Health Information Exchange Case Study Report

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Purpose and Business Context

Throughout their lifetimes, patients engage with various healthcare providers across multiple settings, including hospital stays, primary care visits, and emergency department encounters. These interactions generate substantial volumes of health data, including essential information such as health concerns, medications, and allergies. When treating patients outside their usual care networks or during unforeseen health events, clinicians often encounter barriers to accessing these essential data elements. Even when treating patients from inside their care networks, this critical information may be difficult to locate in electronic health record (EHR) systems, as it is often dispersed across multiple modules or embedded within narrative notes. Searching for this information consumes valuable time, increases clinicians' cognitive load, disrupts care coordination, and may be impossible altogether if the clinician lacks access to the system where the data resides.

To address these challenges, patient summaries have emerged as a pivotal Health Information Exchange (HIE) application, with the International Patient Summary (IPS) offering a standardized framework for their exchange. This report conducts a global environmental scan of IPS initiatives and examines the supporting data exchange standards, terminologies and value sets, business processes, information flows, implementation rules, and associated challenges. Particular attention is given to the Canadian context where relevant.

Environmental Scan

IPS implementations are happening around the world. In the European Union (EU), the eHealth Digital Service Infrastructure (eHDSI), which supports several cross-border digital health services including PS exchanges, was examined by Bruthans (2024). Bruthans describes the eHDSI as a "pull" model, where a clinician or system sends a request for information, and the patient's home system responds by sending the relevant data. To support this model, each country is required to establish a single National Contact Point for eHealth (NCPeH). Despite its potential, adoption remains limited due to technical complexity, language barriers, and national system diversity. As of 2023, only eleven of the twenty-seven EU member states had established an NCPeH, and only eight of those supported PS exchange.

An IPS implementation is also ongoing in Brazil. The IPS-Brazil project is a collaborative effort between the Syrian-Lebanese Hospital and the Brazilian Ministry of Health. Citizens can request their IPS through an official app, which includes data such as outpatient encounters, immunizations, and laboratory results for COVID-19 and Monkeypox. The system is built using the Fast Healthcare Interoperability Resources (FHIR) HIE standard and incorporates widely used clinical terminologies, including the Systematized Nomenclature of Medicine – Clinical Terms (SNOMED CT), and the Logical Observation Identifiers Names and Codes (LOINC). During the 2023 LACPASS Connectathon, a cross-country event where systems are tested for compatibility, Brazil confirmed the effectiveness of its IPS implementation through successful document exchange with Chile, Argentina, and El Salvador (de Faria Leao et al., 2024).

In Canada, the Pan-Canadian Patient Summary (PS-CA) initiative adapts the IPS framework for the Canadian context by incorporating national terminologies and jurisdiction-specific workflows. A trial specification was released by Canada Health Infoway (Infoway) in

2022, and several provinces are in the process of adopting it (Canada Health Infoway, n.d.-b). Alberta released a production-ready implementation guide (PS-AB) in October 2024 (Alberta Health, 2024). Ontario and British Columbia have published draft guides while Manitoba and Saskatchewan operate Patient Summary–like applications that are not yet aligned with PS-CA (Ontario Health, 2022; Provincial Health Services Authority, n.d.; Canada Health Infoway, 2025-c). Manitoba's eChart was launched in 2010, and Saskatchewan's MySaskHealthRecord was launched in 2018 (Owen, 2010; eHealth Saskatchewan, 2024). With the 2024 rollout of MyHealthNB, New Brunswick (NB) became the most recent province to adopt a PS-CA-aligned application (Canadian Healthcare Technology, 2024). The NB Department of Health reports that this makes NB the first in Canada to enable patients to create and share their own summaries (Seeley, 2024).

Data exchange standards

Data exchange standards are foundational to enabling Patient Summary (PS) exchange. They define the structure, format, and protocols that allow health information to be shared consistently and safely between different systems. The first to consider, developed by the European Committee for Standardization (CEN), is the 17269: International Patient Summary standard. It defines a minimal core set of data elements required to enable the safe exchange of health information for scheduled, unscheduled, cross-border, and domestic care scenarios. (CEN-CELEC 2021, 2022, 2025).

Developed by the International Organization for Standardization (ISO) and adapted from the CEN 17269 standard, the 27269: International Patient Summary standard expands the scope of the IPS for international use, with input from multiple standards development organizations (SDOs), including HL7 International and Integrating the Healthcare Enterprise (IHE). Like its CEN predecessor, ISO 27269 offers an abstract reference model, leaving technical implementation details, like workflows, jurisdictional adaptations, and terminology bindings to companion guides such as the HL7 International IPS Implementation Guides (International Organization for Standardization, 2021).

HL7 International is an organization that creates standard specifications for the exchange, integration, and retrieval of electronic health information (HL7 International, n.d.). HL7 International has published two IPS implementation guides. One uses its older standard, Clinical Document Architecture (CDA), which is XML-based and document-centric. The other uses FHIR, a newer standard designed for web-based data exchange. While they differ in technical structure, both formats implement the same core clinical domains defined in the IPS dataset. These domains include allergies, medications, and problems (see Figure 1) (D'Amore et al., 2021). By aligning on shared clinical domains, both guides ensure that patient summaries can convey essential health information in a standardized way.

While HL7 standards define the structure and content of IPS documents, IHE profiles describe how those documents are exchanged across systems in real-world healthcare workflows. The profiles identify the actors (who performs what role), the transactions (how data is shared), and the standards to be used. The IHE profile for the IPS contains detailed guidance on supported data formats, security considerations, and real-world use cases (IHE International, 2020, 2025).

In the Canadian context, the PS-CA adapts international standards through national artifacts developed by Infoway, including the PS-CA Interoperability Specification and Companion Guides. The specification indicates a clear preference for the use of modern FHIR interfaces while also supporting the use of HL7 CDA, recognizing the diversity of technical environments across jurisdictions. This dual-format approach ensures that both modern and legacy systems can participate in patient summary exchange, promoting broader adoption across the Canadian healthcare landscape (Canada Health Infoway, 2022-a).

Terminologies and Value Sets

While data exchange standards ensure data can be transmitted between systems, terminologies and value sets ensure that the data shared can be effectively understood.

Terminologies

The World Health Organization (WHO) emphasizes that standardized clinical terminologies (SCT) are essential for enabling shared understanding among all parties involved in the exchange and use of health information. WHO defines an SCT as "a compilation of terms used in the clinical assessment, management and care of patients, which includes agreed definitions that adequately represent the knowledge behind these terms and link with a standardized coding and classification system" (WHO, 2026, p. 1).

In a global context, the SCT systems used in the IPS include the Anatomical Therapeutic Chemical (ATC) classification system, LOINC, and SNOMED CT. To support the global adoption of the IPS, SNOMED International has created a dedicated streamlined IPS version called the IPS Free Set. This version maintains the semantic integrity and hierarchical structure of SNOMED CT but is constrained to concepts relevant to the IPS use case. The IPS Free Set is distributed under a free and open license, enabling implementers worldwide to use SNOMED CT in IPS documents without licensing restrictions (HL7 International, 2022).

In the Canadian context, the PS-CA prefers Canadian SCTs, including the Canadian edition of SNOMED CT, the pan-Canadian LOINC Observation Code Database (pCLOCD), and the Canadian Clinical Drug Dataset (CCDD). Canada Health Infoway (2022b, 2025a, 2025c) maintains these standards through their Canadian Standards Release Centre and makes them freely accessible through their terminology server.

Value Sets

Value sets are curated subsets of SCTs, and data elements with a coded data type in a PS are often bound to them. Binding implies that the data element will only accept values from the specified value set. HL7 International (2024) identifies four binding strengths:

- Required: The specified value set must be used.
- Extensible: The specified value set must be used, although additional codes may be added.
- Preferred: The specified value set is recommended but not required.

- Example: The specified value set provides examples only, and usage is optional.

Since many EHRs use local codes instead of SCTs to collect and store patient data, for the Required and Extensible binding strengths the data must be mapped to the specified value set before a PS can be created. For instance, the medication data element in the PS-CA will only accept a medication code, where the pan-Canadian value set PrescriptionMedicinalProduct (a subset of the CCDD) is preferred (Canada Health Infoway, 2022-c).

Business Processes, Information Flows, and Rules

To understand how the IPS functions in practice, it is helpful to examine its business processes, information exchange pathways, and required content rules. The IHE Technical Framework Supplement for the IPS identifies four use cases for the IPS: Emergency Care Abroad, Elective Surgery Abroad, Managing Work-Related Illness While Working Abroad, and Within Border Emergency Care. In the Emergency Care Abroad scenario, the precondition is that a patient requires emergency care while outside their home country. The process begins when a local clinician requests an IPS from the patient's home system. This action triggers the home system to send the summary using the Provide Document Bundle [ITI-65] transaction, enabling the clinician to make informed, safe treatment decisions (IHE International, 2023). The IPS flows from the content creator (the patient's home health system) to the content consumer (the local clinician's system).

The IHE and HL7 profiles specify several structural rules for IPS documents. For example, the IPS must include core sections, such as Medications, Allergies, and a Problem List; sections such as Immunizations and Diagnostic Results are recommended but optional. Content requirements are also specified. In the HL7 FHIR AllergyIntolerance profile, for instance, a reaction manifestation and a patient reference are mandatory, and if reaction severity is included, the PS must use a code from the standardized AllergyIntoleranceSeverity value set (e.g., mild, moderate, or severe) (HL7 International, 2022; IHE International, 2023).

Challenges

HL7 International (2022-b) has identified several known issues with their current version of the IPS. For example, for a given IPS, there is no indication of author nor the quality of the data included. Although the IPS Composition profile includes a required author element (HL 7 International, 2022-c), the profile lacks a mechanism to represent the summarization process itself, such as who reconciled each section and what actions were taken. Another challenge is related to terminologies. In the ideal scenario, strict terminology bindings would be used to ensure that the recipient clearly understands the information in the PS. However, many IPS bindings are not required, due to the desire to support local adoption and the lack of globally recognized, freely usable vocabularies. Song and Nakayama (2022) identified an additional limitation when implementing an IPS web application in Japan. They noted that while structured data was well supported, unstructured narrative notes (e.g., physical findings, nursing notes) were not, resulting in essential clinical details being excluded from the summary.

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Figures

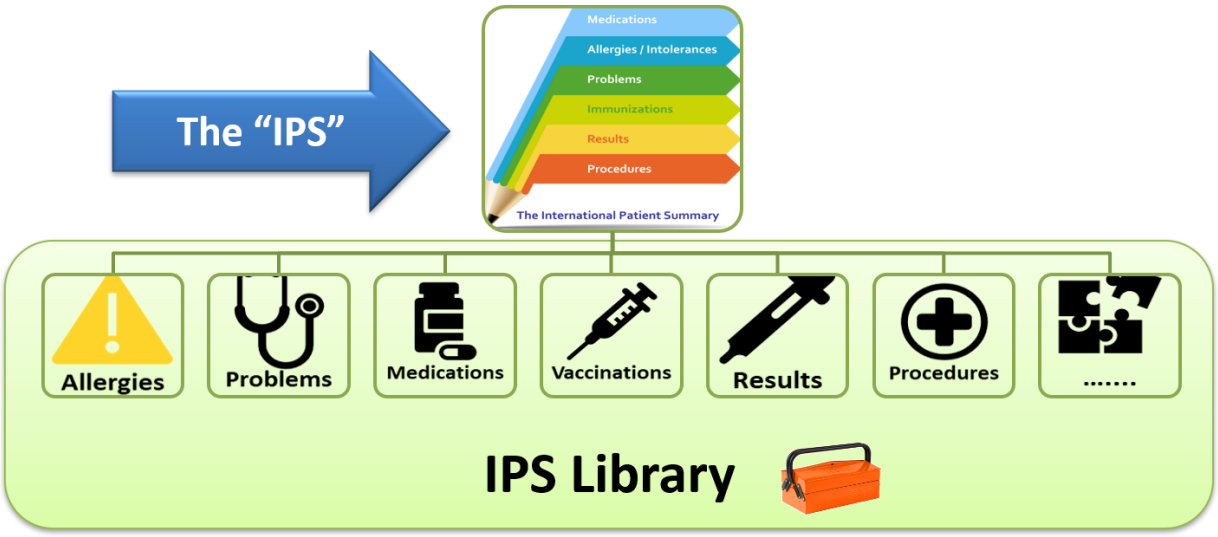

Figure 1
The International Patient Summary (IPS) Library
(from D'Amore, 2022)