

White Paper
August 2003

Aligning Health Information System Design with
Provincial and Federal EHR Initiatives

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ABOUT Strata Health Solutions, Inc.

Strata Health Solutions, Inc. is a leading provider of health care solutions & information technology advancement within the health care sector; is a privately held Canadian corporation, and operates internationally, delivering innovative new approaches to streamlining the global health care process.

Strata Health initiatives invariably focus delivery of three imperatives:

- 1) Definable gains in patient care excellence
- 2) Quantitative system efficiency gains
- 3) Actionable advances in management reporting

In 2000, the Calgary Health Region (Canada) and Strata Health Solutions, Inc. jointly explored the development of an on-line, client-centered waitlist optimization system.

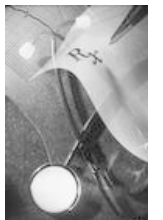
The resulting solution, *Transition PathWays*, is a web-based open-architecture application supporting the transition of clients from acute care or community to the broad continuum of supported living environments, including care centres, sub-acute and palliative. This system streamlines existing processes involved in the transfer of clients, & optimizes resource utilization through maximizing service capacity, positively impacting both acute and the community resource.

A key feature of *Transition PathWays* is the improved management reporting available to the Health Jurisdiction front-line & administration, as well as to the Care Centre Owner/Operators and other Providers. This data allows the health manager to effectively plan today's priorities and future capacity that is closely aligned with the specific needs of our clients.

Transition PathWays outcomes to date have been exemplary, over delivering against all three imperatives both at the acute and the community resource level. [A detailed Pilot Performance Overview is available upon request.](#)

Strata Health Solutions, Inc. continues to strive for further advancements in delivering health care solutions & is currently in the alpha testing stage of a composite home care solution to deliver efficiencies in all transactions impacting the delivery of ongoing client home care.

Strata Health is dedicated to creating advances in client care & privacy, infrastructural productivity & decision support reporting; ensuring positive change is delivered all the way through to 'front-line' professional's daily tasks.



Calgary

L100 - 10th Avenue SE
Calgary, Alberta
Canada T2G 0V9
Tel: (403) 261-0855
Fax: (403) 277-5980

Vancouver

705 – 100 Park Royal
West Vancouver, BC
Canada V6B 2S8
Tel: (604) 913-0188
Fax: (604) 910-0191

Toll Free for Pilot Overview or live demonstration

1-866-556-5005
info@stratahealth.com
www.stratahealth.com

EXECUTIVE SUMMARY

In order to support quality healthcare delivery, and meet various other emerging objectives, Canadian health care organizations / jurisdictions have recognized a need to identify and develop new schema for uniquely identifying patients across multiple providers and multiple health information systems. Accompanying this recognition are a number of initiatives to develop identifier, registry, communications and security standards that will, among other things, facilitate integration and interoperability of health information systems. Within the Canadian context, these initiatives have also recognized that integrating privacy, confidentiality and security must be a fundamental concern.

The main objective of this research paper has been to identify strategies for aligning health information system design with advances in provincial and federal health information system infrastructure development initiatives, particularly with respect to the use of Personal Health Numbers (PHNs) as unique patient identifiers, and security of communications when transmitting personal health information. To achieve this objective, a number of relevant provincial and national initiatives were identified and described, as well as standards for identifiers and registries, as well as communications and security.

As a result, it is recommended that system vendors:

- Align application design / architecture for interoperability with provincial initiatives including, for example, Alberta's Pharmaceutical Information Network (PIN), Provincial Personal Health Identifier (PPHI) Project, Electronic Health Record (EHR), and Lab Test Results History (LTRH) Database. Although still under development, each of these initiatives supports the use of the PHN as a unique client / patient identifier.
- Consider existing standards for patient identification in application design / architecture (in particular, Alberta's Stakeholder Demographic Data Standard and BC's Personal Health Number (PHN) Standard).
- Encourage potential clients to consult with provincial privacy regulators (e.g. Alberta's Office of the Information and Privacy Commissioner) to determine requirements for completing privacy impact assessments. This is a legislated requirement in Alberta whenever a custodian proposes to introduce changes to an administrative practice or information system involving personal health information (such as automating a previously manual system, or modifying identifiers used by existing applications).
- Meet ISO standards for the secure electronic transmission of personal health information. ISO 17799 provides a standard that has been recognized in Alberta by the Physician Office System Program (POSP) Vendor Conformance and Usability Requirements (VCUR) Task Force, and which is required by Regional Health Authorities wishing to be allowed access to Alberta Health and Wellness applications.
- Develop their own information privacy and security policies and procedures, in order to meet the requirements for Information Managers under Alberta's *Health Information Act* (note that having these directives in place will meet standards in Alberta, and also provide a value-add when offering services to prospective clients in other jurisdictions).
- Recognize the widespread adoption of HL7 standards and XML technology to define data exchange and communications protocols and, in particular, the HL7 Clinical Document Architecture (CDS) and Clinic Context Object Workgroup (CCOW) Standards initiatives. Application design / architecture should support HL7 standards.

1.0 INTRODUCTION

Patient identifiers have always been vital for the day to day operation of the health system – activities that include coordinating multi-disciplinary care delivery; ordering and reporting tests, procedures and medications; managing administrative processes such as scheduling, admission, billing, and benefits; record keeping and information management; follow-up and preventive care. As a result, patient identifiers have become an integral part of patient information; clinical documentation is usually based on the patient identifier, which in turn is vital for managing automated information and manual record functions, including filing, storage, retrieval, and communication.

Significant and rapid changes in healthcare delivery, however, including an increasingly mobile patient population that visits multiple providers and is treated by multiple organizations, have introduced new challenges to existing systems. In many cases, patients will have multiple medical record numbers, each issued by the organization that provided care, in addition to their personal health number (PHN). This results in a fragmented health record, with each component separate and unlinked from the others. Ultimately, this fragmentation may prevent timely access to necessary information, and lead to service duplication, delayed decisions, or drug interactions. In addition, it can inhibit outcome measurement and quality improvement, population based service planning, and health research. Further, the increasing use of electronic information systems and telecommunications technology to exchange patient information is not supported by current fragmented methods of patient identification.

In order to support quality healthcare delivery, and meet various other emerging objectives, health care organizations / jurisdictions have found it necessary to turn their attention towards identifying and developing new schema for uniquely identifying patients across multiple providers and multiple health information systems.

The prevailing thought in the Canadian context has been to develop client registries - a directory in which people being served anywhere within the health care system are uniquely identified. Client registry systems are considered to be essential for any effective sharing of health information between various health service providers (physicians, nurses, clinics, facilities, regions, etc.), and for Electronic Health Record (EHR)¹ initiatives.

The use of client registries is common, in one form or another, in Canadian jurisdictions and organizations such as clinics, provider offices, hospitals / facilities, or regions within those jurisdictions. The Western Health Information Collaborative (WHIC), however, in its Client Registries White Paper, has identified a number of challenges associated with these methods of identifying patients / clients, including:²

- Current registries have a significant error rate
- Any one person may have multiple identifiers
- Duplicate data exists in many registries
- Lack of a common identifier scheme across all jurisdictions and levels

¹ The Electronic Health Record (EHR) is intended to be a lifetime record of an individual's key health history and care, available electronically to authorized health care providers and the individual, anywhere and anytime.

² Western Health Information Collaboration (WHIC), *Client Registries White Paper*, March, 2002 - Version 4.0.

- Inconsistencies in out-of-province patient registration handling, number assignment and other related processes
- Lack of technological viability to some registry platforms
- Lack of standards for inter-jurisdictional messaging, authentication of clients, matching of client data to source data and minimum data sets
- Common client registries not fully implemented or available in all regions
- Privacy protection and legislation impact the sharing and exchange of all jurisdiction health data, including client demographics and identifiers
- Fraud and duplication of client insurance registration does exist
- Limited linkage of client data for electronic health records is possible

Across Canada, work is underway to address these issues. In many cases, this work is driven by visions of a coordinated, collaborative national EHR. At the National Workshop on Recipient Identifiers and Registries in March, 2001, participants recognized the need for a client identifier, unique by jurisdiction within Canada, as well as identifier and registry standards for both clinical and administrative operational purposes. Capacity for intra- and inter-jurisdictional communication was also seen to be necessary, and there are several initiatives planned or underway for the implementation and linking of client registries among the regions and jurisdictions of the Western Health Information Collaborative (WHIC).³ For health information system developers and vendors, integration and interoperability – facilitated by standards for patient / client identifiers, and communications and security protocols – is essential.

Privacy, Confidentiality, and Security

Client identifier, registry, and EHR initiatives are not moving forward unopposed; often, concerns raised are associated with privacy, confidentiality and security of information.

For some, a system of multiple identifiers and a fragmented health record helps to protect privacy because potential linkages across data systems are impeded. A single identifier could make it far easier to access an individual's health information, increasing the potential to exploit such information for commercial advantage, personal gain, or malicious harm.

On the other hand, those that advocate for client registries and EHR initiatives argue that a unique patient identifier can help to improve privacy and confidentiality by standardizing and strengthening access control, and eliminating repetitive use of potentially sensitive demographic information (e.g. name, address, gender, DOB, etc.) to identify patients.

In addition, a unique patient identifier can help to preserve anonymity, while at the same time facilitate communication and information sharing, by providing the ability to easily scramble randomly generated numerical identifiers and replace them with a numerical pseudonym.

Overall, there is consensus that client registries and EHR initiatives need to be supported by the following in order to address privacy, confidentiality and security concerns:

- Identifier design should separate the identification function from the access control function – i.e. the patient is identified by accessing only the identification segment of the record and

³ Ibid.

not its content. This functionality is supplemented with access control measures, including authentication of the user by validating user ID and password, verifying access privileges, audit trails, physical security, etc.

- Policies and procedures are required at the organization level to address technical and physical access, encryption and authentication, audit trails, continuous evaluation and improvement, etc.
- Uniform provincial / federal legislation is necessary to protect sensitive information beyond organizational boundaries from misuse, unauthorized access and illegal linkages.
- Individual responsibility must be fostered through staff and user training, education, and reinforcement.

Within the Canadian context, initiatives around unique patient / client identifiers, registries, EHRs, health information systems development, and standardization, have recognized that integrating privacy, confidentiality and security must be a fundamental concern.

2.0 METHODOLOGY

The main objective of this research project has been to identify strategies for aligning health information system design and architecture with provincial initiatives, particularly with respect to use of Personal Health Numbers (PHNs) as unique patient identifiers, and security of communications when transmitting personal health information.

The methodology for this project included the following:

- Review of federal and provincial health network initiatives, with a particular focus on Alberta and British Columbia, including Alberta's Electronic Health Record and Physician Office System Program, British Columbia's PharmaNet and Health Registry, and Infoway and Canadian Institute for Health Information (CIHI) initiatives.
- Review of federal and provincial legislation and standards related to unique patient / client identifiers, including Alberta's Health Information Act, the Health Information Standards Committee of Alberta (HISCA) Stakeholder Demographics Standard, and British Columbia's Personal Health Number Standard.
- Review of international, federal and provincial standards related to secure communication of personal health information, including ISO Standards, HL7 messaging, Vendor Conformance and Usability Requirements (VCUR).

Applicable web-based resources and selected print materials were reviewed as part of the research process, and supplemented by interviews with representatives from key stakeholder organizations (including the Alberta Office of the Information and Privacy Commissioner, the Calgary Health Region, Alberta Wellnet, and the BC Ministry of Health).

3.0 PROVINCIAL AND FEDERAL INITIATIVES

Across Canada, there are a number of federal and provincial initiatives aimed at developing health information networks that facilitate the exchange of patient information among authorized healthcare providers and organizations. These initiatives generally rely on use of the Personal Health Number (PHN) as a unique client / patient identifier. Some of the more significant initiatives are discussed below.⁴

Alberta

Alberta Wellnet is the branch of Alberta Health and Wellness responsible for coordinating key public and private sector stakeholders to build Alberta's health information network.⁵

Wellnet's vision is to "enable health service providers to share health information within a secure network environment that will help them to make better decisions about health care." To meet this vision, Alberta Wellnet is developing the protocols and infrastructure to facilitate the sharing of health information by health professionals across the province. Key initiatives include the Electronic Health Record (EHR), and the Physician Office System Program (POSP).

Electronic Health Record

Alberta's vision for a shared provincial Electronic Health Record (EHR) is that health care providers have the information they need to make optimal care decisions. This requires access to clinical data about the patient at the point of care, along with clinical decision-support and reference tools.

The EHR is evolving as a series of coordinated projects over time, and includes three key components: (1) Provincial Personal Health Identifier (PPHI) / Person Directory, (2) Pharmaceutical Information Network, and (3) Lab Test Results History.

- ***Provincial Personal Health Identifier (PPHI) / Person Directory***

The Provincial Personal Health Identifier (PPHI) Project was initiated in November, 2001 to provide electronic access by health care providers to Alberta's Central Stakeholder Registry (CSR) in order to obtain personal health numbers (PHN), enabling consistent unique identification of patients.⁶

This initiative promotes the use of the Unique Lifetime Identifier (ULI) assigned by Alberta Health and Wellness as a standard identifier, along with the sharing of consistent Person

⁴ See Appendix 1 for more detailed information regarding initiatives underway in the eastern provinces.

⁵ Stakeholders include Alberta Health and Wellness itself, regional health authorities, the Alberta Cancer Board and the Alberta Mental Health Board, medical professional associations (e.g. the Alberta Medical Association, the College of Physicians and Surgeons, the College of Family Physicians, the Alberta College of Pharmacists, Pharmacists Association of Alberta, and the Alberta Association of Registered Nurses), the Alberta Research Council, and university Faculties of Medicine.

⁶ CSR contains demographic information about individuals who have a vested interest in the Alberta health system and as such is the foundation for province-wide unique identification.

Information (PI) data. It allows health care providers to immediately access a person's PHN / ULI, and confirm their AHCIP eligibility.

The Person Directory (PD) application allows authorized health care providers the ability to access individually identifying demographic information in order to uniquely and securely identify a patient at the point of care. It provides the ability to search for a person, display and/or update his/her demographic information, and create temporary ULIs.

Person Directory Release 1 provided web browser access to search and display individually identifiable registration information (including basic AHCIP eligibility information). The information displayed in the Person Directory (PD) was a replica of registration information in the CSR.

Person Directory Release 2 was implemented on March 31, 2003 and has replaced Person Directory Release 1. It includes the ability to:

- search for a person
- display, add and maintain demographic information
- add a person (e.g. new-born, new Alberta resident, visitor)
- view current and historical basic AHCIP eligibility
- publish and subscribe (enable sharing of information between regional health authorities and Alberta Health and Wellness)

Each user of Person Directory Release 2 must have individual user identification and access is restricted based on role. All users are logged and audited.

Alberta Wellnet plans to continue to rollout Person Directory Release 2, including training and transition, and data cleansing activities, in 2003.

- ***Pharmaceutical Information Network (PIN)***

The Pharmaceutical Information Network (PIN) is a computer application developed to provide authorized health care providers (e.g. physicians in the community, pharmacists, hospitals) with confidential access to patient medication information, along with decision support and reference tools for medication therapies.

PIN provides a single, consolidated view of medications and related information that have been prescribed and dispensed to a patient. The following information is available:

- patient demographics
- prescription information
- dosage validation
- automatic dosage checking
- prescription status
- patient allergies and intolerances
- drug-to-drug interaction checking and management
- drug-to-allergy interaction checking
- other clinical support tools

Consistent with other Alberta Wellnet initiatives, patients are identified in PIN primarily by means of their PHN.

The introductory project to PIN was the Senior's Drug Profile.⁷ The pilot PIN project – implemented in the communities of Westlock and Leduc - was officially completed on October 31, 2002, and the PIN Steering Committee has recommended to the Deputy Minister of Health and Wellness that PIN be rolled out across the province. The PIN pilot project is now expanding in both Calgary and Edmonton.

- **Lab Test Results History (LTHR)**

The Lab Test Results History (LTHR) project is intended to provide authorized physicians with access to a patient's historical lab results, regardless of which health care provider ordered the tests. This will enable providers to more quickly and accurately diagnose and treat patients, and possibly avoid additional or duplicate tests. An initial project with Capital Health Authority is nearing implementation.

Alberta Wellnet has partnered with Capital Health Authority (and Dynacare Kasper Medical Laboratories) and Calgary Health Region (and Calgary Laboratory Services) in the development of this application. The two health authorities are developing Clinical Data Repositories for the laboratory data, from which the Wellnet application will provide providers with secure access. User identification and authorization will be conducted through the provincial 'gateway services' developed by Alberta Wellnet. As with other Wellnet initiatives, the PHN is the primary means of identifying patients in the LTRH application.

To date, development of Release 1 of the Lab Test Results History Application has been completed, along with some user acceptance testing and the development of the Capital Health Authority clinical data repository. Alberta Wellnet continues to work with the Calgary Health Region on clinical data repository development.

Physician Office System Program

Along with the Electronic Health Record and its component projects, another Alberta initiative is a joint program between Alberta Health and Wellness and the Alberta Medical Association, known as the Physician Office System Program (POSP). Established in 2001, POSP provides financial assistance, change management support, and information technology support to facilitate the introduction of information technology in physician offices and contribute to an integrated provincial health information system.

Physician offices can participate in the program at either of the following levels:

⁷ Seniors Drug Profile (SDP) was launched in the spring of 1999, to give health care providers electronic access to the claims medication history of seniors. Information made available through Seniors Drug Profile included Patient Information (PHN, patient name, date of birth, gender, address, home and business phone numbers) and Prescription Information (drug name, date and quantity dispensed, days supply, prescriber and pharmacy name and phone number, drug ingredients).

- Level One – intended for physicians with little or no IT in their clinical practices and processes, this level provides assistance to support physician requirements for clinical decision-making and knowledge management, as well as improve practice management efficiencies. This level incorporates the use of the Pharmaceutical Information Network (PIN) via a web browser as a knowledge tool.
- Level Two - in addition to Level One functionality, Level Two incorporates the use of practice management tools, electronic medical records (EMR), and PIN as clinical tools.

To date, Alberta Wellnet’s POSP involvement has included offering physician office system vendors the opportunity to enter into a standing offer contract for the provision of an end-to-end solution of hardware, software, maintenance and support, training, etc. Standing offer vendors include:

ASP delivery model	Local Installation delivery model
Cogient Corp.	National Medical Solutions Inc.
Telin Systems Ltd.	RISE HealthWare Inc.
TELUS Enterprise Solutions Inc.	Telin Systems Ltd.
	Ware Solutions Corporation
	Wolf Medical Systems Corporation

These vendors were required to demonstrate basic system functionalities – including mandatory recording of the Unique Lifetime Identifier (ULI) – of which PHN is a subset – in a structured demographics data field, and a commitment to support HL7 messaging standards for laboratory and diagnostic imaging functionalities.⁸

In addition, Alberta Wellnet has been involved in a collaborative process with the Claims and Central Stakeholder Registry branches of Alberta Health and Wellness to provide physicians participating in POSP with the optional service of a demographic data download of patient data, using PHN as the primary means of identification.

British Columbia

HealthNet/BC is an initiative of the British Columbia (BC) Ministries of Health Services and Health Planning to facilitate the sharing of information amongst healthcare providers in BC.

It is a secure networked application infrastructure that allows multiple stakeholders to share information across a wide variety of integrated applications, including PharmaNet, and the Health Registry. Two new services currently being implemented by HealthNet/BC and its partners are the Provider Registry and HNDData/BC.

PharmaNet

PharmaNet is a province wide network linking all pharmacies into a central set of data systems in order to support drug dispensing, drug monitoring and claims processing.

⁸ Physician Office System Program, *Physician Office System (POS) Definition*, October 1, 2001

Patient drug profiles include all drugs dispensed, reported drug allergies and clinical conditions, and patient demographics (i.e. personal health number (PHN), name, address, gender and date of birth). PharmaNet also provides drug interaction checking and insurance compensation for each transaction.

PharmaNet clients include emergency departments, hospital admitting, medical practice offices and clinics, College of Pharmacists and the College of Physicians and Surgeons.

Health Registry

The Health Registry is a central repository of standard demographic information on individuals accessing health services in British Columbia, accessible by the Ministry and healthcare providers. The Registry assigns Personal Health Numbers (PHNs) to patients. It also records demographic information, client identification documentation, and an eligibility indicator intended to assist care providers in maintaining a longitudinal health record for their clients.

Provider Registry

The Provider Registry is a standards based repository of core provider data supplied by authorized health care organizations. It is available to consumers within the health sector to facilitate the authorized exchange of health data. Uniquely identifying providers will facilitate the transmission of health information between participating organizations.

The Provider Registry is a building block of the Electronic Health Record (EHR) strategy. It has been developed under the leadership of the British Columbia Ministry of Health Services in cooperation with the Western Health Information Collaborative (WHIC). The Provider Registry is intended to be the single trusted source of health care provider data.

HNData/BC

The HNData/BC Project is establishing a secure data warehouse for health information in British Columbia. This will integrate data from sources inside and outside the Ministry into a comprehensive, reliable source on the state of health, health services, and health care management across the province.

The HNData/BC Project will achieve improvement in the efficiency and effectiveness of information management and planning in BC's health system, enabling health service managers to make better informed business decisions.

Western Health Information Collaborative (WHIC)

The Western Health Information Collaborative (WHIC) is a process initiated by the Western Premiers and Deputy Ministers of Health to explore collaborative opportunities with respect to health infrastructure initiatives. Alberta is a key participant in WHIC initiatives, along with British Columbia, Saskatchewan, Manitoba, Northwest Territories, Nunavut, and Yukon. As of October, 2001, WHIC projects include, but are not limited to:

Provider Registry [Lead - British Columbia]

See description under HealthNet/BC initiatives. The Provider Registry System (PRS) has the potential to be implemented by any Canadian province or territory, and expanded as a model for national data standards.

Client Registries [Lead - Manitoba]

This project is directed towards a common Client Registry to enable the accurate, consistent, unique identification of clients. Areas of collaborative opportunities include standards development (for both messaging and client authentication), matching records (duplicates) and data (content). Specific activities and next steps include the analysis, development and reconciliation of business processes, business function lists and messaging requirements; identification of client authentication requirements including matching and data standards; and identification of jurisdiction-level (WHIC and large regions) opportunities, roles and responsibilities.

Pharmacy / PIN [Lead - Alberta]

See description under Alberta Wellnet initiatives.

Laboratory Information [Lead – Alberta]

See description under Alberta Wellnet initiatives. Beginning with further identification of laboratory information, functions and messaging requirements, it is anticipated that a pan-Canadian standard for laboratory information will be developed in conjunction with the Canadian Institute for Health Information (CIHI).

Architecture [Lead - WHIC Secretariat]

Information architects from the Health Ministries of the four western provinces have formed a working group to discuss and compare information architectures. Participants have agreed to document the de facto standards and determine alignment for technical, data, security and application architectures. This project will initially focus on the Provider Registry and expand to include the standards framework for the priority areas of pharmacy, laboratory and other registries.

Continuing Care [Lead - Manitoba]

The four western provinces and the Yukon Territory have identified several collaborative areas of opportunity including home care tool evaluation, data and reporting standards, evaluation frameworks, and business requirements for information technology initiatives. Top priority areas include home care linkages, requirements and data sets; as well as vendor capacity, with Manitoba taking the lead.

E-Claims Standard [Lead - British Columbia]

Established to define a standard for electronic transmission of health claim data between providers and payors, including data, security, audit, compliance, and communications standards. Data collected includes client, provider, facility, diagnostic and preventative intervention coding.

The outcome of this project is recognized to potentially have significant value across all Canadian jurisdictions. As a result the National e-Claims Standards committee was established under the auspices of the CIHI to oversee the completion of this project.

Waitlist [Lead - SK/WHIC Secretariat]

The management of waitlists has received increasing attention in recent months. WHIC participants have agreed to pursue validation of potential opportunities for collaboration around waitlists. A sample structure is available, based on the Provider Registry project and in support of a collaborative Waitlist Registry project, based on and using the BC Waitlist system as a starting point. Saskatchewan will confirm their participation and Alberta will follow up on lead potential, project initiation timing and potential involvement of BC.

Canadian Institute for Health Information (CIHI)

The Canadian Institute for Health Information (CIHI) is an independent, pan-Canadian, not-for-profit organization, established in September, 1992 by the Federal, Provincial and Territorial Ministers of Health. The Institute launched operations in 1994; the following year, specific health information programs from Health Canada and activities from Statistics Canada joined the Institute.

CIHI's core functions include, among others:

- coordinating and promoting the development and maintenance of national health information standards
- developing and managing health databases and registries

Some of CIHI's Infostructure and Technical Standards Projects include:

- Client Registry HL7 Messaging and Education - to support the implementation of Health Level Seven (HL7), a set of standards for the electronic exchange of clinical and administrative data among health services in Canada.
- International Health Informatics Standards Development – a project to harmonize national with international health information standards, specifically those addressed by the International Organization for Standardization's Technical Committee on health informatics (ISO/TC 215). CIHI leads the Canadian delegation to ISO/TC 215 and ensures a strong Canadian presence at this international forum.

- National Public Key Infrastructure (PKI) Framework for Health – the goal of this project was to establish a ***national framework for the secure communication of health information***. In particular, the project aimed to define the requirements for a cross-Canada approach to Public Key Infrastructure (PKI) for health.
- ***Unique Identifiers Development*** – a project to develop national methodologies for linking health information at the level of individuals, facilities, and health service providers through the use of unique identifiers.

Infoway

In September 2000, at their meeting on Health, the First Ministers agreed to collaborate on strengthening a Canada-wide health infostructure to support improvements to the quality, accessibility and timeliness of health care for Canadians. As a result, the federal, provincial and territorial governments created Infoway, an independent, not-for-profit corporation. The Government of Canada committed \$500 million to this initiative.

Infoway's objective is to "foster and accelerate the development and adoption of cost-effective, sustainable and effective EHR solutions with compatible standards and communication technologies across Canada." Infoway builds on existing initiatives and pursues collaborative relationships in pursuit of its mission.

One of Infoway's initial projects has been the EHR Solution Blueprint – intended to provide a common architectural blueprint which forms the basis for all services that must be provided by the system components and how they will interoperate, helping to ensure compatibility and reduce costs. The blueprint includes technology standards and guidelines to help jurisdictions develop their own roadmap as they align their systems to the overall model.

Working together with the Canadian Institute for Health Information (CIHI) and other stakeholders, Infoway is also leading a project to create a "common messaging language" for all systems in the solutions, as well as the data requirements, coding standards and vocabularies required by care providers.

Infoway recognizes that client and provider registries that identify the people being treated and those working within the health care system are also essential to compatible EHR solutions.

4.0 LEGISLATION AND STANDARDS

At the National Workshop on Recipient Identifiers and Registries held in March, 2001, participants from across Canada recognized that while work towards a pan-Canadian EHR was underway in many jurisdictions, overall there is very little standardization as it relates to the fundamental building block client identifiers and registries. The following discussion presents an overview of relevant legislation and standards that could potentially impact the use of Personal Health Numbers (PHNs) as patient identifiers in Alberta, British Columbia, and at a national level.

Alberta Health Information Act (HIA)

Alberta's *Health Information Act* (HIA) was introduced in 2001 and provides rules governing the collection, use and disclosure of health information in Alberta.

Personal Health Numbers

Section 21(1) of the Act states that only ***custodians*** and ***“persons authorized by the regulations”***, have the right to require an individual to provide their PHN. The Act defines custodians to include, among others, Alberta Health and Wellness, regional health authorities, physicians, hospitals, pharmacists, nursing home operators, etc. Additional “persons authorized by the regulation” include:

- the Students Finance Board, to administer student health benefits programs;
- lawyers and insurers, to enforce the Crown's right of recovery under the Hospitals Act;⁹
- insurers, to facilitate the handling, assessing and payment of claims for benefits;
- the Workers' Compensation Board, to facilitate the handling, assessing and payment of claims for benefits;
- ambulance attendants and operators, to provide treatment and care and to seek reimbursement for providing those services from the Alberta Blue Cross Plan;
- the Solicitor General, to provide health services to an inmate outside of a correctional institution;
- the Minister of Seniors, to administer the Seniors Benefit Act;
- the Minister of Human Resources and Employment, to administer the income and employment programs of the Department of Human Resources and Employment;
- persons, other than custodians, who provide health services to individuals, to seek reimbursement for providing those services from the Alberta Health Care Insurance Plan.

Custodians, and other authorized persons, must advise individuals of their authority to require production of the PHN. Individuals may refuse to provide this information when requested by someone other than a custodian, or authorized person.

⁹ Includes an insurer licensed under the Insurance Act, and the ABC Benefits Corporation.

Information Managers

Section 66 of the HIA authorizes custodians to enter into an agreement with an Information Manager for the purpose of

- processing, storing, retrieving or disposing of health information
- stripping, encoding or otherwise transforming individually identifying health information to create non-identifying health information, or
- providing information management or information technology services.¹⁰

Having entered into such an agreement, the custodian may disclose individually identifying health information to the Information Manager without the consent of the individuals who are the subject of the information, but only for purposes authorized by the agreement. In turn, the Information Manager must comply with the provisions of the HIA and regulations, and may use or disclose that information only for purposes authorized by the agreement.

Note that the custodian continues to be responsible for compliance with the HIA and regulations with respect to personal health information disclosed to the Information Manager.

Privacy Impact Assessments (PIA)

A privacy impact assessment (PIA) is a systematic and comprehensive evaluation of how a proposed administrative practice or information system involving the collection, use and disclosure of individually identifying health information may affect the privacy of the individuals who are the subject of the information. The PIA process requires a thorough analysis of potential impacts on privacy and a consideration of measures to mitigate or eliminate any such impacts. The PIA is a due diligence exercise, in which the organization identifies and addresses potential privacy risks that may occur in the course of its operations.

Under section 64 of the HIA, custodians are required to complete PIAs for submission to the Alberta Office of the Information and Privacy Commissioner (OIPC) for review and comment **before** implementing any proposed new practice or system, or any proposed change to existing practices and systems.

A PIA might be required in the following circumstances:

- when designing a new service or system,
- if making significant changes to an existing program or service, such as introducing a new form of individual identifier
- when converting from a conventional service delivery mode to an electronic service delivery mode, or
- reviewing an existing program or service that has significant outstanding privacy issues and no PIA.

The OIPC will work with Custodians to determine the need to complete a PIA.

¹⁰ Note that Strata Health is an Information Manager contracted to the Calgary Health Region with respect to the Pathways database.

Health Information Standards Committee for Alberta (HISCA)

The Health Information Standards Committee for Alberta (HISCA) is responsible for oversight and co-ordination of the development, adoption, and dissemination of approved health information, data, and technology standards within Alberta, and for ensuring that these standards align with approved provincial reporting standards, and national and international standards. The Committee is composed of representatives from Alberta Health and Wellness, Alberta Wellnet, regional health authorities, health professional organizations, and the CIHI.

Stakeholder Demographic Data Standard

The HISCA recently approved the Stakeholder Demographic Data Standard - an enhanced version of an original standard approved in December, 1999. The standard was compiled after a review of provincial, national and international health information standards including HL7, BC Health Information Council Standards, CIHI Health Information Framework, and ISO Standards, and defines stakeholder demographic data elements required to identify, locate or communicate with Alberta health system stakeholders (persons and organizations).

According to the Standard, the component elements required to identify a stakeholder include:

- Stakeholder ID
- Person Information
- Organization Information

The Stakeholder ID itself is made up of 4 compound elements:

1. **Stakeholder ID Type** – a code, identifying the type of identifier e.g. DL (Driver's License), PHN (Personal Health Number), ULI (Unique Lifetime Identifier¹¹). Note the ID Type is required to correctly interpret, validate and use identifiers.
2. **Stakeholder ID Domain** – a code, representing the specific sphere of control under which the identifier is included e.g. ABDL (Alberta Driver's License Number), ABPHN (Alberta Personal Health Number), ABULI (Alberta Health Unique Lifetime Identifier)
3. **Stakeholder Assigning Authority** – a code, identifying the issuer of the identifier e.g. ABREG (Alberta Registries), ABH (Alberta Health), ONH (Ontario Health). Note that the ID Assigning Authority is required to correctly interpret, validate and use identifiers. The ID Assigning Authority is not required for the exchange of information as the ID Type, ID Domain and the Identifier are sufficient for unique identification.
4. **Stakeholder Identifier** – a string of alphanumeric characters assigned to a person or organization. This string of characters is unique for a unique combination of ID Type + ID Domain. The Business Rules / Coding Guidelines for the Stakeholder Identifier indicate that the

¹¹ The ULI (Unique Lifetime Identifier) is a unique and permanent number assigned as an internal identifier by Alberta Health and Wellness to all stakeholders of interest to the health system in Alberta. There are two types of stakeholders recognized in the health system: Stakeholder PERSON and Stakeholder GROUP.

“PHN (Provincial Health Number) is the identifier assigned by the provincial health jurisdictions for identification within their health systems. For Alberta, PHNs are the subset of ULIs that have been assigned to stakeholder persons upon registration and presumes eligibility for basic health services as defined in the Alberta Health Care Insurance Plan.”

Note that the format for individual PHNs is as follows:

Alberta	9 digit PHN
British Columbia	10 digit PHN (12 for Newborns)
Manitoba	6 digit Manitoba Health Registration Number
New Brunswick	9 digit Medicare Number
Newfoundland & Labrador	12 digit Medical Services Insurance
Northwest Territories	8 digit Health Care Number (1 alpha + 7 numeric)
Nova Scotia	10 digit Medical Services Insurance
Nunavut	9 digit Health Care Number
Ontario	10 digit Health Care Number (12 digit with the version code)
Prince Edward Island	8 digit Health Care Number
Quebec	12 digit Health Care Number (4 alpha + 8 numeric)
Saskatchewan	9 digit Health Services Number
Yukon Territory	9 digit Health Care Number (Yukon health care numbers being with 002)

The Stakeholder ID standard states that “a unique identifier, along with a unique combination of ID Type + ID Domain provides the ability to uniquely identify stakeholders within the health system.” The standard’s Business Rules / Coding Guidelines section indicates that all four component elements should be used to ensure uniqueness of an identifier.

The Standard goes on to state that “the Unique Lifetime Identifier is the primary means by which individuals are identified in Alberta, but in the absence of such a unique identifier, personal identification information such as name, birth date, gender and death date are sufficient to provide accurate and positive identification.”

Upon approval, the Stakeholder Demographic Data Standard applies to the Alberta Health and Wellness central repository / directory for Person Information. All other applications are required to use the Standard when exchanging demographic data with the repository.

Vendor Conformance and Usability Requirements

The Vendor Conformance and Usability Requirements (VCUR) Task Force was publicly announced by the joint Alberta Medical Association / Alberta Health and Wellness Physician Office System Program (POSP) on August 23, 2002. Including representatives from various stakeholder groups (i.e. physicians, clinic managers, vendors, regional health authorities, and the provincial government electronic health record initiative), the objective of the Task Force was to update and refine the technical, privacy, security, and functionality requirements for physician office systems articulated by the "standing offer requirements" published by POSP in April 2002.

VCUR Task Force recommendations were submitted to the Joint AMA/Alberta Health and Wellness POSP Subcommittees, and have been formally accepted. These requirements for physician office system vendors come into effect April 1, 2004. Although the VCUR were developed for POSP, they are also intended to serve the needs of all stakeholders.

Relevant Common Functionality Requirements for physician office systems as outlined in the VCUR include:

- Patients searchable by last name, first name, **PHN**, OOP registration number, chart number, date of birth, alias, soundex, partial searches, and / or multiple combinations
- Provides system-to-system access to the Provincial Personal Health Identifier (PPHI) for patient lookup and import¹²

The VCUR specifies that this functionality must be in effect as of April 1, 2004.

British Columbia Health Information Standards Council

The British Columbia (BC) Health Information Standards Council was established in 1995 to identify, recommend, promote and publish standards and guidelines that enable sharing of health information in BC. The Council works with national and international standards organizations to develop and improve standards with a view to implementation in BC.

PHN Standard

The BC Personal Health Number (PHN) Standard was approved by the Ministry of Health on April 4, 1996 on the advice of the BC Health Information Standards Council. The purpose of the standard is to ensure the correct identification of a specific person interacting with the BC health system. This standard is also used to enable approved linkages when information is shared or transferred between agencies or organizations.

The standard defines the PHN as the unique numerical lifetime identifier used in the identification of an individual client or patient who has any interaction with the BC health system. The PHN is the primary means of person identification on the BC Health Registry.

The PHN itself is a 12-digit alphanumeric field, which must be recorded on each health service record generated for a client to enable the creation of a longitudinal health record.

¹² See earlier description of PPHI (page 5). Note that PPHI is an Alberta Wellnet initiative that "promotes the use of the ULI as a standard identifier".

The Health Registry assigns and maintains PHNs and establishes the link between the assigned PHN and a person's identifying information. Every health service provider who has the need to know the PHN for a client must access the Health Registry database either to determine the pre-allocated PHN for the client, or to allocate a new identifier.

The standard is used in BC Ministry of Health programs such as the Medical Services Plan, Pharmacare, and PharmaNet, as well as by hospitals, clinics and private laboratories, and individual caregivers (e.g. physicians, physiotherapists).

BC Health Registry Standard

The PHN is the primary means of person identification on the BC Health Registry. It is now an official health information standard (see above) and is to be recorded on each health service record generated for a client to enable the creation of a longitudinal health record.

The Health Registry has the mandate to manage PHN allocation and maintain a single, accurate record of demographic information for each health service client. Access to the Health Registry is necessary to identify the correct PHN for a person who is already registered, or to register a new client and assign a PHN.

One of the objectives of the Health Registry is to provide a reliable identifier for client records maintained by all health service providers, enabling authorized and secure access to a client's longitudinal health record as a tool in diagnosing, treating and monitoring health care services.

The BC Health Registry Standard establishes the requirement that every health service provider who has the need to know the PHN for a client must access the Health Registry database either to determine the pre-allocated PHN for the client or to allocate a new identifier.

When PHN is not available, individual identification such as name, date of birth, gender and date of death may be used.

Health Registry customers exchange data electronically with the Registry either directly on-line, or by sending data to an intermediary to hold for pickup / direction to addressee. Both methods make use of the HealthNet/BC network and associated services. HealthNet/BC will provide the security required to protect client demographic data (see Communications and Security Standards section of this report).

5.0 COMMUNICATIONS AND SECURITY STANDARDS

The following discussion presents an overview of communications and security standards affecting the electronic transmission of personal health information in Alberta, British Columbia, and at a national level.

Alberta

Work is underway in Alberta to develop and implement standards for the secure electronic communication of personal health information.

Alberta Health and Wellness

Alberta Health and Wellness (AHW) has established a minimum set of information security policies that allow Health Authorities to be considered part of the 'Trusted Zone' and allow them to connect to AHW applications with single-factor authentication (i.e. username and password, not SecurID Fobs). These minimum connectivity requirements are based on a subset of ISO17799 information security standards. AHW's minimum connectivity requirements are also known as 'core 2A.'

To meet AHW's minimum connectivity requirements, Alberta's Regional Health Authorities must submit 31 information security policies to AHW for review, as follows:

Policy Topic	BS7799 Section
Security of Outsourcers and Third Party Access	4.2
Types Of Access	4.2.1.1
Reasons For Access	4.2.1.2
Outsourcing – Overview of Responsibilities & Accountabilities	4.3
Reporting Security Incidents	6.3.1
Reporting Security Weaknesses	6.3.2
Equipment Security	7.2
Cabling Security	7.2.3
Security Of Equipment Off Premises	7.2.5
Network Controls	8.5.1
Network Audit Controls	8.5.2
Exchange of Information and Software	8.7
Information And Software Exchange Agreements	8.7.1
Security Of Media In Transit	8.7.2
Security Of Electronic Mail	8.7.4
Business Requirement for Access Control	9.1
User Access Management	9.2
User Registration	9.2.1
Privilege Management	9.2.2
User Password Management	9.2.3
Unattended User Equipment	9.3.2

Policy On Use Of Network Services	9.4.1
User Authentication For External Connections	9.4.3
Segregation In Networks	9.4.6
Network Connection Control	9.4.7
Network Routing Control	9.4.8
User Identification And Authentication	9.5.3
Desktop Timeout	9.5.7
Teleworking	9.8.1
Data Protection & Privacy of Personal Information	12.1.4
Compliance with Security Policy	12.2.1

Of these, the following are particularly significant for the purposes of this paper:

- ***Exchange of Information and Software (8.7)***

The policy objective here is to reduce the risk of loss, modification or misuse of information exchanged between organizations, by requiring that exchanges be carried out on the basis of formal agreements. Procedures and standards to protect media in transit should be established. Consideration should be given to the business and security implications associated with electronic data interchange, electronic mail exchanges and to the requirements for security controls.

- ***Security of Electronic Mail (8.7.4)***

Misrouting and rerouting of messages can lead to a loss of confidentiality if it allows unauthorized access to these messages. Further, it can lead to a loss of integrity if misrouted messages are altered and then sent to the original addressee. It can also lead to a loss of message availability. Controls should be applied where necessary, to reduce the business and security risks associated with electronic mail. Organizations should draw up a clear policy regarding the use of electronic mail.

AHW's Privacy and Security team in Information Management is engaged in an ongoing process to advise Health Authorities on where their policies may fall short of the minimum requirements and to provide advice on how to amend them accordingly.

Alberta Wellnet

Access to Alberta Health and Wellness or Wellnet applications, either through the Government Network or Internet occurs in one of three ways:¹³

- Frame Relay with 256Kbps CIR 512 Kbps EIS bandwidth. Where no Internet access is available, remote access capability exists via VPN using RSA SecurID fobs.
- LAN Extension with 10Mbps bandwidth. Where no Internet access is available, remote access capability exists via VPN using RSA SecurID fobs.

¹³ Health Infrastructure in Canada: Provincial and Territorial Plans and Priorities – 2002, Health Canada's Office of Health and the Information Highway (OHIIH) (www.hc-sc.gc.ca/ohih-bsi/chics/pt/2002/ab_e.html)

- ADSL with 6Mbps bandwidth. Where no Internet access is available, remote access capability exists via VPN using RSA SecurID fobs.

High-speed ADSL or cable access is preferred in the community for access to provincial systems such as the Pharmaceutical Information Network. Some health authorities have implemented VPN technology to provide remote access to hospital systems. Alberta's SuperNet initiative will deliver high speed network access to all health facilities over the upcoming years, providing the backbone of most Alberta communities to benefit from high speed Internet.

The Alberta Wellnet Blueprint (1996) and the Master Plan (1999) are foundation documents that continue to be used for strategic direction setting. The Alberta Health and Wellness Enterprise Architecture Definition (AHEAD), the Alberta Wellnet Architecture, and the Health System-Wide Architecture-Conceptual view represent the key architecture assets that will continue to be leveraged provincially.

Health Information Standards Committee for Alberta (HISCA)

The Health Information Standards Committee for Alberta (HISCA) is mandated to provide oversight and co-ordination of the development, adoption, and dissemination of approved health information, data, and technology standards within Alberta. HISCA also oversees the alignment of standards with approved provincial reporting standards, as well as national and international standards. Currently, there are no HISCA draft technology standards, although there are telecommunications standards for Alberta Telehealth networking.

Authentication & Authorization

A secure authentication and authorization (A&A) process is intended to ensure that all authorized health system stakeholders have access to Alberta Health and Wellness and Wellnet applications based on "need to know" within a formal accountability structure. The process will establish a standard for ensuring all users are properly registered, authorized, and approved for access activity on new applications.

An interim process has been defined for the registration of health users who require access to Alberta Health and Wellness (AH&W) and Wellnet applications. A registration process specific to each application has been implemented.

A long term vision has been developed for an A&A service, and a project to define A&A requirements for health system stakeholders has been completed. These requirements were reviewed with all health system stakeholders through the Health Sector Security Working Group (HSSWG).

In June, 2002, a Government of Alberta (GoA) Task Force Meeting extended the A&A requirements to meet all ministry security requirements. A set of common service requirements was defined, and posted on the Health Sector Security Working Group website for review and feedback.

In March, 2003, the GoA issued an amended Request For Proposal (RFP) for A&A security services. Three vendors were successfully short listed.

Next steps include reconfirming ministerial support and funding for the A&A service. A planning session will be arranged with the successful vendor to review the plan and to clarify expectations of all parties. Alberta Health and Wellness will be involved in implementing the Electronic Health Record (EHR) application under the Initial Operational Capability (IOC).

Provincial Health System Portal Strategy

The purpose of the Health System Portal project is to design a portal architecture and strategy that will provide secure and consistent access to information and business functions for Alberta health system users. The provincial Health System Portal strategy is currently being reviewed to incorporate a longer term vision for indefinite use, not just one to three years. The focus is on factoring a provincial perspective into the portal strategy and Health System Portal requirements already gathered through a series of business, operational and architectural sessions.

A preliminary Provincial Health System Portal Strategy has been developed based on business, operational and architectural requirements determined through a participatory process involving a multitude of stakeholders, including regional health authorities, Alberta Health and Wellness, and Alberta Wellnet. The strategy is currently under review.

An RFP for a portal product will be issued as a next step, followed by, among other things, development of standards for applications / information integration.

Vendor Conformance and Usability Requirements (VCUR)

As noted earlier in this report, the Vendor Conformance and Usability Requirements (VCUR) Task Force – mandated to update and refine the technical, privacy, security, and functionality requirements for physician office systems in Alberta – submitted its recommendations to the Joint AMA/Alberta Health and Wellness POSP Subcommittees, where they were formally accepted.

The initial POSP RFP security requirements included, among other things:¹⁴

- strong user authentication (two factor)
- SSL / TLS host and client authentication
- VPN and firewall
- electronic signatures
- application security (password, user ID, role-based access)
- anti-virus and intrusion detection
- audit logs, and
- encryption of backup (if unsecured during transport) and communications over unsecured lines

These initial requirements did not specifically address e-mail communications, but did require secure application communication, suggesting that, at a minimum, e-mail must be transmitted over secure networks using SSL (128 bit encryption).¹⁵

¹⁴ Physician Office System Program (POSP), Environmental Scan Final Report Conducted in Support of the Vendor Conformance and Usability Requirements Initiative, November, 2002, p. 45

The VCUR Requirements for implementation by April, 2004, identified a number of more detailed Functionality Requirements for communications and security of physician office systems, based on either an Application Service Provider (ASP) model, or local installation. Examples of requirements for ASP include:

- Control of user access through
 - Role-based security
 - Unique user ID and password
 - Two-factor authentication when there are interactions between external systems and the POS applications (i.e. through the Internet)
 - Management of sites and workstations which can distinguish between trusted and public zones, as defined by AH&W security policies

- Ability to support remote access based on two-factor authentication and end-to-end encryption
- Applications must exchange all information with Wellnet EHR applications (PPHI, PIN, LTRH) through system-to-system interface using the HL7 messaging standard
- If not delivered through system-to-system interface and through a browser then:
 - Solution must use web browsers that are version 5.0 or higher
 - Solution must, at a minimum, support SSL v3 and 128 bit data encryption protocols

- Application must use common exchange formats to export data from the EMR to another application used for data analysis and reporting

British Columbia

The province of British Columbia has developed and approved a number of standards related to secure communication of personal health information.

BC COACH Guidelines for Security & Privacy

The COACH Guidelines were approved by the Ministry of Health in April, 1996, on the advice of the BC Health Information Standards Council. These guidelines apply generally to the management of health information systems. They are published by COACH - Canada's Health Informatics Association.

Approval of these Guidelines was intended to “assist in maximizing the integrity, availability and efficacy of administering authorized access to health information and protect the privacy of users and providers of health services.”

These guidelines are to be used in all health system organizations, agencies, clinics, and private practices in British Columbia, by all health and information systems professionals and caregivers. Among other things, the Guidelines recommend developing data communications strategies that recognize the limitations of the internet and include:

¹⁵ Ibid.

- Strong authentication to identify authorized users
- Continuous monitoring for unauthorized access attempts
- The use of cryptographic techniques, including Virtual Private Networks (VPNs) and secure web sites using Secure Socket Layer (SSL) techniques
- Public Key Infrastructure (PKI), for secure e-mail and messaging in a larger health system
- Development of a secure communications policy based on an international standard such as ISO 17799

HealthNet/BC - Application Services, Professional and Software Compliance Standards

Most HealthNet/BC services provide access to databases maintained by the Ministry of Health Services. The HealthNet/BC compliance documentation defines who can access the data, how the data can be used, and how to construct compliant transactions. Compliance Standards for the following HealthNet/BC programs / initiatives are available:

- PharmaNet
- Health Registry
- Lab Tests

The Standard defines all technical, procedural, and application standards for users of HealthNet/BC standards and services. The document acknowledges standards previously approved by the BC Health Information Standards Council, including Personal Health Number, HL7, TCP/IP, and CPhA.

The Standard recommends that software developers creating and/or testing applications that involve accessing and exchanging health information over the internet should download appropriate compliance documentation, along with test cases to ensure applications adhere to the required standards. If software products do not conform to these standards and tests, they will not be able to access HealthNet/BC services.

Use of the Standard is intended to ensure efficiencies, security and consistency of health information management in the health system by:

- providing technical standards for management of Client Registry data, patient medication information, and Pharmacare claims data;
- providing standards for data message definition, encryption and security for all software systems exchanging data in a HealthNet/BC compliant form;
- providing standards of data quality management (eg. data definitions, edits, display standards) as set by the health professions responsible for that data;
- providing specifications for all developers and vendors, which is also used to drive the compliance testing of the developers' and vendors' products.

The Standard must be employed by all organizations wishing to utilize HealthNet/BC data repositories and services. Each organization allowed to access HealthNet/BC data and services is required to run software which conforms with the Standard, and has been approved by the HealthNet/BC Compliance Team, via its Compliance Testing process.

The Standard was approved by the BC Ministry of Health on October 18, 1998, on the advice of the BC Health Information Standards Council. An addendum addressing (1) emergency department access to the Ministry's PharmaNet system, (2) medical practitioner access to the Ministry's PharmaNet system, and (3) a new security protocol, called HNSecure, was approved in December, 1999.

BC Health Level Seven (HL7) Standard

Health Level 7 (HL7) is a protocol for electronic data exchange among diverse health information systems. It covers areas such as admission, discharge, and transfer (ADT) information; order entry and results reporting, scheduling and referrals; and patient care information. The HL7 standard is used extensively in North America and other international jurisdictions. In British Columbia, HL7 has been widely used in the acute care sector and as the basis for information exchange protocols developed for the PharmaNet project.

This Standard was approved by the British Columbia Ministry of Health on November 27, 1997, on the advice of the BC Health Information Standards Council. Use of the Standard is intended to improve efficiencies in the health system by:

- supporting cost-effective system connectivity; and
- enabling health services providers to exchange key sets of data by implementing common interface standards between diverse computer applications.

The Standard is intended to be used primarily by information system developers and designers of system interfaces. Information systems that communicate using the HL7 standard are used by clinicians, technicians, administrative staff, managers, and employees of the BC Ministry of Health.

BC Transmission Control Protocol / Internet Protocol (TCP/IP) Standard

TCP/IP or Transmission Control Protocol/Internet Protocol is the common name for a telecommunications protocol designed to allow communication (i.e. sharing of data) among diverse computer systems across the Internet and other networks.

This protocol is a critical component of the underlying infrastructure to provide for communications between computing devices, computer systems, and networks associated with HealthNet/BC.

The Standard was approved in July 1996 by the BC Ministry of Health, upon the advice of the BC Health Information Standards Council.

HNSecure

HNSecure is the BC Ministry of Health Services' software for use by doctors, pharmacies, labs and others in the health sector to securely exchange confidential health-related data using the Internet.

HNSecure consists of both software and infrastructure. The software (HNClient) performs encryption, decryption, and authentication services for client applications; HNServer/HNGate does the same for server applications, as well as routing messages. The infrastructure (HNGard), is a service that registers and validates HNSecure users.

HNSecure ensures that only registered users can send and receive messages, and that the messages are tamper proof and fully encrypted. The use of HNSecure is mandatory when transmitting HealthNet/BC HL7 messages to and from Ministry applications, using the Internet.

In order to use HNSecure, health partners need to:

- be compliant with HealthNet/BC standards
- have a connection to HealthNet/BC and TCP/IP protocol
- complete Registration
- ensure their application can send and receive HealthNet/BC messages
- ensure HNClient is installed along with their application
- become an authorized HNSecure user by registering their HNClient

Health Level Seven (HL7)

Health Level Seven (HL7) is one of several standards developing organizations operating in the healthcare arena and accredited by the American National Standards Institute (ANSI). HL7 develops specifications, the most widely used being a messaging standard that enables disparate healthcare applications to exchange key sets of clinical and administrative data. The HL7 standard is used extensively in North America and other international jurisdictions, and is a mandatory requirement for laboratory and diagnostic imaging functionalities in Alberta physician office systems to meet VCUR standards, as well as for a number of British Columbia initiatives including PharmaNet.

BS 7799 / ISO 17799

ISO17799 is a detailed security management standard which, in December, 2000 was accepted word-for-word from BS 7799 Security Standard published by the British Standards Institute.

The Alberta POSP Vendor Conformability and Usability Requirements for physician office systems, effective April 1, 2004, require that system vendors meet select security criteria set out in ISO 17799, including but not limited to:

- Network Controls (8.5.1)
- Network Audit Controls (8.5.2)
- Exchange of Information and Software (8.7)
- Information and Software Exchange Agreements (8.7.1)
- Security of Media in Transit (8.7.2)
- User Access Management (9.2)
- User Registration (9.2.1)
- Privilege Management (9.2.2)

- Policy on Use of Network Services (9.4.1)
- User Authentication for External Connections (9.4.3)
- User Identification and Authentication (9.5.3)

Physician office system vendors are also required to have policies and procedures in place to address, among other things:

- Access, authorization and authentication
- Compliance with security and privacy policies
- Allocation of information security and privacy responsibilities
- Reporting security incidents and privacy breaches
- Safeguarding personal information

6.0 RECOMMENDATIONS

Across Canada, there are a number of federal and provincial initiatives aimed at developing health information networks that facilitate the exchange of patient information among authorized healthcare providers and organizations. These initiatives generally rely on use of the Personal Health Number (PHN) as a unique client / patient identifier.

Overall, however, there is still significant work to be done with respect to development of standards for patient identifiers and client registries, communications and electronic transmission of personal health information. Recognizing these limitations, it is recommended that system vendors:

- Align application design / architecture for interoperability with provincial initiatives including, for example, Alberta's PIN, PPHI, EHR, and LTRH. Although still under development, each of these initiatives supports the use of the PHN as a unique client / patient identifier.
- Consider existing standards for patient identification in application design / architecture (in particular, Alberta's Stakeholder Demographic Data Standard and BC's Personal Health Number (PHN) Standard).
- Encourage potential clients to consult with provincial privacy regulators (e.g. Alberta's Office of the Information and Privacy Commissioner) to determine requirements for completing privacy impact assessments. This is a legislated requirement in Alberta whenever a custodian proposes to introduce changes to an administrative practice or information system involving personal health information (such as automating a previously manual system, or modifying identifiers used by existing applications).
- Meet ISO standards for the secure electronic transmission of personal health information. ISO 17799 provides a standard that has been recognized in Alberta by the POSP VCUR Task Force, and which is required by Regional Health Authorities wishing to be allowed access to Alberta Health and Wellness applications.
- Develop their own information privacy and security policies and procedures, in order to meet the requirements for Information Managers under Alberta's *Health Information Act* (note that having these directives in place will meet standards in Alberta, and also provide a value-add when offering services to prospective clients in other jurisdictions).
- Recognize the widespread adoption of HL7 standards and XML technology to define data exchange and communications protocols and, in particular, the HL7 Clinical Document Architecture (CDS) and Clinic Context Object Workgroup (CCOW) Standards initiatives. Application design / architecture should support HL7 standards.

7.0 SOURCES

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Western Health Information Collaboration (WHIC), *Client Registries White Paper*, March, 2002 - Version 4.0.

On-Line Sources

Alberta Wellnet

<http://www.albertawellnet.org/about/index.html>

British Columbia Health Standards Council

http://healthnet.hnet.bc.ca/hds/stds_council_general_info/index.html

Canadian Institute for Health Information

http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=home_e

Canada Health Infoway

www.infoway-inforoute.ca

Western Health Information Collaborative (WHIC)

<http://www.whic.org/>

Health Infostructure in Canada: Provincial and Territorial Plans and Priorities

http://www.hc-sc.gc.ca/ohih-bsi/chics/pt/index_e.html

APPENDIX 1 – Survey of Status of Client Registries and Identifiers

(reprinted from Western Health Information Collaboration (WHIC), *Client Registries White Paper*, March, 2002 - Version 4.0)

Jurisdiction	Status
British Columbia	<ul style="list-style-type: none"> • Has a Client Registry widely used by Government Social Services and within BC's Health Care sector (including Acute Care, Public Health, Mental Health, PharmaNet). • Insurers can update client data on the client registry. • The provincial identifier is a "personal health number" - PHN. • PHN's are issued to anyone in contact with certain sectors of the BC health system (e.g. pharmacy), regardless of eligibility. • Interaction between the Provincial Client Registry and local (i.e. regional) exists through a variety of methods (e.g. web, HL7 messages, flat file download). PHN's are captured on local client registries mainly for "back office" functions such as billing, but there is a trend towards capturing the PHNs locally for clinical purposes. • Interfaces do exist to capture "newborn" information on the Provincial Registry, but this function is not widely used.
Alberta	<ul style="list-style-type: none"> • Alberta Health and Wellness (AHW) maintains its Central Stakeholder Registry (CSR), a client registry that assigns a Unique Lifetime Identifier (ULI) when a client is registered. A ULI is allocated to most persons in contact with the health system. When AHW grants health insurance coverage to the registered client, the ULI is known as the Personal Health Number (PHN). • Most health providers, including Regional Health Authorities and Boards (HAs), operate local and/or regional registration systems, each with its own person identifier. • All newborns, born in Alberta, are registered by the birth facility, through a web interface, directly into the CSR and assigned a ULI. • Alberta is currently implementing a province-wide person identification system (Provincial Personal Health Identifier (PPHI)). PPHI will make the PHN/ULI available to health service providers. • Through a web interface to the Person Directory (a replica of the CSR), health service providers will have access to search and display person demographic data. As well, add and update functions will be enabled directly to the CSR, through a web browser or message-based interface, to local and/or regional client registries.
Saskatchewan	<ul style="list-style-type: none"> • Assigns an identifier to Saskatchewan residents only - out-of-province clients do not receive Saskatchewan identifiers. • Has a provincial client registry and supports online number assignment for newborns • Uses other provincial identifiers and is reviewing its' policies and procedures for out-of-province client ID assignment
Manitoba	<ul style="list-style-type: none"> • Has a personal health identification number (PHIN) and a client registry used for eligibility. In special cases a PHIN is assigned to out-of-province persons. • Provincial client registry is 'source of truth' to other systems. • Access to PHIN for regions and physician clinics is through mainframe systems (no messaging). • No regional client registries exist at present. • Future plans include a central client registry that can be accessed by new and legacy systems via messaging. Included will be an enterprise – wide master patient index to enable linking of facility- based systems and numbering systems.

Ontario	<ul style="list-style-type: none"> • Assigns individual health numbers and maintains a client registry used for eligibility purposes. • Individual client identifiers are only issued to those that are eligible for provincial health insurance. • Considering including non-eligible persons within their client registry and assigning an identifier.
Newfoundland	<ul style="list-style-type: none"> • Client identifiers for an individual are kept centrally in the provincial UPI, with multiple identifiers possible for any individual. • Multiple identifiers are linked by a 'shadow' unique client identifier. The 'shadow' identifier could be used for multiple purposes in the future. • A centralized Registry Integrity Unit team reconciles duplicate or incorrect identifiers. • The UPI/Client Registry project provides full end-to-end integration with existing legacy systems through a combination of active and passive interfaces.

The following information is from Health Infostructure in Canada: Provincial and Territorial Plans and Priorities – 2002, Health Canada's Office of Health and the Information Highway (OHIH) (www.hc-sc.gc.ca/ohih-bsi/chics/pt/2002/ab_e.html)

PRINCE EDWARD ISLAND

The Island Health Information System (IHIS) links health care sites province-wide, providing support for health service delivery. Some IHIS achievements include implementation of:

- a provincial unique Personal Health Number for all Island residents.
- a Pharmaceutical Informatics System (PhIP) to collect information on all prescriptions dispensed to residents under funded programs.
- a Claims Processing System which allows physicians access to information such as claims status and current resident address information.
- a Virtual Private Network (VPN) and Public Key Infrastructure (PKI) to facilitate Physician access to the claims system through the Internet.
- core applications such as ADT, Acute Care, Pharmacy, Payroll, Financials, Medical Records Abstracting, Clinical Scheduling and Dictation.
- a Radiology Information System able to maintain comprehensive patient files which can be accessed at any of the seven acute facilities.
- a Common Client Registry - the main demographic database for the provincial health system. CCR will be the central repository for all Health clients.

The IHIS network consists of approximately 40 health facilities connected across the province with a combination of frame relay and fibre. The two largest acute facilities connect to the network with dual 100Mb links and the other five currently have 10Mb access. The non-acute facilities connect with a combination of 64K or 128K frame relay, or 10Mb fibre access. Security policy does not permit internet web access from the desktop. Standalone internet workstations are available for employee use. Remote access to the IHIS network is through a Virtual Private Network and is currently restricted to physicians for claims submission, technical support and approved remote users.

As of January 2002, major health infostructure application priorities of PEI include:

- Integrated Service Management (Common Client Registry and Case Management)
- Radiology Information System (RIS)
- Picture Archiving Communication System (PACS) – allowing for electronic transfer of digital radiographic images among the hospitals provincial and interprovincially
- Laboratory Information system
- Clinical Systems: Patient Booking, ADT, Pharmacy, Nutrition, Decision Support, Videoconferencing and Telehealth and Workload Measurement.
- Pharmaceutical Informatics System (PhIP)

Along with the Departments of Health of New Brunswick, Newfoundland and Labrador, and Nova Scotia, Prince Edward Island participates in Health Infostructure Atlantic (HIA). The purpose of HIA is to share health information/ technology initiatives, and to identify projects or strategies for collaborative development, and the use of best practices. HIA is currently working on:

- Common Client Registry
- Telei4 (PACS)
- Case Management
- Health Surveillance Gap Analysis.

NOVA SCOTIA

Nova Scotia Telehealth Network (NSTN)

Nova Scotia was the first province in Canada to establish a province-wide telehealth network, focused on teleradiology, specialist consultation and physician/nursing continuing education. Province wide access was established in 1999. **The Nova Scotia Telehealth Network (NSTN)** is one of the most comprehensive and active telehealth networks in Canada. Fifty-three video conferencing systems provide for educational and medical consultations into 42 healthcare facilities throughout the province. There are 36 teleradiology sending stations and 11 reading stations.

Nova Scotia Hospital Information System (NSHIS)

This project will provide an integrated hospital information system for thirty-four hospitals whose facilities are located primarily in the Halifax Regional Municipality. To support this effort, a consolidated health network has been implemented province-wide to provide a shared infrastructure that may be utilized by both the NSHIS applications and other hospital or healthcare related applications.

The wide area network infrastructure was previously regionally based and remained as five separate networks until the spring of 2002. The implementation of the Nova Scotia Health Network (NSHN) required use of frame-relay, DSL and ATM technology to provide the bandwidth required for the hospitals. The small hospitals will utilize 512K frame-relay connections, the medium-sized hospitals utilizing either frame-relay at T-1 or DSL, depending

upon availability and the regional hospitals have had broadband access implemented at 10Mbps.

The Internet access for these locations is in the process of being consolidated into a single entrance hosted by the CDHA and protected by a commercial firewall. This entrance will manage all external connections to the network and provide remote access to authenticated users.

Nova Scotia also participates in Health Infostructure Atlantic (HIA).

YUKON

In 1997, the Department of Health and Social Services designed innovative strategies to improve accessibility to medical services and the quality of health care for the residents in rural Yukon communities. Telehealth was identified as a major opportunity area for Yukon government consideration, both to improve access to medical services and to improve access to medical knowledge.

The HEN pilot project (Health Education Network) was initiated in July 1998 to pilot the delivery of community and clinical health applications over narrowband facilities for three rural communities. The pilot enabled users, patients and technical support to become familiar with telehealth as a means to help rural residents meet their health care needs.

Yukon participates in the Western Health Infostructure Collaborative (WHIC).

NORTHWEST TERRITORIES

Telehealth is a health infostructure priority for the Government of Northwest Territories. Overall, however, the NWT appears to be delaying strategic investments in health infostructure development until associated initiatives can be thoroughly evaluated and positioned within the emerging primary care reform strategy. At the same time, the Government continues incremental development of WestNet telehealth, and the implementation of the Child and Family Information System.

Northwest Territories participates in the Western Health Infostructure Collaborative (WHIC).

NUNAVUT

The *Ikajuruti Inungnik Ungasiktumi Telehealth Network (IIU Network)* presently connects five sites in the territory and is used to provide medical consultations and support personnel manning remote nursing stations. The vision is to expand this network to link to all 26 communities in the territory.

The primary long-term goal of the IT Section of the Department of Health and Social Services (HSS) is to integrate the essential systems for Nunavut's primary health care and the related

administration. This is well underway now that several newly developed systems were designed for use as separate modules within one overall, integrated system, using the Nunavut Health Care Number as the key identifier.

Many of the key components necessary to develop Nunavut health infostructure are completed/underway and include:

- **Central Client Registry** -- HSS is in process of replacing the Health Services Administration System, which will contain the Registration module (Client Registry). This module will form the new source for Client Registration and tombstone data.
- **CRIS** -- A Client Record Information System is being developed and contains the following modules:
 - Public Health and Sick Clinic Information
 - Communicable Disease Module
 - Chronic Disease Module
 - Immunization Module
 - Medical Travel
- The Requirements Definition for Nunavut's **Provider Registry** is currently underway.
- **Claims Processing/Health Administration System**: Requirements documentation completed.
- The development of GN Wide Area Network is the mandate of the GN Department of Public Works and Services. All 3 Regional HSS headquarters are currently connected to GN WAN. Current electronic communications of 80% of hamlets is limited to low-speed Internet. It is hoped that a territorial Wide Area Network for Health will be completed in 2003. Pending further review.

The development and use of Telehealth services has also been a priority for Nunavut. The long-term goal is to integrate Telehealth into the primary care delivery.

Nunavut also participates in the Western Health Infostructure Collaborative (WHIC).

QUEBEC

The "Réseau de télécommunications sociosanitaire" (RTSS) is the information infrastructure on which health related information applications will be implemented throughout Québec. It is a secure private network based on large bandwidth telecommunications technologies provided through a public-private partnership. It currently links approximately 1600 health institutions.

The RTSS can support both administrative and medical applications, including e-mail, telemedicine, EDI, Internet access, smart card development, videoconferencing, and possibly telephone services.

Major RTSS application projects include: Integration of CLSCs (e.g. User Data System, Vaccine db); Long Term Care User Information System; Emergency Management Information System; Breast Cancer Program Information System; Integrated Transfusion and Hemo-surveillance

Information System; Physically Handicapped Client Information System; Mental Health Information System; Info-Santé Network.

The RTSS also provides the backbone and support for key pilot projects related to EHR/EPR development, SmartCard Applications development, Telemedicine, Tele-home Care and Tele-care in rural and remote Communities, Regional Clinical Networking, and Surgical Care Networking