pan-Canadian Patient Summary

PS-CA Interoperability Specifications

Version: 0.2

Type: Draft

Release Date: January 28, 2022

Canada Health Infoway

Table of Contents

1 Introduction

The *pan-Canadian Patient Summary Interoperability Specification* is an implementable, testable specification, based on the IHE International Patient Summary (IPS) specification and the HL7 IPS Implementation Guide. It defines building blocks to create and share condition-independent and specialty-agnostic patient summaries, irrespective of the condition of the patient or the treatment sought or specialty of the provider delivering care. PS-CA building blocks are configurable to address necessary Canadian jurisdictional variances. A patient summary is a health record extract, at a point in time, comprised of a standardized collection of clinical and contextual information (retrospective, concurrent, prospective), including the minimum necessary and sufficient data to inform a patient's treatment at the point of care.

The PS-CA specifications, written in line with international best practices, contain the information necessary for an implementer to consume and develop the components necessary for creating, consuming and sharing a Patient Summary and may be applied to existing and new information systems.

2 Intended Audience

The intended audience of this document includes but is not limited to:

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

3 Purpose

The purpose of this document is to address the following functionality for release 1:

- Address three PS-CA use cases,
- Provide a detailed set of requirements (including Actors, Transactions and References to specific profiles and standards),
- Describe the implementation patterns that enable the exchange of the PS-CA, and
- Describe the set of requirements that complement the set of IHE Profiles, pan-Canadian Interoperability Specifications (e.g. CA:FeX), and HL7 FHIR® Profiles required by the PS-CA specifications with Canadian-specific constraints.

4 Glossary of Terms and Acronyms

The following terms appear throughout the PS-CA Specifications:

Term / Acronym	Meaning
Business/Legal Interoperability Requirements	Requirements that enable independent organizations to execute a collaborative process or service.
Business Requirements: Non-Testable	Business requirements that are not directly traceable to an IHE profile in the PS-CA specifications (e.g., provided for consideration and to support and provide guidance to implementers of the PS-CA).
Business Requirements: Testable	Business requirements that are directly traceable to an IHE profile in the PS-CA specifications.
CA:FeX	The CA:FeX Interoperability Specifications (Canadian FHIR Exchange (CA:FeX)) seek to promote FHIR RESTful exchange patterns, developed by industry-leading FHIR standards that can be applied on top of an existing non-FHIR infrastructure just as easily as it can be applied on top of FHIR servers.
CCDD	The Canadian Clinical Drug Data Set (CCDD) is the drug terminology for use in digital health solutions such as electronic prescribing in Canada.
Central Infrastructure	A Central Infrastructure collects health information from participating organizations and stores the information in a centralized place. The Infrastructure also provides access control. Typically, the central infrastructure is under jurisdictional control.
Clinical Data eXchange (CDX)	CDX is a clinical distribution service developed by Interior Health. Northern Health (NH) and Interior Health (IH) have collaborated to facilitate the sharing of Health Authority clinical information to participating provider EMR systems using this service. (Sources: https://infocentral.infoway-inforoute.ca/en/resources/docs/coordofcare/1406-clinical-document-exchange-bc-cdx-technical-overview-coc-sep27-16 https://www.intrahealth.com/sites/default/files/docs/Clinical-Data-eXchange-communication-from-Intrahealth-and-CDX-Team.pdf)
Conformance Testing	Conformance testing is a formal process of assessment focused on ensuring clinical solutions and systems accurately implement a particular specification (e.g. PS-CA Specifications) by ensuring there is conformance to the stated parameters that are being claimed in the standard.
Cross Border, Scheduled Care	Scheduled care of a resident of Canada that is delivered in/by another country.

Term / Acronym	Meaning
Cross Border, Unscheduled Care	Unscheduled care of a resident of Canada that is delivered in/by another country.
DIN	A Drug Identification Number (DIN) is a computer-generated eight digit number assigned by Health Canada to a drug product prior to being marketed in Canada.
Document Repository (Local or Central)	A document repository is a shared storage space for clinical documents (Patient Summaries) that can be hosted locally (i.e., at the document producer) or at the HIE Central Infrastructure and can be accessed by authorized users.
DPD	The Drug Product Database (DPD) is used to find drugs authorized for sale by Health Canada. The DPD is updated nightly and includes: availability of the drug in Canada.
Electronic Health Record (EHR)	The EHR represents the Clinical Solution that contains a secure and private collection of a patient's health information in a digital format, which is shareable across different health care settings / clinical solutions that are integrated. The EHR facilitates better sharing and interpretation of health information among the health care professionals involved in the care of the patient. For example: • CareConnect is British Columbia's secure, view-only EHR solution. It offers healthcare providers access to an integrated, provincial view of patient-centric information available 24/7 to support the delivery of patient care. • HEALTHe NL is the Newfoundland & Labrador provincial EHR. HEALTHe NL will provide more accurate and reliable data to support improved health care delivery, decision-making and policy and create improved accountability, stability and efficiency in the provincial health care system. • Netcare is Alberta's name for all the projects related to the provincial EHR - a secure and confidential electronic system of Alberta patients' health information: a single, comprehensive, and integrated patient record. • Other clinical systems: In some health authorities, other clinical systems may act as an EHR, holding the patient summary information.
Extensible PS-CA Dataset	Extensible PS-CA Dataset: PS-CA content that can be extended for use in a PS-CA use case scenario that complements the primary PS-CA use cases. *Note: Extensible PS-CA Dataset refers to the addition of data domains such as Family History.
FHIR Repository	A FHIR repository is a clinical data repository built around the HL7 FHIR standard used for storing clinical data.
Foundational Interoperability	Foundational interoperability is the ability of one IT system to send data to another IT system. The receiving IT system does not necessarily need to be able to interpret the exchanged data — it must simply be able to acknowledge receipt of the data payload. This is the most basic tier of interoperability.

Term / Acronym	Meaning
HCP	Health Care Provider
Health Information Access Layer (HIAL)	An interface specification for the EHR infostructure that defines service components, service roles, information model and messaging standards required for the exchange of EHR data and execution of interoperability profiles between EHR services. (Source:https://www.infoway-inforoute.ca/en/component/edocman/resources/technical-documents/391-ehrs-blueprint-v2-full ; Page.340)
Health Records System	A health records system may include an electronic medical records system, a hospital information system, a clinical information system, an electronic health records system or a personal health records system. The term is broadly used to describe system actors that may produce and/or consume a PS-CA. Jurisdictional implementation patterns will determine which systems are used to create, access, consume and manage patient summaries.
HIS	Health Information System
Health Level 7 (HL7)	Founded in 1987, HL7 is a not-for-profit standards developing organization dedicated to providing a comprehensive framework and related standards for the exchange, integration, sharing, and retrieval of electronic health information that supports clinical practice and the management, delivery and evaluation of health services. (Source: http://www.hl7.org/about/index.cfm?ref=nav)
HL7 Fast Healthcare Interoperability Resources (FHIR)	Expected to be a next generation standards framework created by HL7. FHIR combines the best features of HL7‘s Version 2, Version 3 and product lines while leveraging the latest web standards and applying a tight focus on implementability. (Source: http://www.hl7.org/implement/standards/fhir/)
Information/ Semantic Interoperability Requirements	Requirements for syntax and semantics such that data exchanged between health record systems can be interpreted and the meaning of the data ascertained.
Integrating the Healthcare Enterprise (IHE)	IHE is an initiative by healthcare professionals and industry to improve the way computer systems in healthcare share information. IHE promotes the coordinated use of established standards such as DICOM and HL7 to address specific clinical needs in support of optimal patient care. Systems developed in accordance with IHE communicate with one another better, are easier to implement, and enable care providers to use information more effectively. (Source: https://www.ihe.net/)

Term / Acronym	Meaning
IHE Actor	IHE Actors are responsible for producing, managing and/or acting on information in the context of an IHE Profile (e.g., Primary Care Provider, EMR, EHR, etc.). (Source: https://wiki.ihe.net/index.php/Actors)
IHE Domain	IHE Domains are responsible for the development and maintenance of the IHE Technical Frameworks that document the Integration Profiles. Each Domain manages Integration Profiles in a particular part of healthcare (e.g., Virtual Care). (Source: https://wiki.ihe.net/index.php/Domains)
IHE Profiles	IHE Profiles describe specific solutions to interoperability problems. Profiles specify how "Actors" use standards to address a specific healthcare use case (e.g., Medication, Allergy Intolerance, etc.). (Source: https://wiki.ihe.net/index.php/Profiles)
IHE Transactions	IHE Transactions are interactions between actors that communicate the required information through standards-based messages (e.g., patient look-up query, send patient summary information, etc.). (Source: https://wiki.ihe.net/index.php/PCC_TF-1/About)
International Patient Summary (IPS)	The IPS is a a minimal, non-exhaustive set of data elements defined by ISO/EN 17269 and realized by HL7 in both CDA and FHIR. The IPS is a snapshot clinical document that can be used for planned or unplanned care of a person locally or across borders. It emphasizes the data required and the necessary conformance of the use cases for an international patient summary. (Source: https://wiki.ihe.net/index.php/International_Patient_Summary_(IPS))
Local, Scheduled Care	Scheduled care of a resident of Canada that is delivered in/by the Canadian health care system. This includes care provided in federal, provincial and territorial jurisdictions, as well as cross-jurisdictional care.
Local, Unscheduled Care	Unscheduled care of a resident of Canada that is delivered in/by the Canadian health care system. This includes care provided in federal, provincial and territorial jurisdictions, as well as cross-jurisdictional care.
Longitudinal Electronic Health Record	A longitudinal electronic health record is a single comprehensive patient record comprised of data from numerous data sources across the healthcare continuum.

Term / Acronym	Meaning
Netcare	Alberta Netcare is the name for all the projects related to the provincial Electronic Health Record (EHR) - a secure and confidential electronic system of Alberta patients' health information: a single, comprehensive, and integrated patient record. The EHR stores information about: • laboratory tests, • dispenses of pharmaceuticals (drugs), • hospital discharge reports, and • diagnostic imaging
Patient Portal	A patient portal is a web-based access point that enables secure patient access to personal health information and other self-serve health IT services. For example, a patient portal can be hosted on an EMR solution.
Patient Proxy	An individual or entity that has the authority to act on behalf of a subject of care/ patient. Proxies can include parents of dependent children, parents of dependent adults, powers of attorney etc.
Patient Summary-CA (PS-CA)	An electronic patient summary for use at the point of care comprised of, at minimum, the required elements of the Patient Summary-CA data set and specifications. The PS-CA is a health record extract, at a snapshot in time, comprised of a standardized collection of clinical and contextual information (retrospective, concurrent, prospective), including the minimum necessary and sufficient data to inform a patient's treatment at the point of care. The PS-CA is condition-independent and specialty-agnostic, irrespective of the condition of the patient or the treatment sought or specialty of the provider delivering care.
PS-CA Author	A health care provider who authors and/or curates a PS-CA.
PS-CA Consumer	A health records system (e.g., EMR, HIS, CIS, PHR, or EHR) that enables access to or receipt of a Patient Summary-CA by an authorized health care provider or the subject of care/patient.
PS-CA Producer	A health records system (e.g., EMR, HIS, CIS, PHR, or EHR) that creates/produces a Patient Summary-CA in response to a request from an authorized health care provider, the subject of care or another authorized health records system.
Patient Summary-CA Solution	Any combination of health information technology assets and processes that enables a Patient Summary-CA to be created, communicated, managed and dispositioned between a PS-CA Producer and a PS-CA Consumer. Patient Summary-CA Solutions can be comprised of various Producer and Consumer systems including: EMR, HIS, CIS, PHR, EHR or any combination of these systems.

Term / Acronym	Meaning
PS-CA Specifications	**pan-Canadian Patient Summary Interoperability Specifications:** The pan-Canadian Patient Summary Interoperability Specification is an implementable, testable specification, based on the IHE International Patient Summary specification and the HL7 IPS Implementation Guide. For more information on the PS-CA Specifications, please go here.
Semantic Interoperability	Semantic interoperability is the ability of health IT systems to exchange and interpret information — then actively use the information that has been exchanged. Semantic interoperability is the highest level of interoperability. "Semantic interoperability takes advantage of both the structuring of the data exchange and the codification of the data including vocabulary so that the receiving information technology systems can interpret the data," stated HIMSS. Achieving semantic interoperability allows providers to exchange patient summary information with other caregivers and authorized parties using different EHR systems to improve care quality, safety, and efficiency. This level of interoperability allows healthcare organizations to seamlessly share patient information to reduce duplicative testing, enable better-informed clinical decision-making, and avoid adverse health events. Effective health data exchange can also help to improve care coordination, reduce hospital readmissions, and ultimately save money. While semantic interoperability is the goal, most healthcare organizations are still working to establish foundational and structural interoperability. Hospitals and health systems can utilize existing health data standards to achieve the lower levels of interoperability and set a solid foundation for future improvements in health data exchange.
Structural Interoperability	Structural interoperability is "the uniform movement of healthcare data from one system to another such that the clinical or operational purpose and meaning of the data is preserved and unaltered," HIMSS states. To achieve structural interoperability, the recipient system should be able to interpret information at the data field level. This is the intermediate level of interoperability.
Technical Interoperability Requirements	Requirements for one health record system to send data to another health record system and for the receiving system to acknowledge receipt of the data payload.
Terminology	Collection of uniquely identifiable concepts with associated representations, designations, associations and meanings.

5 Preface

In support of the provinces and territories, Canada Health Infoway is facilitating a national collaborative effort to advance interoperability. While there are many interoperability-related challenges, these specifications address sharing of Patient Summaries.

Canada is not alone in trying to solve for this challenge. The International Patient Summary (IPS) project started in Europe several years ago and has been adopted by ISO, IHE and HL7 International. In addition, there is an active working group led by the Office of the National Coordinator (ONC) in the United States called the Global Digital Health Partnership (GDHP) that is actively working with member countries to find solutions for scaling Patient Summary exchanges at an international scale. Canada is an active participant in this partnership and has made a commitment at the G7 meeting in June 2021 to collaboratively work with jurisdictions, vendors, and participating organizations on a pan-Canadian effort to develop an implementable set of specifications aligned to the IPS that reflect Canada's jurisdictional realities. The overarching principle adopted for the Patient Summary-CA (PS-CA) project is to maintain as close of an alignment to the IPS profiles as possible while creating the instruments to allow jurisdictions to properly represent their desired clinical workflows and allow vendor systems to undergo necessary change management associated with adoption activities making it worth an investment.

A Patient Summary (PS) is a health record extract comprising a standardized collection of clinical and contextual information (retrospective, concurrent, prospective) that provides a snapshot in time of a subject of care's health information and healthcare, while a longitudinal health record is a single comprehensive patient record comprised of data from numerous data sources across the healthcare continuum.

The PS-CA specifications implementation approach for alignment with the IPS will span a number of releases on a roadmap. Release 1 will focus on three use cases that have been identified as priority for Canadian jurisdictions (i.e., Alberta (AB), British Columbia (BC), Ontario (ON), Saskatchewan (SK) and Newfoundland & Labrador (NL)) and their supporting business requirements, actors and transactions, terminology and FHIR® profiles. This release will include supports for sharing Patient Summaries for scheduled or unscheduled local care with information from a single source.

Future releases will incorporate additional use cases and their supporting requirements, reference architecture, terminology and FHIR profiles. For example, the implementation roadmap will include a use case for creating the Patient Summary with information from more than one source and additional scenarios for supporting scheduled or unscheduled cross-border care.

The following table represents the alignment of the PS-CA to the IPS, data domains of interest by Canadian jurisdictions and the PS-CA Release 1 and 2 plans. Release 1 will include all of the data domains highlighted in the Release 1 column and Release 2+ will continue to build on the Release 1 data domains as well as add the additional data domains.

Patient Summary-CA: Data Domains of Interest by Canadian Jurisdiction and Release

	IPS-UV		PS- CA	AB	BC	MB	NL	ON	SK	Release 1	Release 2+
Header	Subject	Header	Subject								+
	Author		Author								+
	Attester		Attester								+
	Custodian		Custodian								+
Required	Medication Summary	Recommended	Medication Summary								+
	Allergies and Intolerances		Allergies and Intolerances								+
	Problem List		Problem List								+
Recommended	Immunizations		Immunizations								+
	History of Procedures		History of Procedures								+
	Medical Devices		Medical Devices								
	Diagnostic Results		Diagnostic Results								
Optional	Vital Signs	Optional	Vital Signs								+
	Past history of Illness		Past History of Illness								+
	Social History		Social History								+
	Advance Directives		Advance Directives								
	Pregnancy		Pregnancy								
	Functional Status		Functional Status								
	Plan of Care		Plan of Care								
		EXT	Extension(s)								
			Family History								

Legend

- Blue: Header domains
- Red: Required domains
- Orange: Recommended domains
- Green: Optional domains
- Grey: Domains of interest by jurisdiction

5.1 Context

The pan-Canadian Patient Summary Interoperability Specifications v1 Trial Implementation document is published to a public space within Canada Health Infoway's InfoScribe and is also available as a downloadable document. InfoScribe is a web-based tool developed for jurisdictions and vendors to create, publish, and collaborate on clinical requirements and specifications for interoperability solutions. Teams can document, share, and discuss content, files, ideas, specs, mock-ups, diagrams, and projects. A link to the online published content and the downloadable documentation will be published with each release of the Patient Summary-CA project.

Release information for each release is contained in the corresponding PS-CA Release page.

New content will be added throughout the life of the PS-CA Roadmap to accommodate the requirements of Canada's implementers.

5.2 Introduction to IHE

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

The primary output of IHE is system implementation guides, called IHE profiles. IHE publishes each profile through a well-defined process of public review and Trial Implementation, and gathers profiles that have reached Final Text status into an IHE Technical Framework. These profiles are referenced in the Appendices of this document.

Preference for Modern HL7 FHIR interfaces

New implementation of IHE profiles based on the Patient Summary-CA standard should avoid legacy interfaces. IHE profiles that are HL7 FHIR based are preferred when available; however, the Reference Architecture will account for legacy systems that do not support FHIR. Canada Health Infoway will encourage the adoption of modern exchange protocols but will also provide the runway and opportunity for the jurisdictions to improve their interoperability capabilities.

For implementation patterns pertaining to HL7 FHIR Health Information Exchange (HIE) patterns, a new pan-Canadian Interoperability Specifications document has been developed (i.e., CA:FeX). More information about CA:FeX can be found in the Appendix and the Companion Guide: Reference Architecture.

5.3 How to Read This Document

This document contains the following content, as well as informative appendices for your convenience.

- **Preface:** Contains an introduction to the pan-Canadian Patient Summary Interoperability Specifications v1 Trial Implementation. This section contains a summary of the context, document purpose and scope, as well as other content to help orient the first-time reader to the topic of these specifications and how they relate to other specifications in the digital health ecosystem in Canada.
- **PS-CA Use Case Overview:** Describes the Use Cases, including design constraints and assumptions and the flows of information that will be specified in the PS-CA specifications. This section also introduces scenarios that describe how the specified flows may be used in the Canadian context.
- **Core Interoperability Specifications:** Establishes the Core Interoperability Requirements for the pan-Canadian Patient Summary Interoperability Specifications v1 Trial Implementation for two implementation options:
    - Document Repository/Registry Pattern (i.e., MHD - IHE Profile); and
    - FHIR Health Information Exchange (HIE) Pattern (i.e., CA:FeX).
- **PS-CA Actor Conformance:** Establishes the Conformance Requirements for the PS-CA specifications for the two implementation patterns identified above.
- **Data Protection, Privacy & Security:** Provides key considerations around Data Protection, Privacy and Security for the PS-CA specifications.
- **Information Models, Applications and Infrastructure:** Provides key implementation guidance around Information Models, Applications and Infrastructure for the PS-CA specifications.
- **PS-CA Content Data Model & FHIR® Profiles:** Describes the PS-CA Content Data Model & FHIR® Profiles required for the pan-Canadian Patient Summary Interoperability Specifications v1 Trial Implementation.
- **Appendices:** Contains supplementary information related to the IHE profiles and other related information for the pan-Canadian Patient Summary Interoperability Specifications v1 Trial Implementation.

5.4 Related Documents & References

The pan-Canadian Patient Summary Interoperability Specifications v1 Trial Implementation is the sole entry point for the technology developers, the compliance assessment testing and certification, and the purchasers of IT systems in terms of technical requirements.

The PS-CA specifications reference several supporting documents:

- **pan-Canadian Patient Summary – FHIR Implementation Guide**

  The pan-Canadian Patient Summary - FHIR Implementation Guide is an implementable, testable specification for the HL7 FHIR composition that defines the data payload of the PS-CA specifications, based on the HL7 FHIR IPS implementation guide. It contains information for solution developers to implement the PS-CA content data model using the HL7® Fast Healthcare Interoperability Resources (FHIR®) standard. It describes the data elements & types, cardinality, constraints, and code system references - all of the details needed for two systems to be semantically interoperable with each other when a PS-CA compliant patient summary is exchanged.

  Target Audience: Solution Developers

- **pan-Canadian Patient Summary - Companion Guide to Use Cases & Definitions**

  The pan-Canadian Patient Summary - Companion Guide to Use Cases & Definitions is a companion document to the pan-Canadian Patient Summary Interoperability Specifications that presents the broader context for clinical, business, interoperability and solution development considerations that were discovered during the development of the PS-CA. It defines the healthcare problem that the PS-CA addresses and includes healthcare use cases and interoperability requirements in terms that will be traceable to the content in the pan-Canadian Patient Summary - Companion Guide to Reference Architecture, which defines the actors and their interactions with other actors and the pan-Canadian Patient Summary – FHIR Implementation Guide, which defines the contents and semantic interoperability of the PS-CA.

  This document will also support upcoming releases and roadmap elements of the PS-CA specifications.

  Target Audience: CTOs, CMIOs, CIOs, PTs and vendors

- **pan-Canadian Patient Summary - Companion Guide to Reference Architecture**

  The pan-Canadian Patient Summary - Companion Guide to Reference Architecture contains background information on the abstracted PS-CA actors and transactions for the pan-Canadian Patient Summary Interoperability Specifications for stakeholders who are not familiar with the IHE Methodology. It describes baseline information on the recommended IHE profiles & pan-Canadian Interoperability Specifications and includes links to the IHE source documentation where stakeholders can get additional details on each PS-CA actor and transaction. This document also includes descriptions of alternatives and choices for implementation patterns and ecosystem architectures to support the Patient Summary-CA in current state, including sequence diagrams that demonstrate the relationship and dependencies between the PS-CA actors and transactions.

  Target Audience: CTOs, CMIOs, CIOs, PTs and vendors

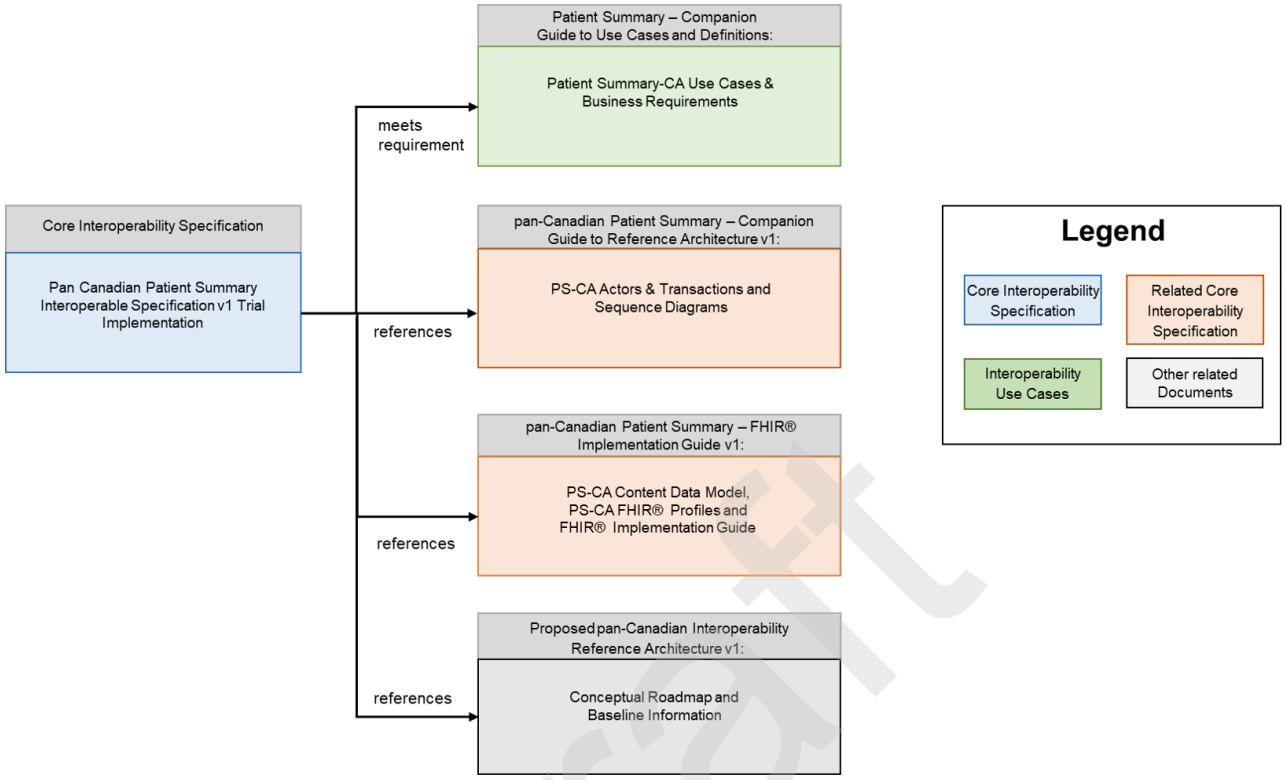
Additionally, the following document also contains relevant background information for the pan-Canadian Patient Summary Interoperability Specifications v1 Trial Implementation:

- **Proposed pan-Canadian Interoperable Reference Architecture v1**:

The Proposed pan-Canadian Interoperable Reference Architecture is intended as a conversation starter on the broader interoperability landscape, not limited to patient summaries. Its purpose is to facilitate multi-stakeholder dialogue, collaboration and convergence towards common standards. It is a conceptual roadmap that provides a common vocabulary and a set of abstracted actors and transactions representing typical components in a digital health ecosystem (public and private sector solutions). It is composed of building blocks based on international standards.

Target Audience: CTOs, CMIOs, CIOs, Technical Leads, Decision makers, PTs, vendors

The diagram below represents the PS-CA specifications framework:



5.5 Document Conventions

The pan-Canadian Patient Summary Interoperability Specifications v1 Trial Implementation will be numbered according to this format:

- **Name + Version + Stage**, where name refers to the name of the document, version refers to the versioning history of the document and stage refers to its stage in implementation such as “Trial Implementation” or “TI”.
- **Key documents will evolve during review cycles from version 0.x to v1.0**

5.6 Requirements Language

The following conventions are used to specify requirement levels for the business requirements of the pan-Canadian Patient Summary Interoperability Specifications v1 Trial Implementation:

- **Shall:** used to indicate a **required** requirement.
- **Should:** used to indicate that a requirement is **recommended** and should be considered as best practice for implementation, but not required (i.e., it is optional) for implementation.
- **May:** used to indicate that a requirement is permittable / **optional**, but not required for implementation.
- **Shall not:** used to indicate that an element or action is prohibited.

Additional information on the PS-CA business requirements can be found in the Patient Summary – Companion Guide to Use Cases and Definitions.

5.7 Methodology

The pan-Canadian Patient Summary Interoperability Specifications v1 Trial Implementation document has been co-developed with feedback and input from various jurisdictions and vendors collected during several months through Coordinating Table Meetings, Executive Table Meetings, stakeholder workshops and 1-on-1 meetings.

Stakeholders included clinicians, technical SMEs, and standards SMEs from participating jurisdictions (i.e., AB, ON, BC, SK, and NL), as well as vendors and software developers. The development of the PS-CA specifications rely on the business requirements set by the in-scope Use Cases of the PS-CA project. These high-level requirements are not restated in the specifications. Stakeholders should review the Companion Guide for this information.

5.8 Introduction to a Use-Case Driven Approach

The following use case-driven approach was utilized in the development of the pan-Canadian Patient Summary Interoperability Specifications v1 Trial Implementation:

- **Baseline:** Develop foundational Use Cases, Use Case Scenarios and Business Requirements for pan-Canadian Patient Summaries based on information provided by jurisdictions
- **Collaborate:** Collaborate with jurisdictions, clinical SMEs, technical SMES, vendors, participating organizations to develop and refine detailed artefacts
- **Review:** Review and provide feedback into artefacts through engagement workshops and input gathering
- **Publish:** Publish artefacts for broader stakeholder consultation
- **Recommend:** Recommend draft artefacts for approval
- **Iterate:** Continue to refine as per testing and priorities

5.9 Release Cycle

The PS-CA specifications' release cycle will include a multi-stage review and feedback process. For more information, please visit the pan-Canadian Interoperability PS-CA Release Information page.

6 PS-CA Use Case Overview

6.1 PS-CA Use Case Overview

This section describes the three pan-Canadian Use Cases, including all design constraints and assumptions as well as the flows of information that will be specified in this specification. This section also introduces the scenarios that describe how the specified workflows may be used in the Canadian eHealth context.

6.2 In-Scope

Stakeholder engagement has identified 3 prioritized common use cases for Release 1. These use cases are aligned within the participating jurisdictions and are in-scope of the PS-CA project:

PS-CA Use Cases In-Scope for Release 1	AB	BC	NL	ON	SK
1) Health Care Provider (HCP) Creates a Patient Summary-CA	x	x	x	x	x
2) Health Care Provider (HCP) Views and Uses a Patient Summary-CA	x	x	x	x	x
3) Patient Accesses and Views their Patient Summary-CA	x	x	x	x	

Additionally, all the business requirements of the pan-Canadian Patient Summary Interoperability Specifications that are testable in Release 1 are in-scope. More information on this can be found in the Patient Summary – Companion Guide to Use Cases and Definitions.

6.3 Out-of-Scope

The following Use Cases are not in-scope for Release 1 of the pan-Canadian Patient Summary Interoperability Specifications v1 Trial Implementation and will be addressed in future releases.

PS-CA Use Cases Out-of-Scope for Release 1:

- Healthcare Provider (HCP) Sends a Patient Summary-CA to another Healthcare Provider (HCP) as part of a Clinical Workflow (e.g., eReferral)
- Patient Presents Patient Summary-CA to Healthcare Provider (HCP) in Another Jurisdiction
- Healthcare Provider (HCP) requests Patient Summary-CA on Demand

In addition, all the business requirements of the pan-Canadian Patient Summary Interoperability Specifications v1 Trial Implementation that are not testable in Release 1 are out-of-scope. More information on this can be found in the Patient Summary – Companion Guide to Use Cases and Definitions.

6.4 Use Case Actors and Services

The Use Case Actors and the Services that are used by this specification for sharing Patient Summaries are described at a functional level in the Patient Summary – Companion Guide to Use Cases and Definitions. Stakeholders who wish to understand the mapping of Use Case Actors to business requirements and recommended

IHE Profiles are recommended to read the pan-Canadian Patient Summary – Companion Guide to Use Cases and Definitions and the pan-Canadian Patient Summary – Companion Guide to Reference Architecture. A summary is provided in the following tables:

Use Case Actors and Descriptions

Actor Name	Description / Definition
PS-CA Producer	A health records system (e.g., EMR, HIS, CIS, PHR, or EHR) that creates/produces a Patient Summary-CA in response to a request from an authorized health care provider, the subject of care or another authorized health records system.
PS-CA Consumer	A health records system (e.g., EMR, HIS, CIS, PHR, or EHR) that enables access to or receipt of a Patient Summary-CA by an authorized health care provider or the subject of care/patient.
Document Repository (Local or Central)	A document repository is a shared storage space for clinical documents (Patient Summaries) that can be hosted locally (e.g., at the document producer) or at the Central Infrastructure and can be accessed by authorized users.
Central Infrastructure	A Central Infrastructure collects health information from participating organizations and stores the information in a centralized place. The Infrastructure also provides access control. Typically, the central infrastructure is under jurisdictional control.
Patient Portal	A patient portal is a web-based access point that enables secure patient access to personal health information and other self-serve health IT services. ***Note:** Patient Portal is also comparable to the PS-CA Consumer role; however, for Use Case 3, the Patient Summary is viewed by the subject of care.

Use Case Actor Mapping

Actor Name	UC-01	UC-02	UC-03
PS-CA Producer	x		x
PS-CA Consumer		x	
Document Repository (Local or Central)	x	x	x
Central Infrastructure	x	x	x
Patient Portal			x

6.5 Design Constraints & Assumptions

The following design constraints and assumptions exist for the pan-Canadian Patient Summary Interoperability Specifications v1 Trial Implementation:

- All Use Case Actors/Users are logged in to the system. The Use Case Actors/Users are authenticated and appropriately authorized for all data exchange transactions.
    - Our recommendation is that the Use Case Actors/Users obtain a valid access token from the Authorization Server that is used within each transaction and is based on the IUA IHE Profile.
- PS-CA is created from local data sources for Release 1.
    - There may be exceptions to the data source of some of the data domains of the Patient Summary-CA across jurisdictions in Canada. For example, for some jurisdictions, the immunization data will be pulled from the provincial immunization repository.
- The implementation patterns in-scope for Release 1 will be based on the MHD IHE Profile or CA:FeX Interoperability Specifications that are being developed for FHIR Health Information Exchange (HIE) Pattern. Additional details about these profiles can be found in the pan-Canadian Patient Summary – Companion Guide to Reference Architecture.

Additional information on design constraints and assumptions can be found in the pan-Canadian Patient Summary – Companion Guide to Use Cases and Definitions.

7 Core Interoperability Specification Requirements

7.1 Actor Mapping to Interoperability Specification

The Use Case Actors and the Services they support are described at a functional level in the Patient Summary – Companion Guide to Use Cases and Definitions. Services may be Recommended or Optional. The Use Case Actors, Services and Optionality are conveyed in the first three columns of Tables 1 to 3 in the section below. The second part of the table (columns 4-7) provides the mapping of the Use Case Actor to the detailed specifications (such as IHE Profiles, Technical Actors, Optionality) that systems shall implement to exchange healthcare information in the context of these Use Cases. The purpose of the tables below is to map the use case actors to the technical actors and the services they are supporting. These tables are aligned with the flow captured in the sequence diagrams which are included in the Companion Guide: Reference Architecture section.

For a selected Use Case Actor (columns 1-3), the system shall implement all the requirements (some optionality when allowed) listed in the second part of the table (columns 4-7). This includes the referenced healthcare profiles, the standards specified and terminology standards. For Technical Actors, which map to IHE Profiles or pan Canadian Interoperability Specifications (*MHD, PDQm, PMIR, CA:FeX, etc.*), the last column provides the reference location. These specifications may be found in Appendices to this specification document or in other referenced companion guides.

The following interoperability requirement tables are categorized by options for implementation patterns that jurisdictions may choose based on their maturity, capabilities and current state:

1. Document Repository/Registry Pattern using MHD
2. FHIR Health Information Exchange (HIE) Pattern using CA:FeX

Published Versions

The following describes the published versions in scope for the required and optional IHE Profiles that have been referenced in this PS-CA Specification:

- MHD: v4.0.2: Trial Implementation v4.0.2 based on FHIR R4
- IUA: Revision 2.1 - Trial Implementation
- PDQm: v2.3.0: Trial Implementation) based on FHIR R4
- PMIR: Revision 1.3 – Trial Implementation
- SVCM: Revision 1.2: Trial Implementation based on FHIR R4
- XDM: Revision 18.0, July 30, 2021 – Final Text

*Note: The STU1 Release of the IPS-UV were reviewed as the starting point for the PS-CA profiles.

Versioning

This is an evolving specification, the release cycle assumes some degree of change will happen across versions. We've established a versioning protocol and will be clearly communicating the version of the artefacts that are employed by the PS-CA Specification and will ensure testing aligns to it. There will be a process in place to monitor changes in the current versions of the IHE profiles which will be incorporated in future versions of the PS-CA specification based on our intereoperability roadmap.

Legend

R = Required

O = Optional

7.2 Table 1.1 Interoperability Conformance Requirements for Use Case 1: HCP Creates PS-CA

Option 1: Document Repository/Registry Pattern

PS-CA USE CASE 1: HCP Creates PS-CA			**MAPPING TO SECTIONS FROM THIS AND REFERENCED INTEROPERABILITY SPECIFICATIONS**			
USE CASE ACTOR	SERVICE SUPPORTED	OPT	TECHNICAL ACTOR	OPT	PROFILE/ STANDARD	REFERENCED SPECIFICATION AND STANDARDS (Refer to the sections listed below in Appendix A)
PS-CA Producer	Authenticate User	O	Client (e.g., EMR)	O	Internet User Assertion (IUA)	Appendix A: IUA Profile Overview
	Identify Patient	O	Client (e.g., EMR)	O	Use Existing Standards Employed by the Clinical System	N/A
		O	Patient Demographic Consumer	O	PDQm	Appendix A: PDQm Profile Overview
	Retrieve clinical data from local data sources (Patient Identifier)	R	Client (e.g., EMR)	R	Use Existing Standards Employed by the Clinical System	N/A
	Assemble and review Patient Summary	R	Client (e.g., EMR)	R	Use Existing Standards Employed by the Clinical System	N/A
	Update Current Valuesets and ConceptMaps	O	Client (e.g., EMR)	O	SVCM	Appendix A: SVCM Profile Overview

PS-CA USE CASE 1: HCP Creates PS-CA			MAPPING TO SECTIONS FROM THIS AND REFERENCED INTEROPERABILITY SPECIFICATIONS			
USE CASE ACTOR	SERVICE SUPPORTED	OPT	TECHNICAL ACTOR	OPT	PROFILE/ STANDARD	REFERENCED SPECIFICATION AND STANDARDS (Refer to the sections listed below in Appendix A)
	Omit or Mask Data based on Jurisdictional Policy	O	Client (e.g., EMR)	O	Jurisdictional Requirement	N/A
	Save PS-CA to Document Repository	R	Client (e.g., EMR)	R	Use Existing Standards Employed by the Clinical System	N/A
		R	Document Source	R	MHD	Appendix A: MHD Profile Overview
Document Repository (Local to PS-CA Producer or Central)	Save PS-CA to Document Repository	R	Document Recipient	R	MHD	Appendix A: MHD Profile Overview
Central Infrastructure	Identify Patient	O	Patient Identity Registry	O	PMIR	Appendix A: PMIR Profile Overview

7.3 Table 1.2 Interoperability Conformance Requirements for Use Case 1: HCP Creates PS-CA

Option 2: FHIR Health Information Exchange (HIE) Pattern

PS-CA USE CASE 1: HCP Creates PS-CA			**MAPPING TO SECTIONS FROM THIS AND REFERENCED INTEROPERABILITY SPECIFICATIONS**			
USE CASE ACTOR	SERVICE SUPPORTED	OPT	TECHNICAL ACTOR	OPT	PROFILE/ STANDARD	REFERENCED SPECIFICATION AND STANDARDS (Refer to the sections listed below in Appendix A)
PS-CA Producer	Authenticate User	O	Client (e.g., EMR)	O	Internet User Assertion (IUA)	Appendix A: IUA Profile Overview
	Identify Patient	O	Client (e.g., EMR)	O	Use Existing Standards Employed by the Clinical System	N/A
		O	Patient Demographic Consumer	O	PDQm	Appendix A: PDQm Profile Overview
	Retrieve clinical data from local data sources (Patient Identifier)	R	Client (e.g., EMR)	R	Use Existing Standards Employed by the Clinical System	N/A
	Assemble and review Patient Summary	R	Client (e.g., EMR)	R	Use Existing Standards Employed by the Clinical System	N/A
	Update Current Valuesets and ConceptMaps	O	Client (e.g., EMR)	O	SVCM	Appendix A: SVCM Profile Overview
	Omit or Mask Data based on Jurisdictional Policy	O	Client (e.g., EMR)	O	Jurisdictional Requirement	N/A

PS-CA USE CASE 1: HCP Creates PS-CA			MAPPING TO SECTIONS FROM THIS AND REFERENCED INTEROPERABILITY SPECIFICATIONS			
USE CASE ACTOR	SERVICE SUPPORTED	OPT	TECHNICAL ACTOR	OPT	PROFILE/ STANDARD	REFERENCED SPECIFICATION AND STANDARDS (Refer to the sections listed below in Appendix A)
	Save PS-CA to Document Repository	R	Client (e.g., EMR)	R	Use Existing Standards Employed by the Clinical System	N/A
		R	Data Source	R	CA:FeX	Appendix A: CA:FeX Profile Overview
Document Repository (Central)*	Save PS-CA to Document Repository	R	Data Recipient	R	CA:FeX	Appendix A: CA:FeX Profile Overview
Central Infrastructure	Identify Patient	O	Patient Identity Registry	O	PMIR	Appendix A: PMIR Profile Overview

*For Option 2, **Document Repository** use case actor is a logical role enacted by the Data Recipient which is described in detail in the 'Companion Guide: Reference Architecture'.

7.4 Table 2.1 Interoperability Conformance Requirements for Use Case 2: HCP Views/ Consumes PS-CA

Option 1: Document Repository/Registry Pattern

PS-CA USE CASE 2: HCP Views/ Consumes PS-CA			**MAPPING TO SECTIONS FROM THIS AND REFERENCED INTEROPERABILITY SPECIFICATIONS**			
USE CASE ACTORS	SERVICE SUPPORTED	OPT	TECHNICAL ACTOR	OPT	PROFILE/ STANDARD	REFERENCED SPECIFICATION AND STANDARDS (Refer to the sections listed below in Appendix A)
PS-CA Consumer	Authenticate User	O	Client (e.g., EMR)	O	Internet User Assertion (IUA)	Appendix A: IUA Profile Overview
	Identify Patient	O	Client (e.g., EMR)	O	Use Existing Standards Employed by the Clinical System	N/A
		O	Patient Demographic Consumer	O	PDQm	Appendix A: PDQm Profile Overview
	Request Patient Summary References (Patient Identifier)	R	Client (e.g., EMR)	R	Use Existing Standards Employed by the Clinical System	N/A
	Request Patient Summary (Patient Summary References)	R	Client (e.g., EMR)	R	Use Existing Standards Employed by the Clinical System	N/A
	Return Patient Summary References	R	Document Consumer	R	MHD	Appendix A: MHD Profile Overview
	Return Patient Summary	R	Document Consumer	R	MHD	Appendix A: MHD Profile Overview

PS-CA USE CASE 2: HCP Views/ Consumes PS-CA			**MAPPING TO SECTIONS FROM THIS AND REFERENCED INTEROPERABILITY SPECIFICATIONS**			
USE CASE ACTORS	SERVICE SUPPORTED	OPT	TECHNICAL ACTOR	OPT	PROFILE/ STANDARD	REFERENCED SPECIFICATION AND STANDARDS (Refer to the sections listed below in Appendix A)
	Perform transformation between different formats	O	Client (e.g., EMR)	O	Use Existing Standards Employed by the Clinical System (Render to Specific Format (PDF))	N/A
		O	Client (e.g., EMR)	O	CA:FMT (e.g., FHIR to CDA, Export to PDF, etc.)	Appendix A: CA:FMT Profile Overview
	Download/ Print PS-CA	O	Client (e.g., EMR)	O	Use Existing Standards Employed by the Clinical System	N/A
	Update Current ValueSets and ConceptMaps	O	Client (e.g., EMR)	O	SVCM	Appendix A: SVCM Profile Overview
Document Repository (Local to PS-CA Producer or Central)	Retrieve PS-CA References from Document Repository	R	Document Responder	R	MHD	Appendix A: MHD Profile Overview
	Retrieve PS-CA from Document Repository	R	Document Responder	R	MHD	Appendix A: MHD Profile Overview
Central Infrastructure	Identify Patient	O	Patient Identity Registry	O	PMIR	Appendix A: PMIR Profile Overview

7.5 Table 2.2 Interoperability Conformance Requirements for Use Case 2: HCP Views/ Consumes PS-CA

Option 2: FHIR Health Information Exchange (HIE) Pattern

PS-CA USE CASE 2: HCP Views/ Consumes PS-CA			**MAPPING TO SECTIONS FROM THIS AND REFERENCED INTEROPERABILITY SPECIFICATIONS**			
USE CASE ACTOR	SERVICE SUPPORTED	OPT	TECHNICAL ACTOR	OPT	PROFILE/ STANDARD	REFERENCED SPECIFICATION AND STANDARDS (Refer to the sections listed below in Appendix A)
PS-CA Consumer	Authenticate User	O	Client (e.g., EMR)	O	Internet User Assertion (IUA)	Appendix A: IUA Profile Overview
	Identify Patient	O	Client (e.g., EMR)	O	Use Existing Standards Employed by the Clinical System	N/A
		O	Patient Demographic Consumer	O	PDQm	Appendix A: PDQm Profile Overview
	Request Search Patient Summary (Patient Identifier)	R	Client (e.g., EMR)	R	Use Existing Standards Employed by the Clinical System	N/A
	Request Patient Summary (Bundle ID)	R	Client (e.g., EMR)	R	Use Existing Standards Employed by the Clinical System	N/A
	Return Patient Summary Compositions	R	Data Consumer	R	CA:FeX	Appendix A: CA:FeX Profile Overview

PS-CA USE CASE 2: HCP Views/ Consumes PS-CA			**MAPPING TO SECTIONS FROM THIS AND REFERENCED INTEROPERABILITY SPECIFICATIONS**			
USE CASE ACTOR	SERVICE SUPPORTED	OPT	TECHNICAL ACTOR	OPT	PROFILE/ STANDARD	REFERENCED SPECIFICATION AND STANDARDS (Refer to the sections listed below in Appendix A)
	Return Patient Summary	R	Data Consumer	R	CA:FeX	Appendix A: CA:FeX Profile Overview
	Perform transformation between different formats	O	Client (e.g., EMR)	O	Use Existing Standards Employed by the Clinical System (Render to Specific Format (PDF))	N/A
		O	Client (e.g., EMR)	O	CA:FMT (e.g., FHIR to CDA, CDA to FHIR, Export to PDF, etc.)	Appendix A: CA:FMT Profile Overview
	Download/ Print PS-CA	O	Client (e.g., EMR)	O	Use Existing Standards Employed by the Clinical System	N/A
	Update Current ValueSets and ConceptMaps	O	Client (e.g., EMR)	O	SVCM	Appendix A: SVCM Profile Overview
Document Repository (Local to PS-CA Producer or Central)*	Retrieve Patient Summary Compositions From Document Repository	R	Data Responder	R	CA:FeX	Appendix A: CA:FeX Profile Overview

PS-CA USE CASE 2: HCP Views/ Consumes PS-CA			MAPPING TO SECTIONS FROM THIS AND REFERENCED INTEROPERABILITY SPECIFICATIONS			
USE CASE ACTOR	SERVICE SUPPORTED	OPT	TECHNICAL ACTOR	OPT	PROFILE/ STANDARD	REFERENCED SPECIFICATION AND STANDARDS (Refer to the sections listed below in Appendix A)
	Retrieve Patient Summary Bundle Document Repository	R	Data Responder	R	CA:FeX	Appendix A: CA:FeX Profile Overview
Central Infrastructure	Identify Patient	O	Patient Identity Registry	O	PMIR	Appendix A: PMIR Profile Overview

*For Option 2, **Document Repository** use case actor is a logical role enacted by the Data Recipient which is described in detail in the 'Companion Guide: Reference Architecture'.

7.6 Table 3.1 Interoperability Conformance Requirements for Use Case 3: Patient Views/Consumes PS-CA

Option 1: Document Repository/Registry Pattern

PS-CA USE CASE 3: Patient Views/ Consumes PS-CA			MAPPING TO SECTIONS FROM THIS AND REFERENCED INTEROPERABILITY SPECIFICATIONS			
USE CASE ACTOR	SERVICE SUPPORTED	OPT	TECHNICAL ACTOR	OPT	PROFILE/ STANDARD	REFERENCED SPECIFICATION AND STANDARDS (Refer to the sections listed below in Appendix A)
Patient Portal	Authenticate User	O	Client App	O	Internet User Assertion (IUA)	Appendix A: IUA Profile Overview
	Identify Patient	O	Client App	O	Use Existing Standards Employed by the Clinical System	N/A

PS-CA USE CASE 3: Patient Views/ Consumes PS-CA			**MAPPING TO SECTIONS FROM THIS AND REFERENCED INTEROPERABILITY SPECIFICATIONS**			
USE CASE ACTOR	SERVICE SUPPORTED	OPT	TECHNICAL ACTOR	OPT	PROFILE/ STANDARD	REFERENCED SPECIFICATION AND STANDARDS (Refer to the sections listed below in Appendix A)
		O	Patient Demographic Consumer	O	PDQm	Appendix A: PDQm Profile Overview
	Request Patient Summary References (Patient Identifier)	R	Client App	R	Use Existing Standards Employed by the Clinical System	N/A
	Request Patient Summary (Patient Summary References)	R	Client App	R	Use Existing Standards Employed by the Clinical System	N/A
	Return Patient Summary References	R	Document Consumer	R	MHD	Appendix A: MHD Profile Overview
	Return Patient Summary	R	Document Consumer	R	MHD	Appendix A: MHD Profile Overview
	Perform transformation between different formats	O	Client App	O	Use Existing Standards Employed by the Clinical System (Render to Specific Format (PDF))	N/A

PS-CA USE CASE 3: Patient Views/ Consumes PS-CA			**MAPPING TO SECTIONS FROM THIS AND REFERENCED INTEROPERABILITY SPECIFICATIONS**			
USE CASE ACTOR	SERVICE SUPPORTED	OPT	TECHNICAL ACTOR	OPT	PROFILE/ STANDARD	REFERENCED SPECIFICATION AND STANDARDS (Refer to the sections listed below in Appendix A)
		O	Client App	O	CA:FMT (e.g., FHIR to CDA, Export to PDF, etc.)	Appendix A: CA:FMT Profile Overview
	Download/ Print PS-CA	O	Client App	O	Use Existing Standards Employed by the Clinical System	N/A
	Save to Portable Media	O	Client App	O	Use Existing Standards Employed by the Clinical System	N/A
		O	Portable Media Creator	O	XDM	Appendix A: XDM Profile Overview
Document Repository (Local or Central)	Retrieve PS-CA References from Document Repository	R	Document Responder	R	MHD	Appendix A: MHD Profile Overview
	Retrieve PS-CA from Document Repository	R	Document Responder	R	MHD	Appendix A: MHD Profile Overview
Central Infrastructure	Identify Patient	O	Patient Identity Registry	O	PMIR	Appendix A: PMIR Profile Overview

7.7 Table 3.2 Interoperability Conformance Requirements for Use Case 3: Patient Views/Consumes PS-CA

Option 2: FHIR Health Information Exchange (HIE) Pattern

PS-CA USE CASE 3: Patient Views/ Consumes PS-CA			**MAPPING TO SECTIONS FROM THIS AND REFERENCED INTEROPERABILITY SPECIFICATIONS**			
USE CASE ACTOR	SERVICE SUPPORTED	OPT	TECHNICAL ACTOR	OPT	PROFILE/ STANDARD	REFERENCED SPECIFICATION AND STANDARDS (Refer to the sections listed below in Appendix A)
Patient Portal	Authenticate User	O	Client App	O	Internet User Assertion (IUA)	Appendix A: IUA Profile Overview
	Identify Patient	O	Client App	O	Use Existing Standards Employed by the Clinical System	N/A
		O	Patient Demographic Consumer	O	PDQm	Appendix A: PDQm Profile Overview
	Request Search Patient Summary (Patient Identifier)	R	Client App	R	Use Existing Standards Employed by the Clinical System	N/A
	Request Patient Summary (Bundle ID)	R	Client App	R	Use Existing Standards Employed by the Clinical System	N/A
	Return Patient Summary Compositions	R	Data Consumer	R	CA:FeX	Appendix A: CA:FeX Profile Overview
	Return Patient Summary	R	Data Consumer	R	CA:FeX	Appendix A: CA:FeX Profile Overview

PS-CA USE CASE 3: Patient Views/ Consumes PS-CA			**MAPPING TO SECTIONS FROM THIS AND REFERENCED INTEROPERABILITY SPECIFICATIONS**			
USE CASE ACTOR	SERVICE SUPPORTED	OPT	TECHNICAL ACTOR	OPT	PROFILE/ STANDARD	REFERENCED SPECIFICATION AND STANDARDS (Refer to the sections listed below in Appendix A)
	Perform transformation between different formats	O	Client App	O	Use Existing Standards Employed by the Clinical System (Render to Specific Format (PDF))	N/A
		O	Client App	O	CA:FMT (e.g., FHIR to CDA, CDA to FHIR, Export to PDF, etc.)	Appendix A: CA:FMT Profile Overview
	Download/ Print PS-CA	O	Client App	O	Use Existing Standards Employed by the Clinical System	N/A
	Save to Portable Media	O	Client App	O	Use Existing Standards Employed by the Clinical System	N/A
		O	Portable Media Creator	O	XDM	Appendix A: XDM Profile Overview
Document Repository (Local or Central)*	Retrieve Patient Summary Compositions from Document Repository	R	Data Responder	R	CA:FeX	Appendix A: CA:FeX Profile Overview

PS-CA USE CASE 3: Patient Views/ Consumes PS-CA			**MAPPING TO SECTIONS FROM THIS AND REFERENCED INTEROPERABILITY SPECIFICATIONS**			
USE CASE ACTOR	SERVICE SUPPORTED	OPT	TECHNICAL ACTOR	OPT	PROFILE/ STANDARD	REFERENCED SPECIFICATION AND STANDARDS (Refer to the sections listed below in Appendix A)
	Retrieve Patient Summary Bundle from Document Repository	R	Data Responder	R	CA:FeX	Appendix A: CA:FeX Profile Overview
Central Infrastructure	Identify Patient	O	Patient Identity Registry	O	PMIR	Appendix A: PMIR Profile Overview

*For Option 2, **Document Repository** use case actor is a logical role enacted by the Data Recipient which is described in detail in the 'Companion Guide: Reference Architecture.'

8 PS-CA Actor Conformance

A system conforming to this Core Interoperability Specification shall claim conformance at the level of a Use Case Actor (first columns of Tables 1.1, 1.2, 2.1, 2.2, 3.1 and 3.2). A system may claim conformance to one or more Use Case Actors among:

- PS-CA Producer
- PS-CA Consumer
- Document Repository (Local or Central)
- Central Infrastructure
- Patient Portal

PS-CA Producer and PS-CA Consumer use case actor roles will primarily be taken up by EMR clinical solution vendors. Document Repository and Central Infrastructure use case actor roles can be taken up either by EMR clinical solution vendors or jurisdictions depending on the implementation approach that the jurisdiction decides to adopt. Similarly, the Patient Portal use case actor can be taken up either by a vendor or jurisdiction depending on the approach and policies defined regarding patient/subject-of-care access to their patient summary.

In order to implement a system that fully supports the pan-Canadian Patient Summary Interoperability Specifications v1 Trial Implementation, the system shall be able to claim conformance to 'Required' services and it's associated requirements as defined in Core Interoperability Specification Requirements.

8.1 OpenAPI Specification

It is recommended to use the OpenAPI UI to access the interactive API documentation. The API allows developers to test API calls directly in the browser. There are two APIs:

- OpenAPI for MHD: available here
- Open API for CA:FeX: available here

8.2 Constraints on PS-CA Use Case Actors Using Two Implementation Patterns

The pages that follow will describe the constraints on PS-CA Use Case Actors for two implementation patterns below:

1. Option 1 - Document Repository/Registry Pattern Using MHD Profile
2. Option 2 - FHIR Health Information Exchange (HIE) Pattern Using CA:FeX

8.3 Option 1 - Document Repository/Registry Pattern Using MHD Profile

8.3.1 Constraints on PS-CA Use Case Actors: Option 1 - Document Repository/ Registry Pattern Using MHD Profile

There are some design constraints on use case actors when developing functionality to support the services mapped to those Use Case Actors.

Note: The scope of this section is limited to the constraints that are applicable to IHE MHD profile actors and transactions. The two key services supported by the IHE MHD Profile are:

- Save PS-CA to Document Repository
- Retrieve PS-CA from Document Repository

This section provides key design constraints for implementation of these two required services using IHE methodology and FHIR standards.

8.3.2 Save PS-CA to Document Repository

The *Save PS-CA to Document Repository* service shall be implemented using PS-CA Producer and Document Repository Use Case Actors.

These actors shall use the IHE Transaction **Provide Document Bundle [ITI-65]** of the MHD profile that passes a *Provide Document Bundle Request* from a Document Source to a Document Recipient.

Provide Document Bundle [ITI-65]

This message uses the HTTP POST method on the target Provide Document Bundle endpoint to convey the metadata and the document(s) as a FHIR transaction.

Trigger Events

This method is invoked when the Document Source needs to submit one or more documents to a Document Recipient.

Message Semantics

The Document Source shall initiate a FHIR "transaction" using a "create" action by sending an HTTP POST request method composed of a FHIR Bundle Resource. The media type of the HTTP body shall be either application/fhir+json or application/fhir+xml.

Expected Actions

The Document Recipient shall accept both media types application/fhir+json and application/fhir+xml. On receipt of the submission, the Document Recipient shall validate the resources and respond with one of the HTTP codes defined in the response Message Semantics.

Refer to the Provide Document Bundle [ITI-65] transaction details page for additional information.

8.3.3 Retrieve PS-CA from Document Repository

The *Retrieve PS-CA from Document Repository* service shall be implemented using the PS-CA Consumer and Document Repository Use Case Actors.

These actors shall use the following IHE Transactions of the MHD profile to find document references, document lists and retrieval of an identified Patient Summary document:

- **Find Document Lists [ITI-66]**
- **Find Document References [ITI-67]**
- **Retrieve Document [ITI-68]**

Find Document List [ITI-66]

This message uses the search method parameterized query to obtain List Resources from the Document Responder.

Trigger Events

When the Document Consumer needs to discover List Resources matching various metadata parameters it issues a Find Document Lists message.

Message Semantics

The Document Consumer executes an HTTP search against the Document Responder List endpoint. The search target follows the FHIR HTTP specification, addressing the List Resource http://hl7.org/fhir/R4/http.html:

[base]/List?<query>

This URL is configurable by the Document Responder and is subject to the following constraints:

- The <query> represents a series of encoded name-value pairs representing the filter for the query as well as control parameters to modify the behavior of the Document Responder such as response format, or pagination.
- The Document Consumer may use GET or POST based searches. The Document Responder shall support both GET and POST based searches http://hl7.org/fhir/R4/http.html#search .

Query Search Parameters

The Document Consumer may supply, and the Document Responder shall be capable of processing all query parameters listed below. All query parameter values shall be appropriately encoded per RFC3986 “percent” encoding rules. Note that percent encoding does restrict the character set to a subset of ASCII characters which is used for encoding all other characters used in the URL.

- The Document Consumer shall include search parameters patient or patient.identifier, code, and status. The other parameters described below are optional.
- The Document Responder shall implement the parameters described below. The Document Responder may choose to support additional query parameters beyond the subset listed below. Any additional query parameters supported shall be supported according to the core FHIR specification. Such additional parameters are considered out of scope for this transaction. Any additional parameters not supported should be ignored and shall not cause a failure.

Query Search Parameters	Description
code	This parameter, of type token, specifies the code.coding value supplied in the List Resource. The value of the code element indicates the List of type SubmissionSet or Folder as indicated.
date	This parameter, of type date, specifies the time when the List was created. See FHIR http://hl7.org/fhir/R4/search.html#date for use of the date search type.

Query Search Parameters	Description
designationType	This IHE extension on parameters defined as List-DesignationType, of type token, specifies the designation type of the List. The value of the designation type element expresses contentType of submissionSet or the codeList of a Folder. It is usually expressed in LOINC or SNOMED. Note that servers that do not support this extended search parameter will ignore it, and thus return more results than expected.
identifier	This parameter, of type token, specifies an identifier for this List. The search results represent the results of a search on List.masterIdentifier and List.identifier. See ITI TF-2x: Appendix Z.2 for additional constraints on the use of the token search parameter type.
patient	This parameter is of type Reference(Patient). The Document Consumer may get this reference through the use of the PDQm or PIXm Profiles, or by some other method. When the patient parameter is used, the Patient reference would need to be accessible to both the Document Consumer and the Document Responder.
patient.identifier	This parameter, of type token, specifies an identifier associated with the patient to which the List Resource is assigned. This use of patient.identifier follows the FHIR Chaining Parameters search methodology.
source.given and source.family	These parameters, of type string, specify the name parts of the author person which is associated with the List. This use of source.given and source.family follows the FHIR Chaining Parameters search methodology.
sourceId	This IHE extension on parameters defined as List-SourceId, of type reference, specifies the source (author) value supplied in the List Resource.
status	This parameter, of type token, specifies the status of the List. If included in the query, the Document Consumer shall populate the code portion of the token with one of the codes in the below table for status of List. The system portion of the token shall not be populated.

Code	ebRIM Code
Current	urn:oasis:names:tc:ebxml-regrep:StatusType:Approved
Superseded	urn:oasis:names:tc:ebxml-regrep:StatusType:Deprecated

Expected Actions

The Document Responder shall process the query to discover the List entries that match the search parameters given.

Refer to the Find Document Lists [ITI-66] transaction details page for additional information.

Find Document References [ITI-67]

This message uses the search method parameterized query to obtain DocumentReference Resources from the Document Responder.

Trigger Events

When the Document Consumer needs to discover DocumentReference Resources matching various metadata parameters, it issues a Find Document References message.

Message Semantics

The Document Consumer executes an HTTP search against the Document Responder's DocumentReference URL. The search target follows the FHIR HTTP specification, addressing the DocumentReference Resource http://hl7.org/fhir/R4/http.html:

[base]/DocumentReference?<query>

This URL is configurable by the Document Responder and is subject to the following constraints:

- The <query> represents a series of encoded name-value pairs representing the filter for the query, as specified in Section Query Search Parameters, as well as control parameters to modify the behavior of the Document Responder such as response format, or pagination.
- The Document Consumer may use GET or POST based searches. The Document Responder shall support both GET and POST based searches http://hl7.org/fhir/R4/http.html#search.

Query Search Parameters

The Document Consumer may supply, and the Document Responder shall be capable of processing, all query parameters listed below. All query parameter values shall be appropriately encoded per RFC3986 “percent” encoding rules. Note that percent encoding does restrict the character set to a subset of ASCII characters which is used for encoding all other characters used in the URL.

- The Document Consumer shall include search parameters patient or patient.identifier, and status. The other parameters described below are optional.
- The Document Responder must implement the parameters described below. The Document Responder may choose to support additional query parameters beyond the subset listed below. Any additional query parameters supported shall be supported according to the core FHIR specification. Such additional parameters are considered out of scope for this transaction. Any additional parameters not supported should be ignored and shall not cause a failure.

Query Search Parameters	Description
author.given and author.family	These parameters, of type string, specify the name parts of the author person, which is associated with the DocumentReference Resource, or in Document Sharing nomenclature, the author of the Document Entry. This use of author.given and author.family follows the FHIR Chaining Parameters search methodology.
category	This parameter, of type token, specifies the general classification of the DocumentReference Resource, or in Document Sharing nomenclature, the classCode of the Document Entry.

Query Search Parameters	Description
creation	This IHE defined parameter defined as DocumentReference-Creation, of type dateTime, specifies a search against the DocumentReference.content.attachment.creation. See FHIR http://hl7.org/fhir/R4/search.html#date for use of the date search type.
date	This parameter, of type date, specifies the time when the DocumentReference was created. See FHIR http://hl7.org/fhir/R4/search.html#date for use of the date search type.
event	This parameter, of type token, specifies the main clinical acts documented by the DocumentReference Resource, or in Document Sharing nomenclature, the eventCodeList of the Document Entry.
facility	This parameter, of type token, specifies the kind of facility found in DocumentReference.context.facilityType, or in Document Sharing nomenclature, the healthcareFacilityTypeCode of the Document Entry.
format	This parameter, of type token, specifies the format of the DocumentReference Resource, or in Document Sharing nomenclature, the formatCode of the Document Entry.
identifier	This parameter, of type token, specifies an identifier for this DocumentReference and/or the contained document. The search results represent the results of a search on DocumentReference.masterIdentifier and DocumentReference.identifier.
patient	This parameter is of type Reference(Patient). The Document Consumer may get this reference using the PDQm or PIXm Profile. When the patient parameter is used, the Patient reference would need to be accessible to both the Document Consumer and the Document Responder.
patient.identifier	This parameter, of type token, specifies an identifier associated with the patient to which the DocumentReference Resource is assigned. This use of patient.identifier follows the FHIR Chaining Parameters search methodology.
period	This parameter, of type date, represents the time of service that is being documented by the DocumentReference. The period search parameter specifies an interval which the time of service overlaps. In Document Sharing nomenclature, this query parameter represents from/to parameters for the serviceStartTime and serviceStopTime of the Document Entry. See FHIR http://hl7.org/fhir/R4/search.html#date for use of the date search type.
related	This parameter, of type reference, represents other identifiers associated with the DocumentReference Resource, or in Document Sharing nomenclature, the referenceIdList of the Document Entry.

<table>
<tr><th>Query Search Parameters</th><th>Description</th></tr>
<tr><td>security-label</td><td>This parameter, of type token, specifies the security labels of the document referenced by the DocumentReference Resource, or in Document Sharing nomenclature, the confidentialityCode of the Document Entry.</td></tr>
<tr><td>setting</td><td>This parameter, of type token, specifies the specific practice setting of the DocumentReference Resource, or in Document Sharing nomenclature, the practiceSettingCode of the Document Entry.</td></tr>
<tr><td>status</td><td>This parameter, of type token, specifies the status of the DocumentReference Resource, or in Document Sharing nomenclature, the availabilityStatus of the Document Entry. The Document Consumer shall populate the identifier portion of the token using one of the FHIR Codes in below table. The system portion of the token shall not be populated.
<table>
<tr><th>FHIR Code</th><th>ebRIM Code</th></tr>
<tr><td>Current</td><td>urn:oasis:names:tc:ebxml-regrep:StatusType:Approved</td></tr>
<tr><td>Superseded</td><td>urn:oasis:names:tc:ebxml-regrep:StatusType:Deprecated</td></tr>
</table>
</td></tr>
<tr><td>type</td><td>This parameter, of type token, specifies the specific type of the DocumentReference resource or in Document Sharing nomenclature, the typeCode of the Document Entry. See ITI TF-2x: Appendix Z.2 for additional constraints on the use of the token search parameter type.</td></tr>
</table>

Expected Actions

The Document Responder shall process the query to discover the DocumentReference entries that match the search parameters given.

Refer to the Find Document References [ITI-67] transaction details page for additional information including the ***Find Document References Response Message.***

Retrieve Document [ITI-68]

This transaction is used by the Document Consumer to retrieve a document from the Document Responder.

Trigger Events

The Document Consumer wants to obtain a document.

Message Semantics

The Document Consumer sends an HTTP GET request to the server. The Document Consumer request may be to retrieve the document content referenced by a DocumentReference.content.attachment.url.

The Document Consumer may provide an HTTP Accept header, according to the semantics of the HTTP protocols. This enables the Document Consumer to indicate preferred mime-types such that the Document Responder could provide the document requested in an encoding other than the encoding indicated in the DocumentReference. For example, indicating application/fhir+json could result in the response from the Document Responder being a JSON FHIR Bundle of type document with all the content encoded as FHIR resources.

The only MIME type assured to be returned is the MIME type indicated in the DocumentReference.content.attachment.contentType.

The HTTP If-Unmodified-Since header shall not be included in the GET request.

Expected Actions

The Document Responder shall provide the document in the requested MIME type or reply with an HTTP status code indicating the error condition. The Document Responder is not required to transform the document.

Refer to the Retrieve Document [ITI-68] transaction details page for additional information including the ***Retrieve Document Response Message***.

8.4 Option 2 - FHIR Health Information Exchange (HIE) Pattern Using CA:FeX

8.4.1 Constraints on PS-CA Use Case Actors: Option 2 - FHIR Health Information Exchange (HIE) Pattern Using CA:FeX

The section below captures some of the design constraints on use case actors when developing functionality to support the services mapped to those Use Case Actors.

Note: The scope of this section is limited to the constraints that are applicable to actors and transactions defined in CA:FeX Interoperability Specifications.

While global implementations are actively testing various ways to exchange patient summaries and other documents (See *Pan-Canadian FHIR Exchange (CA:FeX) Interoperability Specifications: Preface*), more sophisticated exchange patterns may not be as accessible for implementers in the current state. As such, PS-CA has identified the patterns in CA:FeX that early implementers are most likely to start with.

This implementation is currently constrained to only support FHIR-assembled documents in the form of a Bundle of resources of type "document" that has a Composition resource as the first resource in the bundle, followed by a series of other resources, referenced from the Composition resource, that provide supporting evidence for the document.

The two key services supported by CA:FeX are:

- CA:FeX-1: Save PS-CA to Document Repository
- CA:FeX-2A: Retrieve PS-CA from Document Repository

The following section provides key design constraints for implementation of these two required services using the CA:FeX Interoperability Specifications and FHIR standards.

Save PS-CA to Document Repository

PS-CA Producer attempts to save a PS-CA in the Document Repository. The PS-CA Producer implements the Data Source actor from the CA:FeX Interoperability Specifications by using the Save PS-CA to Document Repository service. Similarly, the Document Repository implements the Data Recipient actor from the CA:FeX Interoperability Specifications.

These actors shall use the transaction **Submit Data [CA:FeX-1]** of CA:FeX that executes a *Submit Data Request* from a Data Source to a Data Recipient.

Note: Document lifecycle management including update, replacement, and deprecation of documents, is out of scope for this release.

Submit Data [CA:FeX-1]

This message involves a request by a Data Source to transfer a PS-CA FHIR Document Bundle to a Data Recipient. The request is received by a Data Recipient which stores the received PS-CA document bundle and returns an HTTP response code.

Trigger Events

This method is invoked when the Data Source needs to submit a FHIR Document Bundle to a Data Recipient (Document Repository).

Message Semantics

This message uses the HTTP POST method on the target Submit Data endpoint to convey the metadata and the document(s) as a FHIR transaction. The Data Source shall initiate a FHIR "transaction" using a "create" action by sending an HTTP POST request method composed of a FHIR Bundle Resource (with type of document). The content type of the HTTP body shall be either application/fhir+json or application/fhir+xml.

Expected Actions

The Data Recipient shall accept both content types application/fhir+json and application/fhir+xml. On receipt of the submission, the Data Recipient shall validate the resources and respond with one of the HTTP response codes and an OperationOutcome, if applicable. For additional information on HTTP response codes, refer to Response Handling in the CA:FeX Specifications v0.1, section *Exchanging Documents in FHIR*.

Retrieve PS-CA from Document Repository

The PS-CA Consumer and Document Repository (Central) Use Case Actors are required to implement the *Retrieve PS-CA from Document Repository* service.

These actors shall use the following transactions to find document metadata and retrieval of identified Patient Summary document:

- **Search Data [CA:FeX-2A]**
- **Retrieve Data [CA:FeX-3]**

Search Data [CA:FeX-2A]

This message involves a query request by Data Consumer for PS-CA FHIR Document Bundle matching the search criteria included in the request. The request is received by Data Recipient which returns a *searchset* Bundle containing the document(s) matching search parameters.

The Data Consumer may use HTTP GET or HTTP POST based searches. The Data Responder shall support both GET and POST based searches.

Trigger Events

When the Data Consumer needs to discover PS-CA FHIR Document Bundles in the Document Repository matching various parameters.

Message Semantics

The Data Consumer executes a FHIR search request against the Data Responder endpoint (FHIR Repository).

The Data Consumer may use HTTP GET or HTTP POST based searches. The Data Responder shall support both GET and POST based searches.

GET [base]/Bundle?composition

POST [base]/Bundle/_search{?&_format=[mime-type]}

Query Search Parameters

Search Document Bundle operation shall include the following search parameters:

Query Search Parameters	Description	Usage Note
timestamp (bundle.timestamp)	This parameter, of type date, specifies the timestamp when the FHIR bundle was created. See FHIR http://hl7.org/fhir/R4/search.html#date for use of the date search type.	Applied directly on Bundle, does not require chaining.
composition (bundle.composition)	This parameter, of type reference, specifies the first resource in the bundle, if the bundle type is "document" - this is a composition, and this parameter provides access to search its contents using chaining. See FHIR Chaining Parameters search methodology.	Search parameter on Bundle that is the base for further chained.
type (bundle.composition.type)	This parameter, of type token, specifies the kind of composition (LOINC if possible). The use of composition.type follows the FHIR Chaining Parameters search methodology.	Will be fixed to 60591-5 for patient summary.
patient.identifier (bundle.composition.patient.identifier)	This parameter, of type token, specifies an identifier associated with the patient to which the FHIR bundle is assigned. This use of patient.identifier follows the FHIR Chaining Parameters search methodology.	Should include system and value to prevent improper retrieval of patient summaries.

Example Search Queries

Search by Type of Patient Summary

Note: This is the base that is recommended for all searches for patient summaries to build on. This type is shared by IPS and national implementations of the Patient Summary and therefore will return any patient summaries for the subject of care.

GET [base]/Bundle?composition.type=60591-5

Search by Type + Patient Identifier

GET [base]/Bundle?composition.type=60595-1&composition.patient.identifier=[system]|[value]

Search by Type + Date with qualifier

GET [base]/Bundle?composition.type=60591-5&date=gt2021-01-01

Expected Actions

The Data Responder shall process the query and return a search result Bundle matching the search criteria included in the request. The FHIR standard provides encodings for responses as either JSON (application/fhir+json) or XML (application/fhir+xml). For additional information on HTTP response codes, refer to Response Handling in the CA:FeX Specifications v0.1, section *Exchanging Documents in FHIR*.

Security Considerations

This transaction should not return information that the Data Consumer is not authorized to access. Where authorization here is inclusive of system, app, user, and purpose, according to local policy, patient consents, and security layering. However, the transaction may return search result bundles that have Reference elements that the Data Consumer may not have access to. This is to say that the authorization need only be to the content returned in the Bundle. There may be references (URLs) for which the content is not authorized. This is considered proper as the Data Consumer would need to retrieve the content pointed to by those references, and at that time the proper authorization decision would be made on that context and content. In this way it is possible for a Data Consumer to get Resources that are pointing at data that the Data Consumer is not authorized to retrieve. Thus, the URLs used must be carefully crafted so as to not expose sensitive data in the URL value. Also most of the significant resources should be included in the document, so it wouldn't be possible to strip out sensitive content, and thus the whole document should be treated as sensitive.

Retrieve Data [CA:FeX-3]

This transaction involves a request by the Data Consumer for retrieving the identified PS-CA FHIR Document Bundle from a FHIR Repository. The desired Document Bundle is identified by the target server's record ID for that PS-CA FHIR Document Bundle. The request is received by the Data Responder which returns the requested PS-CA FHIR Document Bundle and returns an HTTP response code.

This message uses the HTTP GET request to retrieve the identified PS-CA FHIR Bundle from the central FHIR repository.

Trigger Events

This method is invoked when the Data Consumer needs to retrieve a FHIR Document Bundle.

Message Semantics

The Data Consumer sends an HTTP GET request to the server based on a known resource ID from the Data Responder. The Read operation will return a document Bundle resource containing the Patient Summary Composition and linked resources.

GET [base]/Bundle/[id]

Expected Actions

The Data Responder shall process the query and respond with PS-CA FHIR Bundle matching the specified ID included in the request. When the requested document is returned, the Data Responder shall respond with an HTTP Status Code 200. The HTTP message-body shall be the content of the requested document. For additional information on HTTP response codes, refer to Response Handling in the CA:FeX Specifications v0.1, section *Exchanging Documents in FHIR*.

Security Considerations

This transaction should not return information that the Data Consumer is not authorized to access.

9 Privacy & Security Guidance

9.1 Privacy Considerations

> A Digital Health Privacy Toolkit, which will be a companion guide for the interoperability specifications, is under development. The Digital Health Privacy Toolkit will be available and referenced here as part of the PS-CA v1 Trial Implementation release.

9.2 Security Considerations

It is recommended that vendors and jurisdictions ensure appropriate security services, mechanisms and functionality are in place for the PS-CA Specifications, depending on maturity levels of current capabilities. For example, security considerations include the following:

- Authorization
- Authentication
- Role-Based Access Control
- Data Encryption
- Segregate Duties
- Audit Logging
- Security Labels
- Digital Signatures
- Communication
- Narrative

10 Information Models, Application, and Infrastructure

This table provides key implementation guidance for Information Models, Applications and Infrastructure for the PS-CA specifications.

Information Models: Information models are widely used to express structure and process resulting in data interchange formats and behaviours.

Application: Functional specifications are laid down at the Information level. These form the basis for the technical specifications, which are described at the Application level. At this level, agreements have to be made within both the PS-CA Producer and PS-CA Consumer regarding the integration of various applications between which information is exchanged.

Infrastructure: Infrastructure refers to the communication between systems in the different healthcare organizations. Agreements are defined between PS-CA Solutions and jurisdictions on the design of the infrastructures, databases, networks, exchange protocols, tokens and other technologies.

Categories	Concept	Implementation Guidance Description
Information Models	**PS-CA: Data Domains of Interest by Canadian Jurisdiction and Release**	A table representing the alignment of the PS-CA to the IPS, data domains of interest by Canadian jurisdiction and the PS-CA Release 1 and 2 plans has been created and validated through stakeholder engagement. Release 1 will include all of the data domains highlighted in the Release 1 column and Release 2+ will continue to build on the Release 1 data domains as well as add the additional data domains. More information about this can be found in the Preface section.

Categories	Concept	Implementation Guidance Description
Information Models	**Valuesets**	Data residing in a clinical system will need to be mapped to appropriate FHIR profiles and Valuesets from the Content Data Model of the PS-CA specification in Release 1. For more information on the Valuesets implementation patterns, please refer to the Terminology Approach page in the Pan-Canadian Patient Summary v0.0.3 FHIR Implementation Guide. Valuesets define the possible choices of coded concepts for a data element within a PS-CA. The concept domains often serve the function of a predicate to be tested. In any clinical setting, implemented systems usually host many Valuesets. Because Valuesets are often localized, which makes semantic interoperability between systems difficult without extensive cross-mapping, Infoway will create or identify suitable pan-Canadian valuesets that are applicable for the PS-CA. The PS-CA specification promotes two simultaneous goals for terminology. It promotes standardized Canadian terminologies in use today for the purpose of facilitating semantic interoperability within and across jurisdictions through the exchange of patient summaries. These are referred to as the Proposed Pan-Canadian Value Sets. The PS-CA specification also encourages global interoperability where possible for international exchange. Value sets that have been defined by the HL7® FHIR® Base Standard or by the IPS Specification for the purposes of interoperable international exchange are referred to as the Global Value Sets.
Application	**Patient Summary References (e.g., Patient Identity)**	The PS-CA Solution (e.g., EMR, EHR) will leverage their existing product standards and policies for identifying the patient/ subject of care. However, if there is a central service available for patient identity, then the PS-CA Solution can leverage those services for uniquely identifying the patient/subject of care. For more information on the patient identity implementation patterns, please refer to the IHE Profile PDQm and PMIR in the Appendices.
Application	**Render to Specific Format (e.g., PDF, CDA)**	It is recommended that the PS-CA Solution leverages the CA:FMT Interoperability Specifications that provides formatting support service. It provides support for transformation of documents between different formats (e.g., from FHIR to PDF, CDA, etc.). Content is in development and will be added in future roadmaps

Categories	Concept	Implementation Guidance Description
Application	**Data Interchange Format**	JSON is the recommended data interchange format for the implementation of the PS-CA interoperability use cases. • The server actors (PS-CA Recipient and PS-CA Responder) are required to support JSON and XML. • The client actors (PS-CA Producer and PS-CA Consumer) can use either JSON or XML.
Application	**Data Conversion / Structured Data**	The PS-CA should be a FHIR Document (meaning that it is authored and assembled using FHIR). For scenarios where the implementation requires the delivery of the document in a different form (e.g., PDFs), jurisdictions should use conversion and translation services that can convert FHIR Documents
Application	**On-Demand**	The long-term vision for the PS-CA standard is to include an on-demand option where a PS-CA consumer submits a request and based on that request, a PS-CA is assembled on-demand and returned to the consumer.
Infrastructure	**Jurisdictional Infrastructures**	Integration of the recommended actors and transactions of the PS-CA standard into existing jurisdictional healthcare infrastructures may differ; therefore, it is highly recommended that local implementation guidance is reviewed prior to the implementation of the PS-CA standard. Example: For user authentication, Alberta uses certificate-based security footprint while Ontario uses token-based security.
Infrastructure	**Document Management**	Implementation of the PS-CA standard must refer to jurisdictional specific requirements and policies for document management, including archiving, replacement, etc.

11 PS-CA Content Data Model & FHIR® Profiles

The Release 1 FHIR® Artefacts (Profiles, ValueSets, Extensions, etc.) of the PS-CA Specifications are presented in the PS-CA Simplifier FHIR Implementation Guide.

As this is a working specification that is being updated as feedback is acquired from various engagement activities, the profiles use a versioning system to help implementers understand their development status prior to the formal release of the PS-CA Interoperability Specifications v1.0 Trial Implementation (TI).

Version 1.0 will be published as a Simplifier package that acts as a snapshot in time of the profiling and conformance expectations of PS-CA Interoperability Specifications v1.0 TI. This will allow for evolution of profiles to prepare for Version 2.0, without undermining the stability of Version 1.0 profiles. Instructions on how to access and use the v1.0.0 package will be provided.

Implementers are encouraged to begin by reviewing the PS-CA Library of Profiles page which describes the Patient Summary Composition Structure & Profiles (e.g., sections that make up the data model content for the PS-CA).

The list of summary sections within the Patient Summary-CA Composition and their respective profiles can be found below.

Note: Some elements in the Header section reference profiles that do not have appropriate equivalents in the current IPS specification. Implementers are encouraged to utilize the minimal profiling expectations outlined National Canadian Baseline profiles in these cases.

PS-CA Section	FHIR® Profiles
Subject	Patient (PS-CA)
Author	Practitioner (CA Baseline), PractitionerRole (CA Baseline), Organization (CA Baseline), Patient (PS-CA)
Attester	Practitioner (CA Baseline), PractitionerRole (CA Baseline), Organization (CA Baseline), Patient (PS-CA)
Custodian	Organization (CA Baseline)
Allergies and Intolerance	AllergyIntolerance (PS-CA)
Problem List	Condition (PS-CA)
Immunizations	Immunization (PS-CA)

PS-CA Section	FHIR® Profiles
History of Procedures	Procedure (PS-CA)
Medication Summary	Medication (PS-CA), MedicationRequest (PS-CA), MedicationStatement (PS-CA)
Vital Signs	Vital Sign (Global)
Past History of Illness	Condition (PS-CA)
Social History	SHx Observation: Alcohol Use (PS-CA), SHx Observation: Tobacco Use (PS-CA)

Additional information on the PS-CA FHIR® Profiles can be found in the pan-Canadian Patient Summary – FHIR Implementation Guide v1.0

12 Appendix A: IHE Profile Baseline Information

Appendix A describes baseline information on the recommended IHE profiles and pan Canadian Interoperability Specifications, with links to the IHE source documentation where stakeholders can get additional details on each PS-CA actor and transaction.

Published Versions

The following describes the published versions in scope for the required and optional IHE Profiles that have been referenced in this PS-CA Specification:

- MHD: v4.0.2: Trial Implementation v4.0.2 based on FHIR R4
- IUA: Revision 2.1 - Trial Implementation
- PDQm: v2.3.0: Trial Implementation) based on FHIR R4
- PMIR: Revision 1.3 – Trial Implementation
- SVCM: Revision 1.2: Trial Implementation based on FHIR R4
- XDM: Revision 18.0, July 30, 2021 – Final Text

*Note: There will be a process in place to monitor changes in the current versions of the IHE profiles which will be incorporated in future versions of the PS-CA specification based on our interoperability roadmap.

12.1 MHD Profile Overview

Introduction

The Mobile Access to Health Documents (MHD) Profile defines one standardized interface to health document sharing. This profile is applicable to systems where needs are simple, such as pulling the latest summary for display.

Benefits of MHD

- The Mobile access to Health Documents (MHD) Profile defines one standardized interface to health document sharing (a.k.a. an Application Programming Interface (API)) for use by mobile devices so that deployment of mobile applications is more consistent and reusable.
- The MHD Profile is not limited to mobile devices. The term “mobile” is used only as a grouping for mobile applications, mobile devices or any other systems that are resource and platform-constrained, which were early use cases for FHIR-based solutions.
- The critical aspects of the “mobile device” are that it is resource-constrained, has a simple programming environment (e.g., JSON, JavaScript), simple protocol stack (e.g., HTTP), and simple display functionality (e.g., HTML browser) with a goal to avoid burdening the client with additional libraries such as those that are necessary to process SOAP, WSSE, MIME-Multipart, MTOM/XOP, ebRIM, and multi-depth XML.
- The MHD Profile can be used as an API to a Document Sharing exchange using XDS (Cross-enterprise Document Sharing) or XCA (Cross-Community Access). The MHD Profile is used by the MHDS (Mobile Health Document Sharing) solution. The MHD Profile can be used in push solutions alone or as an API to solutions like XDR (Cross-enterprise Document Reliable Interchange) or XDM (Cross-enterprise Document Media Interchange).

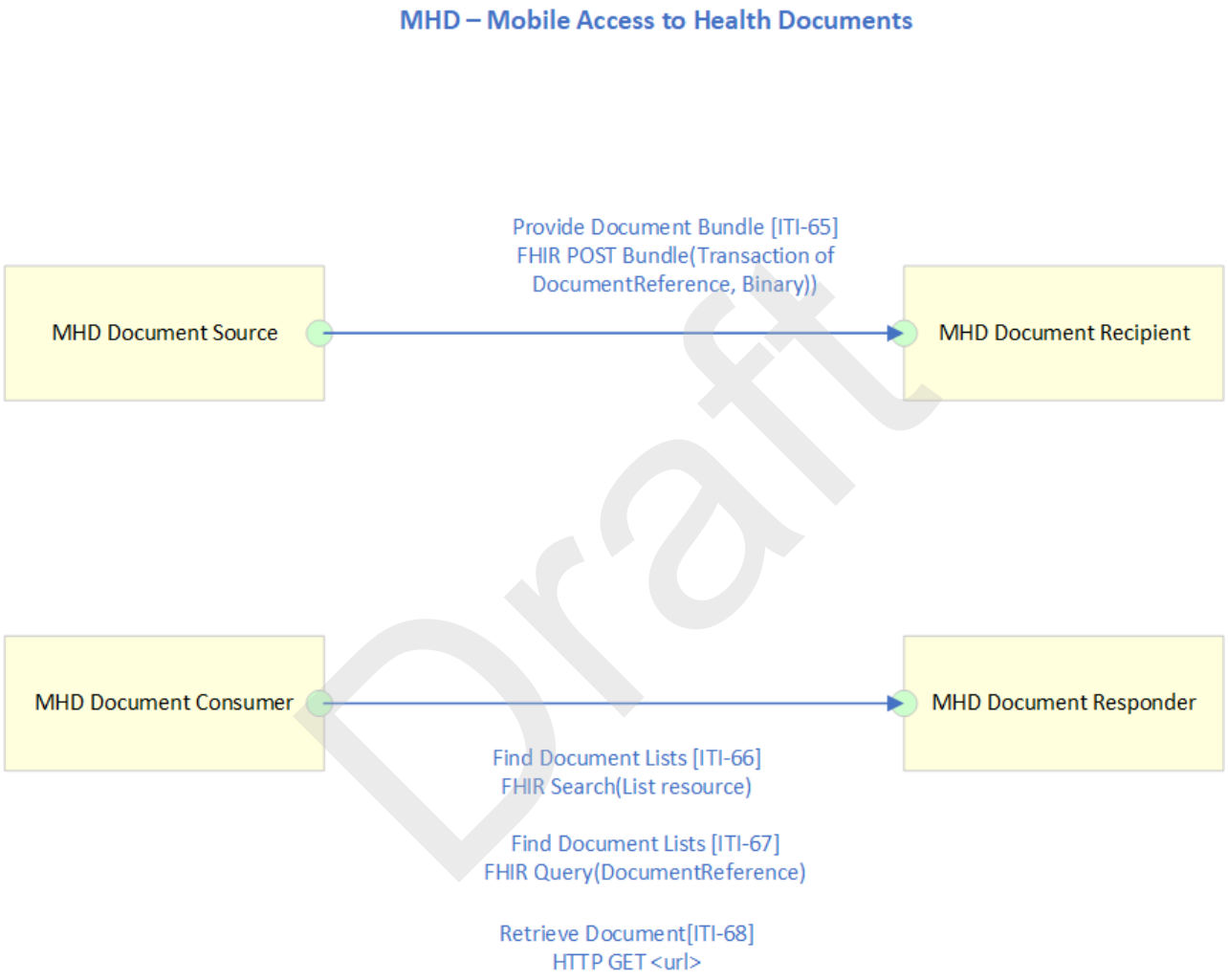
Scenarios for MHD Implementation

The following are examples of environments which may choose the MHD Profile:

- Medical devices such as those targeted by the IHE Patient Care Devices (PCD) domain or Continua organization, submitting data in the form of documents.
- Kiosks used by patients in hospital registration departments, where it is anticipated that a hospital staff member will review, edit, and approve the document before it is allowed into the hospital system.
- PHR publishing into a staging area for subsequent import into an EHR or HIE.

- Patient or provider application that is configured to securely connect to a PHR in order to submit a medical history document. (For example BlueButton+)
- Electronic measurement device participating in an XDW (IHE Cross-enterprise Document Workflow) workflow and pulling medical history documents from an HIE.
- A General Practitioner physician's office with minimal IT capabilities using a mobile application to connect to an HIE or EHR.

Actor & Transaction Diagram of MHD



12.2 CA:FeX Interoperabilty Specifications

Introduction

The CA:FeX Interoperability Specififcations for FHIR Exchange provide support for submitting, searching and retrieving a document, such as a PS-CA to and from a central Document Repository using FHIR resources.

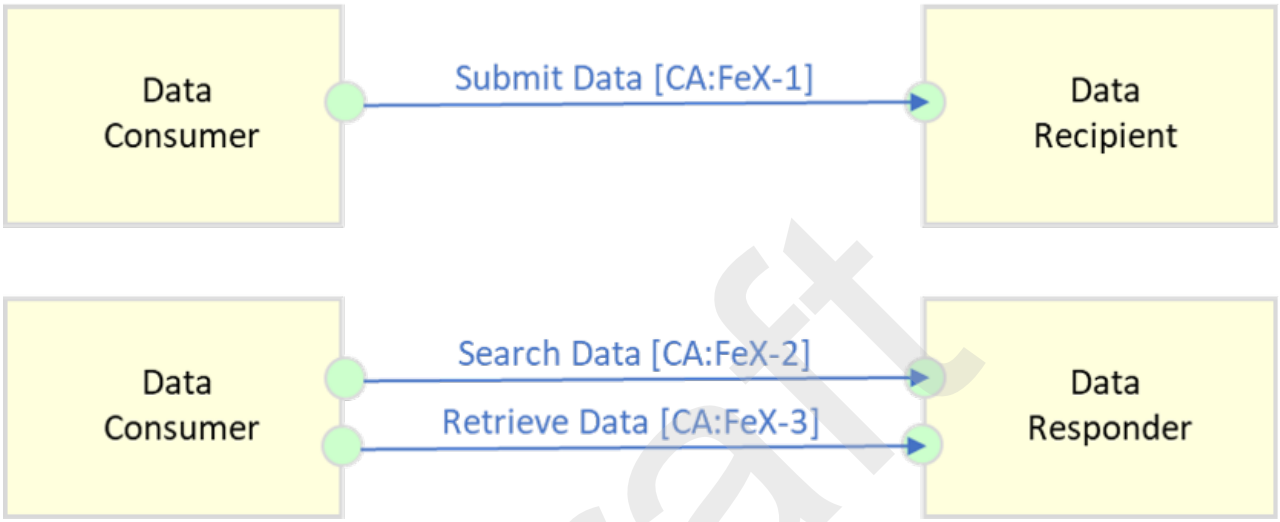
Benefits of CA:FeX

The following are some examples of the benefits of CA:FeX:

- Supports scenarios of health care provider creating, viewing and updating a Patient Summary-CA using standardized HL7 FHIR operations such as submission, search and retrieval
- Supports safe provision of care in a scheduled or unscheduled medical situation
- Supports transitions of care or transfers of patients across the continuum of care
- Supports coordination and collaboration of a patient's care

Actors and Transactions Diagram

The diagram below provides an overview of the Actors, Transactions and their interactions that are part of CA:FeX.



12.3 IUA Profile Overview

Introduction

The Internet User Authorization (IUA) is an interoperability profile that provides an authorization profile for the HTTP RESTful transactions. Being authorized means that the user, patient, or provider has legitimate access to this HTTP RESTful service. The authorization includes identifying the user and the application that is making the request to the HTTP RESTful server, so that server can make further access control decisions.

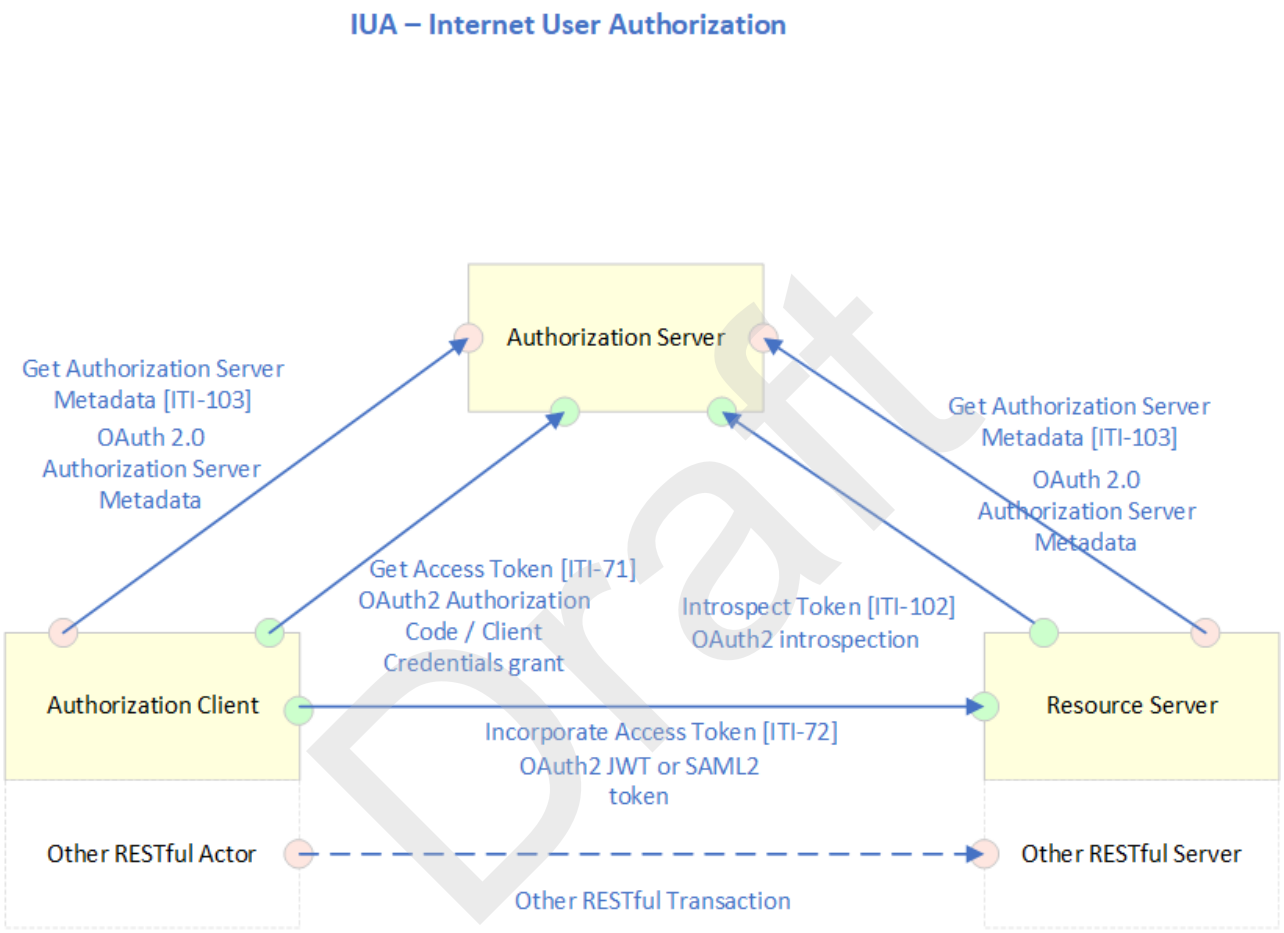
Benefits of IUA

IUA conveys User Identity, Attributes, and Authorizations to a RESTful service to enable security and confidentiality policy enforcement. The primary use cases are for obtaining authorization for access to a resource using HTTP RESTful HTTP transactions. There are other use cases for delegation, provisioning, etc. which are out of scope for this profile.

The authorization service is separated from the HTTP RESTful access so that it can be provided by a different organization or part of the organization than the resource service. This is driven by the requirements of patients, providers, and other users to simplify and maintain autonomy and control over authorization services. A user may interact with dozens of providers. It is difficult for the user to coordinate different authorization mechanisms with each of these dozens of providers.

This pattern is a common Internet usage and there are already vendors of authorization services that are being used to solve this problem. These include Facebook, Google, and a variety of other service providers in different commercial and governmental sectors. Some countries may use their citizen identity card to access their governmental services. These overlap with providers of authentication services. These services allow a patient to establish an authentication and authorization relationship with minimal provisioning by the healthcare provider. The user can specify “use vendor X” to their healthcare provider.

Actor & Transaction Diagram of IUA



12.4 PDQm Profile Overview

Introduction

The Patient Demographics Query for Mobile (PDQm) Profile provides a transaction for mobile and lightweight browser-based applications to query a patient demographics supplier for a list of patients based on user-defined search criteria and retrieve a patient’s demographic information.

Benefits

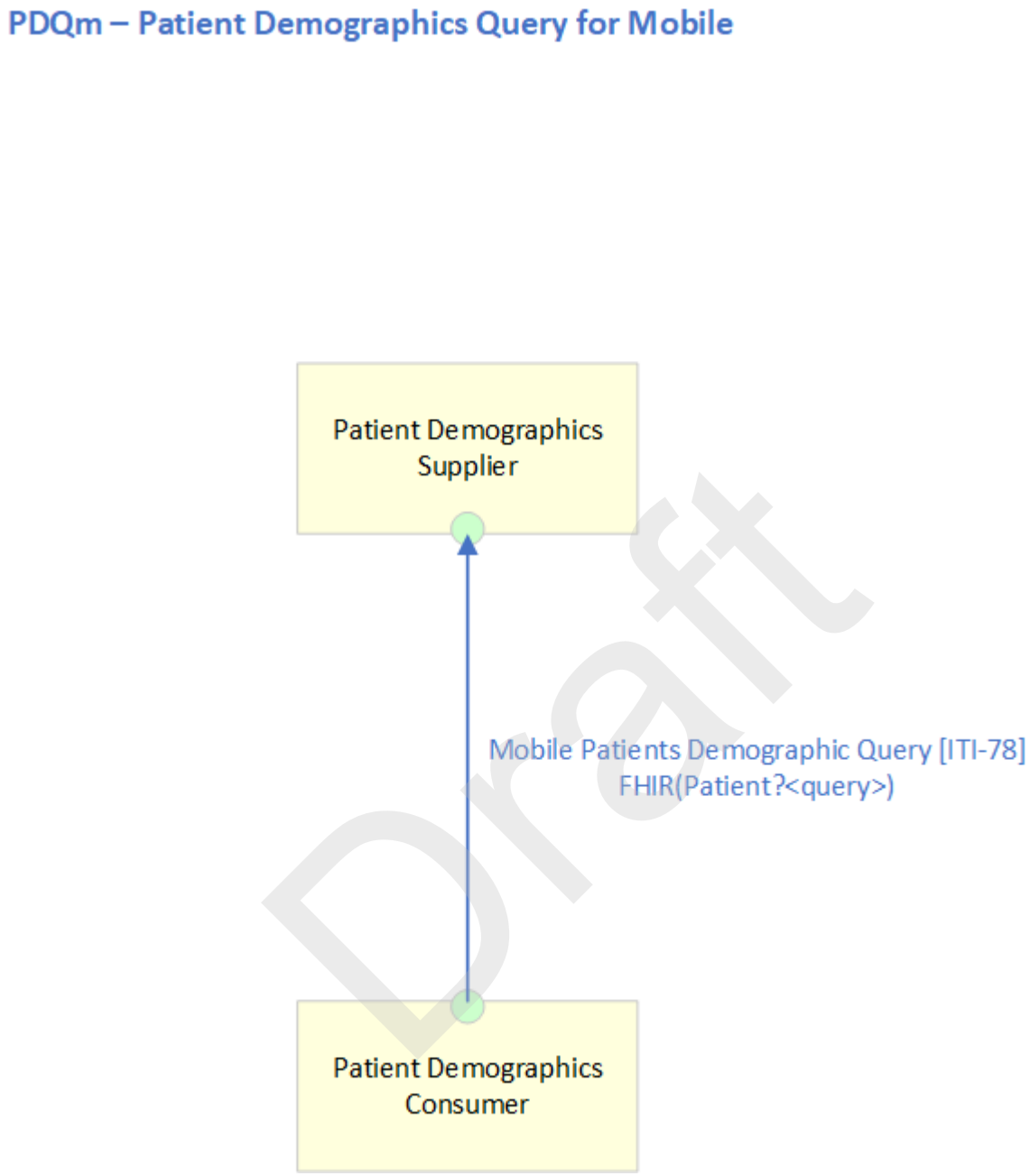
- This profile leverages HTTP transport, and the JavaScript Object Notation (JSON), Simple-XML, and Representational State Transfer (REST). The payload format is defined by the HL7 FHIR standard.

Scenarios of PDQm Implementation

Using these patterns, the PDQm Profile exposes the functionality of a patient demographics supplier to mobile applications and lightweight browser applications. The following list provides a few examples of how PDQm might be leveraged by implementers:

- A health portal securely exposing demographics data to browser-based plugins
- Medical devices which need to access patient demographic information
- Mobile devices used by physicians (example bedside eCharts) which need to establish patient context by scanning a bracelet
- Web based EHR/EMR applications that wish to provide dynamic updates of patient demographic information such as a non-postback search, additional demographic detail, etc.
- Any low resource application which exposes patient demographic search functionality
- Any application using the MHD Profile to access documents may use PDQm to find an appropriate patient identifier

Actor & Transaction Diagram of PDQm



12.5 PMIR Profile Overview

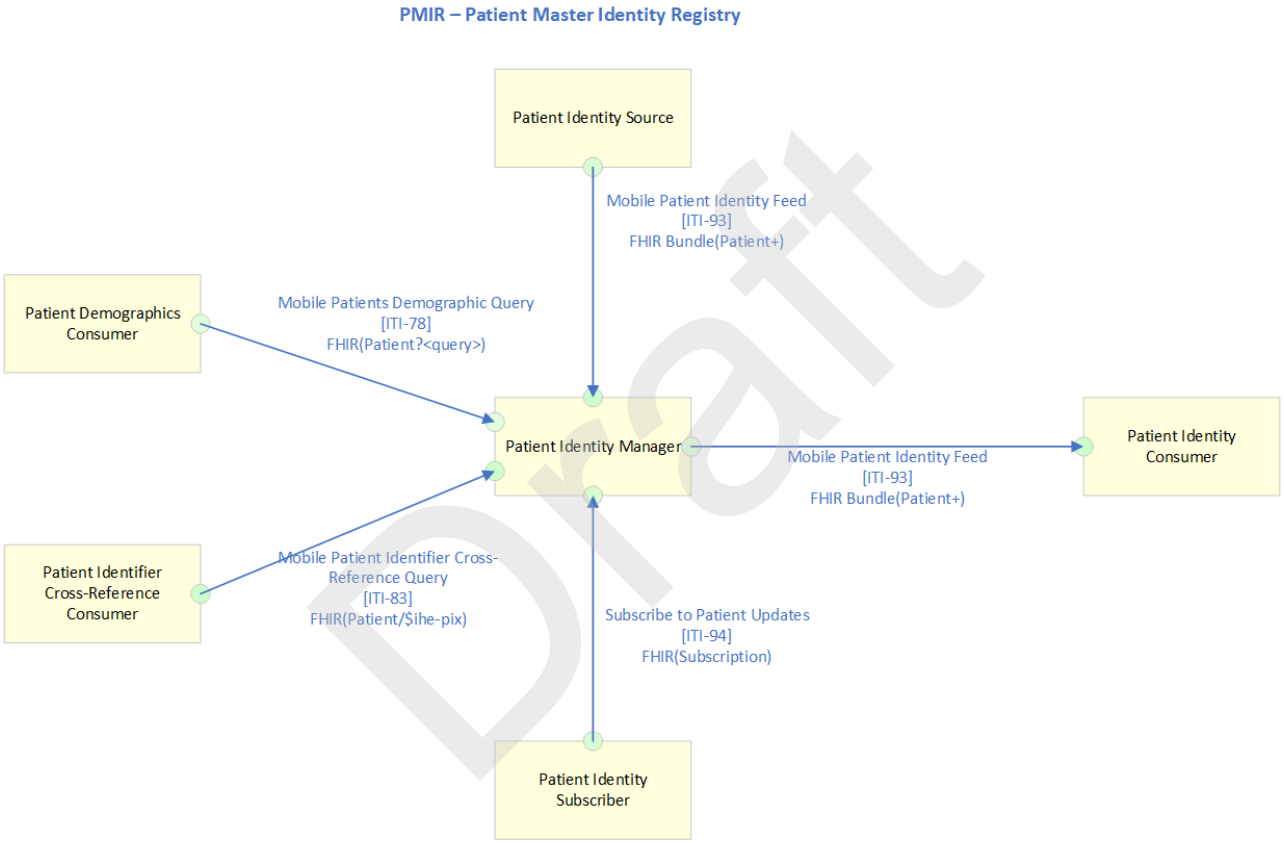
Introduction

The Patient Master Identity Registry (PMIR) Profile supports creating, updating, and deprecating patient identity information about a subject of care, as well as subscribing to changes, using HL7 FHIR resources and RESTful transactions. This profile includes the Patient Identifier Cross-reference for Mobile (PIXm) and Patient Demographics Query for Mobile (PDQm) profiles. The “patient master identity” is the dominant patient identity managed centrally among many participating organizations (a.k.a., “Golden Patient Identity”).

Benefits of PMIR

Beyond the basic create, retrieve, update, and delete transaction set, this profile addresses important patient safety issues related to cases where there are two or more patient master identities that have been established for the same person, thus it is not clear which identity is the "true" one. There is also a risk that health data (possibly conflicting) may be associated with each identity – and these disparate data, together, may need to be reconciled before a fully and accurate "health picture" can be developed for this person. These situations represent patient safety risks. This profile addresses how these multiple patient master identities can be merged into a single patient master identity, and how this merge flows down to data custodians so that they take appropriate actions. It is outside the scope of this profile to define how references to the deprecated patient master identity from other data should be handled.

Actor & Transaction Diagram of PMIR



12.6 XDM Profile Overview

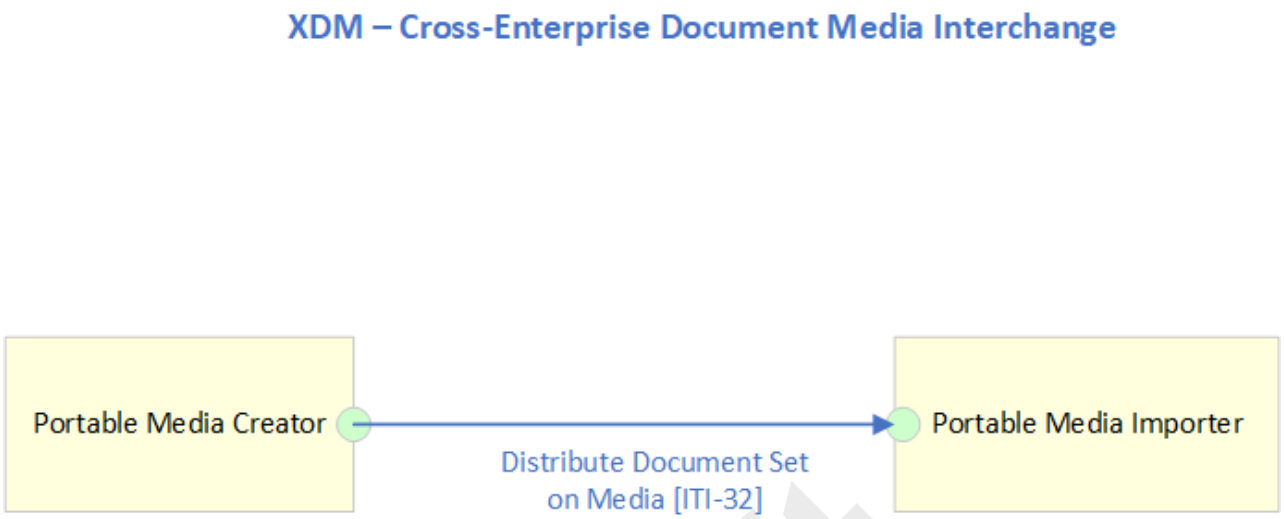
Introduction

The Cross-Enterprise Document Media Interchange (XDM) profile provides document interchange using a common file and directory structure over several standard media types. This permits the patient to use physical media to carry medical documents. This also permits the use of person-to-person email to convey medical documents. XDM supports the transfer of data about multiple patients within one data exchange.

Benefits of XDM

XDM Facilitates person-to-person exchange of the healthcare information by supporting transport via physical media - USB and CD-R and supporting transport as an attachment to an email.

Actor & Transaction Diagram of XDM



12.7 SVCM Profile Overview

Introduction

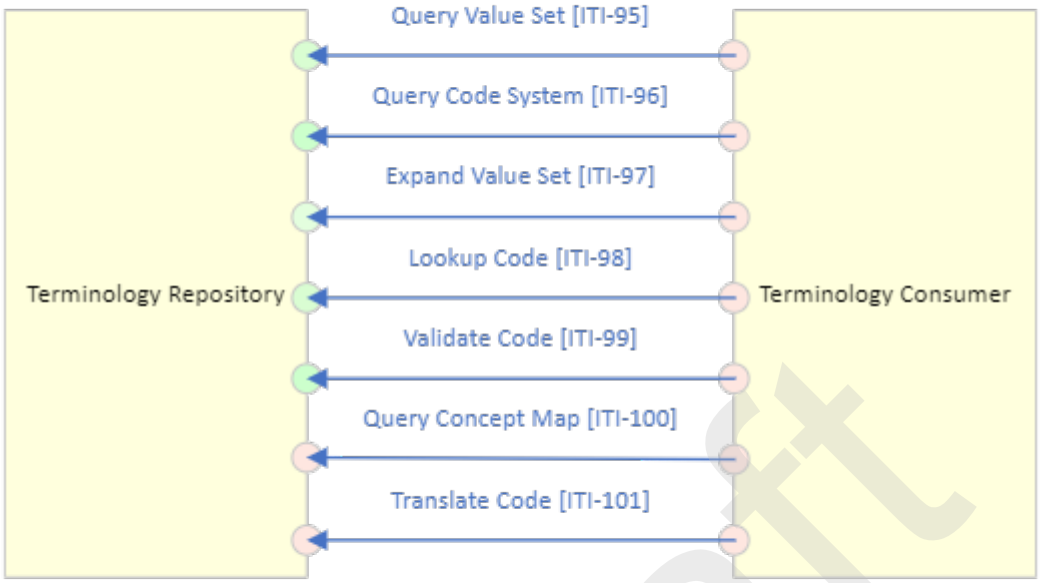
The Sharing ValueSets, Codes and Maps (SVCM) Profile defines a lightweight interface through which healthcare systems may retrieve centrally managed uniform nomenclature and mappings between code systems based on the HL7 Fast Healthcare Interoperability Resources (FHIR) specification.

Benefits of SVCM

Terminologies managed in value sets are most useful when they are widely shared and standardized across geography and disciplines to add clarity and specificity.

Actor & Transaction Diagram of SVCM

SVCM – Sharing ValueSets, Codes and Maps



All FHIR Vocabulary Operations