1..1	string		
active	1..1	boolean		Whether this patient's record is in active use
name	0..1*	HumanName		Patient name
-text	0..1	string		A full text representation of the name
-family	0..1	string		Family name (often called 'Surname')
-given	0..*	string		Given names (not always 'first'). Includes middle names
telecom	0..1*	ContactPoint		Patient phone number
-system	1..1	code	Fixed: "phone"	The type of contact point
-value	1..1	string		The actual contact point details
gender	0..1	code	male female other unknown	Administrative Gender, the gender that the patient is considered to have for administration and record keeping purposes
birthDate	0..1	date		The date of birth in YYYY-MM-DD format
deceasedDateTime	0..1	dateTime		The date of death in YYYY-MM-DDThh:mm:ssZ format
address	0..1*	Address		Patient address
-text	0..1	string		A full text representation of the address
-line	0..*	string		This component contains the house number, apartment number, street name, street direction, P.O. Box number, delivery hints, and similar address information
-city	0..1	string		Name of city, town etc.
-state	0..1	string		Sub-unit of country (abbreviations ok)
-postalCode	0..1	string		Postal code for area
-country	0..1	string		Country (can be ISO 3166 3 letter code)

link	0..1	BackboneElement		
-other	1..1	Reference		
--reference	1..1	string		The other patient resource that replaced this patient
-type	1..1	code	replaced-by replaces refer seealso	The type of link between this patient resource and the other patient resource

7.3.6 Immunization Profile

Immunization Profile based on <http://www.hl7.org/fhir/R4/immunization.html>

Table 22: Immunization Profile

NAME	CARD.	TYPE	VALUE/VOCAB	DESCRIPTION	MUST DISPLAY
resourceType	1..1	code	Fixed: "Immunization"		No
Extension[1]	0..1	Element		Vaccine schedule status	Yes
-url	1..1	Uri	Fixed: "[system-local-base]/fhir/4.0/ ca-mb-immunization-schedule-status"		
-valueCodeableConcept	1..1	CodeableConcept			
--coding	1..1*	Coding			
---system	1..1	uri			
---version	0..1	string			
---code	1..1	Code			
--text	1..1	string			
Extension[2]	0..1	Element		Status Override Reason	Yes
-url	1..1	Uri	Fixed: "[system-local-base]/fhir/4.0/ca-mb-immunization-status-override-reason"		
-valueCodeableConcept	1..1	CodeableConcept			
--coding	1..1*	Coding			
---system	1..1	uri			
---version	0..1	string			

---code	1..1	Code			
--text	1..1	string			
Extension[3]	0..1	Element		Tradename	Yes
-url	1..1	Uri	Fixed: "[system-local-base]/fhir/4.0/ca-mb-immunization-tradename"		
-valueCodeableConcept	1..1	CodeableConcept			
--coding	0..1*	Coding			
---system	0..1	uri			
---version	0..1	string			
---code	0..1	Code			
--text	1..1	string			
meta	0..1	Object			No
-lastUpdated	1..1	dateTime	YYYY-MM-DDThh:mm:ssZ	When the immunization resource last changed in PHIMS	
id	1..1	string		Unique identifier for the resource	No
identifier	1..1	Identifier		Unique identifier for the resource	No
-system	1..1	uri	Fixed: "[system-local-base]/NamingSystem/ca-mb-phims-immunization-id"		
-value	1..1	string			
status	1..1	code	completed entered-in-error not-done	Status of the immunization event	Yes
vaccineCode	1..1	CodeableConcept		Vaccine product administered	Yes
-coding	1..1*	Coding			
--system	1..1	uri			
--version	0..1	string			
--code	1..1	code			
-text	1..1	string			

patient	1..1	Reference (Patient)		Patient who was immunized, reference	No
-reference	1..1	string			
lotNumber	0..1	string		Lot number of the vaccine product	Yes
expirationDate	0..1	date	YYYY-MM-DD	Vaccine lot expiration date	Yes
occurrenceDateTime	1..1	dateTime	YYYY-MM-DDThh:mm:ssZ	Vaccine administration date	Yes
site	0..1	CodeableConcept		Body site vaccine was administered	Yes
-coding	1..1*	Coding			
--system	1..1	uri			
--version	0..1	string			
--code	1..1	Code			
-text	1..1	string			
route	0..1	CodeableConcept		How vaccine entered body	Yes
-coding	1..1*	Coding			
--system	1..1	uri			
--version	0..1	string			
--code	1..1	Code			
-text	1..1	Coding			
doseQuantity	0..1	SimpleQuantity		Amount of vaccine administered	Yes
-value	1..1	decimal			
-unit	1..1	string			
performer	0..1*	BackboneElement		Who performed event	Yes
-function	1..1	CodeableConcept			
--coding	1..1*	Coding			
---system	1..1	uri	Fixed: "http://terminology.hl7.org/CodeSystem/v2-0443"		

---code	1..1	code	Fixed: "AP"		
---display	0..1	string			
-actor	1..1	Reference			
--display	1..1	string			
note	0..*	Annotation		Additional immunization notes	Yes
-text	1..1	markdown		Must translate end-of-line characters "\n" into line breaks upon display	
reasonCode	0..1	CodeableConcept		Why immunization occurred	Yes
-coding	1..1*	Coding			
--system	1..1	Uri			
--version	0..1	string			
--code	1..1	code			
-text	1..1	string			

7.4 Responses

The table below outlines resources that may be returned from each request.

Table 23: Responses

REQUEST	HTTP CODE	BUNDLE	PATIENT	IMMUNIZATION	OPERATIONOUTCOME
GET Patient/id	200	No	0..1	NA	0..1
GET Patient (PHIN, birthDate)	200	Yes	0..1	NA	0..1
GET Patient (family, birthdate, gender)	200	Yes	0..*	NA	0..1
GET Immunization?patient	200	Yes	NA	0..*	0..1

7.5 Immunization Query Service Error Responses

The following list is a sample of the most common error scenarios that may occur:

Table 24: HTTP Response Codes

OPERATION	VALIDATION	HTTP CODE	OPOUTCOME CODE	OPOUTCOM E SEVERITY	EXAMPLE SCENARIOS
ALL	Bad Request	400	Bad-request	error	Identifier must have a valid typeCode and id DateOfBirth must be format error Unknown Gender Code An error has occurred parsing the JSON message auditInfo is NOT provided in request header orgName, orgID, sysName or sysID should be less than 100 characters userID, userFirstName or userLastName should be less than 1000 characters Minimum search criteria has not been met.
	Not Found	404	Not-found	Error	The requested resource was not found
	Server Error	500	Exception	Error	The server encountered an unexpected error
GET Patient/id	Forbidden	403	No-consent	error	The request was forbidden The request was blocked by Consent to Disclose Directive
	Not Found	404	Not-found	Error	Client not found in PHIMS
GET Patient (PHIN, birthdate)	Consent Block	200	Suppressed	Warning	
	Not Found	404	Not-found	Error	A valid MB Health record could not be found with this PHIN and Date of Birth

GET Patient (family, birthdate, gender)	Consent Block	200	Suppressed	information	One or more patient records have been suppressed due to lack of consent
GET Immunization?patient	Consent Block	200	Suppressed	information	One or more Immunization records have been suppressed due to lack of consent
	Not Found	404	Not-found	Error	The requested resource was not found
	Forbidden	403	No-consent	Error	The request was forbidden The request was blocked by Consent to Disclose Directive

8 Appendix C: Type Codes

8.1 Patient Identifier Type Codes

Table 25: Patient Identifier Type Codes

NAMING SYSTEM REFERENCE	DESCRIPTION
[system-local-base]/NamingSystem/ca-mb-phims-client-id	Manitoba PHIMS Client ID
[id-system-global-base]/ca-ab-patient-healthcare-id	Alberta Health Card
[id-system-global-base]/ca-bc-patient-healthcare-id	British Columbia Health Card
[id-system-global-base]/ca-mb-patient-healthcare-id	Manitoba Health Card (PHIN)
[id-system-global-base]/ca-nb-patient-healthcare-id	New Brunswick Health Card
[id-system-global-base]/ca-nl-patient-healthcare-id	Newfoundland and Labrador Health Card
[id-system-global-base]/ca-nt-patient-healthcare-id	Northwest Territories Health Card
[id-system-global-base]/ca-ns-patient-healthcare-id	Nova Scotia Health Card
[id-system-global-base]/ca-nu-patient-healthcare-id	Nunuvut Health Card
[id-system-global-base]/ca-on-patient-hcn	Ontario Health Card
[id-system-global-base]/ca-pe-patient-healthcare-id	Prince Edward Island Health Card
[id-system-global-base]/ca-qc-patient-healthcare-id	Quebec Health Card
[id-system-global-base]/ca-sk-patient-healthcare-id	Saskatchewan Health Card
[id-system-global-base]/ca-yt-patient-healthcare-id	Yukon Health Card

8.2 Immunization Query Service System References

Table 26: Immunization Query Service System References

SYSTEM	URI	ELEMENT
HL7 v3 ActSite	http://terminology.hl7.org/CodeSystem/v3-ActSite	site
HL7 v3 ActCode	http://terminology.hl7.org/CodeSystem/v3-ActCode	
SNOMED CT Canadian Edition	system of http://snomed.info/sct and version: http://snomed.info/sct/20611000087101	route vaccineCode reasonCode site extension: vaccineScheduleStatus extension: statusOverrideReason
Health Canada Drug Identification Number (DIN)	http://hl7.org/fhir/NamingSystem/ca-hc-din urn:oid:2.16.840.1.113883.5.1105	vaccineCode
RIExtActSite	Urn:oid: 2.16.840.1.113883.3.122.3.66	site
RISNOMEDEExtension	Urn:oid: 2.16.840.1.113883.3.122.3.254	vaccineCode reasonCode site

RiImmunizationMgmtVaccineStatus	urn:oid:2.16.840.1.113883.3.122.3.2063	
RiImmunizationMgmtVaccineStatusChangeReason	urn:oid:2.16.840.1.113883.3.122.3.2064	Extension: statusOverrideReason
RiLotMaintenanceChangeReason	Urn:oid: 2.16.840.1.113883.3.122.3.1245	Extension: statusOverrideReason
JiMBSNOMEDCdnExtension	urn:oid:2.16.840.1.113883.3.379.1.2.2.96.1	vaccineCode
JiMBSNOMEDCoreDelta	urn:oid:2.16.840.1.113883.3.379.2.50.2.1000.96.1	vaccineCode
MB Codes	urn:oid:2.16.840.1.113883.3.379.1.2.2.1.1	vaccineCode
JiMBSNOMEDMBExtension	urn:oid:2.16.840.1.113883.3.379.1.2.2.96.2	vaccineCode site
JiMBActImmunizationReason	urn:oid:2.16.840.1.113883.3.379.2.50.2.273	reasonCode
RiActCode	urn:oid:2.16.840.1.113883.5.4	reasonCode
RiActSite	urn:oid:2.16.840.1.113883.5.1052	site
Status Override Reason	[system-local-base]/terminology/codesystems/local/PHIMS/ca-mb-immunization-status-override-reason	Extension: statusOverrideReason
Vaccine Schedule Status	[system-local-base]/terminology/codesystems/local/PHIMS /ca-mb-immunization-schedule-status	extension: vaccineScheduleStatus
Vaccine Code	[system-local-base]/terminology/codesystems/local/PHIMS/ca-mb-immunizing-agent	vaccineCode
Route	[system-local-base]/terminology/codesystems/local/PHIMS/ca-mb-administration-route	route
Reason Code	[system-local-base]/terminology/codesystems/local/PHIMS/ca-mb-immunization-reason	reasonCode
Site	[system-local-base]/terminology/codesystems/local/PHIMS/ca-mb-administration-site	site
Trade Name	[system-local-base]/terminology/codesystems/local/PHIMS /ca-mb-immunization-tradename	Extension: tradename

8.3 Extensions

Table 27: Immunization Extension ca-mb-immunization-schedule-status

NAME	CARD	TYPE	VALUE/VOCAB	DESCRIPTION
Extension	0..1	Extension		Vaccine Schedule Status
-url	1..1	uri	Fixed: "[system-local-base]/fhir/4.0/ca-mb-immunization-schedule-status"	
-valueCodeableConcept	1..1	CodeableConcept		
--coding	1..1	Coding		
---system	1..1	uri		
---version	0..1	string		

---code	1..1	Code		
--text	1..1	string		

Table 28: Immunization Extension ca-mb-immunization-status-override-reason

NAME	CARD	TYPE	VALUE/VOCAB	DESCRIPTION
extension	0..1	Extension		Status Override Reason
-url	1..1	uri	Fixed: “[system-local-base]/fhir/4.0/ca-mb-immunization-status-override-reason”	
-valueCodeableConcept	1..1	CodeableConcept		
--coding	1..1	Coding		
---system	1..1	uri		
---version	0..1	string		
---code	1..1	Code		
--text	1..1	string		

Table 29: Immunization Extension ca-mb-immunization-tradename

NAME	CARD	TYPE	VALUE/VOCAB	DESCRIPTION
extension	0..1	Extension		Tradename
url	1..1	uri	Fixed: “[system-local-base]/fhir/4.0/ca-mb-immunization-tradename”	
valueCodeableConcept	1..1	CodeableConcept		
--coding	1..1	Coding		
---system	1..1	uri		
---version	0..1	string		
---code	1..1	Code		
-text	1..1	string		

9 Appendix D: Use Case to Requirement Traceability

Table 30: Use Case to Requirement Traceability Matrix

Rqmt ID	UC-01 Configure Immunization Query Service	UC-02 Initiate Imms Request	UC-03 GET Patient	UC-04 GET Immunizations	UC-05 Remove PHIMS Data	UC-06 View Imms	UC-07 Cancel	Totals
IQS001	X							1
IQS002			X	X				2
IQS003		X	X	X				3
IQS004	X							1
IQS005	X	X						2
IQS006	X							1
IQS007	X							1
IQS008		X						1
IQS009		X						1
IQS010			X					1
IQS011			X					1
IQS012			X	X				2
IQS013			X					1
IQS014			X					1
IQS015				X				1
IQS016				X				1
IQS017				X				1
IQS018			X	X		X		3
IQS019				X				1
IQS020						X		1
IQS021						X		1
IQS022				X				1
IQS023				X				1
IQS025			X	X				2
IQS026					X			1
IQS027					X			1
IQS028							X	1
IQS029			X	X				2
IQS030			X	X				2
Totals	5	4	11	13	2	3	1	2

10 Appendix E: Release Notes

Version 1.1 October 25, 2023

- Initial release.

Version 1.2 November 20, 2023

- Updated GET Patient (UC-03) Exception E4 Consent to Disclose Directive Step 1b – Removed text about removing all PHIMS data from patient record. Added text about indicating that any currently incorporated immunization resources for the patient may be out of date.
- Updated IQS013 – added text to guidelines about indicating that any currently incorporated immunization resources for the patient may be out of date.
- Retired IQS024
- Appendix E: Use Case to Requirement Traceability – removed IQS024
- Renamed Appendix E to D and Appendix F to E