F/P/T Advisory Committee on Health Infostructure

Blueprint and Tactical Plan for a pan-Canadian Health Infostructure

(A Report on F/P/T Collaboration for the Planning of the Canadian Health Infostructure)

December 2000

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Introduction

BACKGROUND

In 1999, the newly formed federal, provincial, territorial Advisory Committee on Health Infostructure (ACHI) established a Strategic Planning Working Group to to develop strategies for the development and implementation of a Canadian health infostructure. To begin, ACHI assessed the current state of use of information and communication technologies in the health sector across Canada. ACHI then undertook to develop this present document: the **Blueprint and Tactical Plan 2000 (**the Tactical Plan) as the basis for further planning and consultation regarding the development of a pan-Canadian health infostructure.

This document has been drafted over a period of 18 months and, while it does outline a plan and strategy, it is also intended to stimulate further thinking and discussion about a pan-Canadian health infostructure. The document outlines a range of options which were developed over the time of writing, and proposes recommendations on where to start work on a **Canadian Health Infostructure** (the Infostructure).

THE CANADIAN CONTEXT

The Changing Business of Health

The world we live in is ever changing. Indeed, it has been said that change is the only constant in life. Significant change can certainly be found in the health system, in its very composition and in the way in which we use and manage it. While this has manifested itself in many forms and at different speeds in each jurisdiction, there are some common themes.

Health service governance is rapidly becoming regionalized and there is a policy shift toward enhancing community-based care. There is a focus on improving efficiency, effectiveness, access, quality and accountability within the health sector. In addition, there is a growing desire by citizens to participate in, and make decisions, about their own health care.

The many drivers of change are commonly recognized. There is agreement on the need to put in place the structures and mechanisms that will enable continuous improvement in meeting the challenges of the 21st century and there is a shared commitment to deploying them within the health sector in Canada. Improved health information is seen as a key "enabler" in fostering health system improvements.

Rising to the Challenges

At federal, provincial and territorial levels, this has resulted in numerous health information and technology initiatives, which vary considerably in scope and size. They include systems that range from local or regional, to larger scale projects that span the country. All have one thing in common: addressing pressing health information needs through new technologies.

While innovative work and activity are to be encouraged, there has been an expressed need to harness the energy, innovation and effort of these activities and situate them within a larger context in order to ensure the *strategic* deployment of health information and technology resources across Canada.
This larger context has been envisaged a pan-Canadian framework or ***infostructure***, to become the information and communications foundation for our health system. The vision

for the infostructure is defined in the 1999 report ***Canada Health Infoway: Paths to Better Health*** (the Infoway report), produced by the Federal Minister of Health's Advisory Council on Health Infostructure.

THE NEED TO MAKE IT A REALITY

With the Council's vision and broad strategic framework defined, there is now a need to develop a plan for the implementation of the Infostructure in order to allow health services across Canada to work or connect together in practical ways that will improve services and the health of Canadians.

This is especially important, because there needs to be a common understanding of the components necessary to achieve the Infostructure, and what steps the federal, provincial and territorial governments can take to contribute to its development and of the benefits to be gained from a highly collaborative approach to health information technology investments.

Consequences

Failure to act and to continue to move forward is simply not an option. The vision of the infostructure necessary for Canada's health system over the next decade will never be fully realized without connecting the activities that are underway. In the absence of such a connection:

Portability of information is compromised - Portability enables health information to follow the patient within and between health care delivery institutions and agencies, and supports quality improvement and co-ordination of services. This is especially important for those who are among the most vulnerable in society; and those who tend to be highly mobile and may present for services in more than one jurisdiction.

Access to services is affected - In health care, technology has made some significant advances. It allows us to do things unheard of even 10 years ago—receive and display images on-line from remote areas, see inside anatomical structures as well as access and analyze cross sections of data using sophisticated tools. However, these tools are often not available to all who need them at the point of care delivery.

Approaches to privacy and security are inconsistent - Respecting the privacy of personal health information and assuring its confidentiality and secure handling are fundamental considerations. A piecemeal or "local" approach will seriously compromise the functioning of the health infostructure and may result in less than ideal security for health information.

Duplication and unnecessary expense - Investments in information and communications technology is significant and is expected to increase. Given the fiscal pressures facing then health system at all levels, it is important that these investments are as cost-effective as possible. Failure to share information and technology and working in isolation results in redundancies and the constant need to reinvent and "re-fund" solutions within the health system.

Effective management of data is compromised - Without standards and integrated mechanisms for managing and analyzing health data across all health delivery agencies and federal, provincial and territorial jurisdictions, opportunities for improving the health system's effectiveness and accountability, and the health of Canadians, cannot materialize.

MAKING IT HAPPEN

Essential Ingredients

A number of essential ingredients must be in place if the national health infostructure is to be implemented in a coordinated and cost-effective manner.

Leadership - Given the multitude and diversity of the stakeholders involved, it is important that the implementation of the Infostructure has strong leadership and provides an appropriate forum for discussion. The Advisory Council on Health Infostructure emphasized the need for all governments to foster and to facilitate the Canada-wide co-operation and collaboration necessary to ensure the initiative's success.

Strategy and Detailed Plan - While the *Canada Health Infoway* report provides some direction, the exact approach and methods for implementing the Infostructure need to be decided upon and then made clear. A comprehensive strategy or "blueprint" is needed to provide that detail and to ensure coordination of federal, provincial, and territorial investments in this area.

Common Understanding - The components necessary to achieve the Infostructure need to be understood by a large and diverse group of interested stakeholders. In addition, it is important for stakeholders to understand how the federal, provincial and territorial initiatives that are underway will contribute to the vision.

The Work Begins

In October 1999, the Conference of Deputy Ministers of Health directed the Advisory Committee on Health Infostructure (ACHI) to develop a blueprint and tactical plan for a Canadian Health Infostructure. This document would serve to address many of the issues which are identified above. More precisely, the objectives of the document were to:

- Identify the essential information and technology components that are required to achieve a cohesive national health infostructure.
- Identify what is in place today and how it could contribute toward a national health infostructure.
- Identify any significant gaps that require attention.
- Recommend a tactical plan which will outline the actions necessary to advance the development of the Infostructure by building upon existing federal, provincial and territorial investments.

Taking Stock

THE INFORMATION AGE

As a first step in developing the Blueprint and Tactical Plan, it was important to understand the current health infostructure, both within Canada and globally. This 'taking stock' identified the factors that needed to be considered in planning for the future Infostructure.

Information

In the global context, there can be little doubt that the information age is upon us; information and its enabling technologies pervade every aspect of our lives.

The increasing amount, type and availability of information is having a tremendous impact on society. People are becoming more informed and knowledgeable, or demanding to be so. Individuals and families, want to know more about their own health, as well as about the management and operation of the health system.

The enormous and beneficial power of information is increasingly understood. At the clinical level, information can support the co-ordination of services, patient assessment, treatment plans and reviews and provide a basis for fostering the continuity of care among clinicians. The potential benefits for health managers include the support for planning and allocating of resources, measuring efficiency, as well as clinical audit and outcome measurement.

Technology

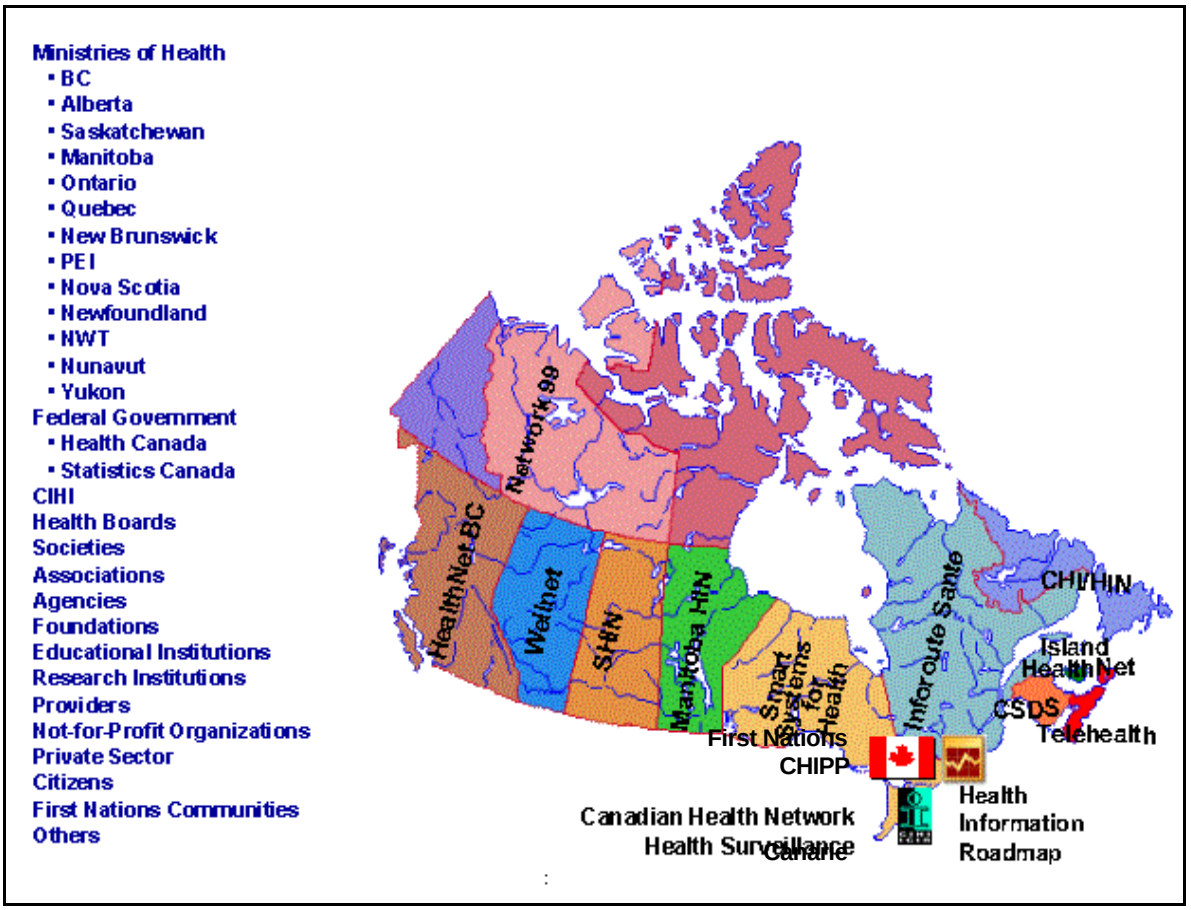
Technology has emerged as a major factor in shaping our environment, from the way we learn or work to the very way we live. Major information technology trends, from a health industry perspective, can be summarized as follows:

- **Internet -** its use will continue to increase dramatically. Security remains an issue, especially for personal health information. However, new encryption and security technologies, such as Public Key Infrastructure (PKI) offer promising solutions.
- **Interoperability -** systems are increasingly talking to other systems, thereby creating seamless access to information. Voice and video data can more readily be integrated into commonly used communication networks and systems, and in a cost-effective manner due to advances in fiber optics and other technological advances.
- **Demand for and access to information -** consumer and service provider demand for the right information, at the right time and in the right place, is increasing. Hand held devices are beginning to revolutionize data collection and access at the point of care.
- **Electronic health record -** its implementation will be limited until the issues of privacy, security, cost and acceptance by the provider community are addressed.
- **Standards consolidation –** some standards will begin to dominate information and technology within the health care sector. Significant effort will be required, however, to configure and apply these standards across diverse and wide-spread health networks and systems across Canada.

CANADA

There are many relevant information and technology initiatives currently underway in Canada, both at a local and national level. These were documented in a Health Infostructure: Current State Assessment report, commissioned by ACHI. In summary, as of 1999, over 180

initiatives had been identified across Canada, with almost every province and territory involved. For example, at the time, there was HealthNet/BC, Alberta We//net; Saskatchewan Health Information Network; Quebec Inforoute-Santé; Nova Scotia Telehe alth; and PEI IslandNet, to name a few. At the national level, there was Health Canada's Canadian Health Network, National Health Surveillance Network, First Nations and Inuit Health Information System; Industry Canada had SchoolNet and CANARIE; and CIHI, Health Canada and Statistics Canada jointly had the Health Information Roadmap initiative. The map below illustrates the fairly balanced geographic distribution of initiatives.



Of the identified initiatives, almost two thirds of the national, provincial and local initiatives were geared towards strengthening and integrating health services, while a third focused on creating information resources for accountability and continuous improvement. The principal areas of focus for current initiatives were:

N.B. THE PROJECTS BELOW ARE ILLUSTRATIVE ONLY AND SOME MAY NO LONGER BE ACTIVE AS OF THE DATE OF WRITING OF THIS REPORT.

- **Pharmacy** - some examples include Pharmanet (British Columbia), Pharmacy Information Network (Alberta), Pharmacy Network Redevelopment (Saskatchewan), Pharmaceutical Informatics Program (PEI).

- **Acute Care** - Some examples include Electronic Patient Record (Quebec), Integrated Cancer care (Alberta), Strategic IM & IT Plan (New Brunswick), ADT/CPI Implementation (Northwest Territories), and telemedicine (Nova Scotia).

- **Long Term/Community Care/Case Management** - Some examples include Client Service Delivery System (New Brunswick), Continuing Care (Alberta), Nursing Home and LTC Client Information System (Quebec).

- **Public Health and Mental Health** - Some examples include New Directions for Tobacco Control in Canada (Advisory Committee on Population Health), Community Health Information System (Northwest Territories), Client Service Delivery System (New Brunswick), National Health Surveillance Infostructure (Health Canada, British Columbia, Alberta) and the First Nations Inuit Health Information System (Health Canada).

- **Technology** - Some examples include: Digital Communications Network (Northwest Territories), Réseau de télécommunications socio-sanitaire (RTSS) (Quebec), PKI (Saskatchewan, Health Canada, PEI), Vital NB Heart Centre, PACS tele-radiology - Atlantic Canada, IIU Network – Nunavut.

- **Information Management and Analysis** - Some examples include Health Information Legislation (Alberta, Saskatchewan, New Brunswick), Performance Indicators for Human Resources (Advisory Committee on Health Human Resources), health data warehouse and data marts (British Columbia, Nova Scotia).

The vast majority of reported initiatives included standards development and implementation as key elements. The CIHI Health Information Roadmap initiative is central to the standards development work. Other work underway in the provinces, territories and through CIHI include standards for unique identifiers (service recipient, service provider, facility, place), electronic claims, lab tests, and minimum data sets (continuing care, primary care, mental health).

Of the over 180 initiatives reported at a federal, provincial and territorial level, (i.e. does not include all the local initiatives) the estimated expenditure was estimated to be over $1.5 billion. This level of expenditure clearly indicates that a significant level of new investment is already underway to develop the health infostructure across Canada. It also underlines the importance of having a common approach to health infostructure investment so that duplication of effort and expenditures are minimized, and benefits to health service delivery and to the health of Canadians are maximized.

INTERNATIONAL CONTEXT

Health care systems in all industrialized countries are faced with similar issues when modernizing their health systems. There is significant activity taking place in other countries in planning national information and technology solutions to support health system change.

Canada and five other countries surveyed have national health information and technology strategies, either in place or being developed (see table below).

A scan of international activities revealed some common initiatives:

- **Standards -** to allow seamless connectivity between systems and to improve the availability, quality and reliability of health data and information.
- **Security and Privacy of Information -** to ensure that personal health information, given in confidence, remains safe.
- **Health Networks -** a health system network through which information can flow securely between health service delivery locations.
- **Digitization and integration of patient information -** an electronic record of personal health information, which facilitates improved health care by allowing access by authorized health care providers, on a strictly need-to-know basis, to a comprehensive view of patient health information.
- **Telehealth -** the use of technology to enable remote diagnostic services and care.
- **Information and Technology Training and Education -** in recognition of the varying levels of digital literacy and IM/IT skills, there is a recognition that progress can only be made with the pre-requisite education and training of service providers and managers.

Table 1 Activities in International Jurisdictions

	United Kingdom	New Zealand	Australia	USA	Italy	France	Japan	Germany
National Strategy	✓	✓	In progress	In progress	✓	National Project	National Project	National Project
Standards	✓	✓	✓	✓	✓	✓	✓	✓
Security & Privacy of Information	✓	✓	✓	✓	✓	✓		
Health Network	✓	✓			✓	✓	Limited	Limited
Digitization of Patient Information	EPR, EHR	NHI, MWS	EHR	EHR		Smart Cards	EMR, Smart Cards	Smart Cards
Telehealth	✓	✓	✓	✓				
Education & Training	✓	✓		✓	✓			

The Blueprint

OVERVIEW

The Blueprint for a Canadian Health Infostructure is composed of three parts:

VISION:

- the Vision is the strategic framework for a health infostructure, as described by the Advisory Council on Health Infostructure in its 1999 report: *Canada Health Infoway: Paths to Better Health.*

PRINCIPLES:

- the Principles serve to ensure the development of the Blueprint and Tactical Plan are based on the strategic framework proposed by the Advisory Council.

COMPONENTS:

- the components are the distinct elements that collectively will make up the health infostructure, and that will need to be implemented collaboratively. It is important to carefully define and describe these components because they will foster the common understanding that is essential for the realization of a pan-Canadian health infostructure.

CANADA HEALTH INFO*WAY* VISION

The Canada Health Infoway empowers individuals and communities to make informed choices about their own health, the health of others and Canada's health system. In an environment of strengthened privacy protection, it builds on federal, provincial and territorial infostructures to improve the quality and accessibility of health care and to enable integrated health services delivery. It provides the information and services that are the foundation for accountability, continuous improvement to health care and better understanding on the determinants of Canadians' health.

-- Minister of Health's Advisory Council on Health Infostructure, 1999

In defining its vision of the Infostructure, the Advisory Council described a number of values to guide the thinking and work of governments. These values are essentially the same ones that Canadians consider as essential to the health system, namely:

Values

- **Strengthening Medicare** as a single payer, publicly funded health care system guided by the five principles of the *Canada Health Act*—universality, accessibility, comprehensiveness, portability and public administration—within the framework of a strong federal, provincial and territorial partnership.
- **Privacy** and personal health information will be protected and the level of privacy protection improved.
- **Inclusive rather than exclusive**, so that caregivers, patients, the general public, health care professionals, researchers, administrators and policymakers should participate as both creators and users of information.
- **Collective and personal responsibility**, so that Canadians can take greater responsibility for their own health and participate meaningfully in decisions about the health system.

Strategic Framework

The Advisory Council defined four strategic goals that the Infostructure should achieve:

- **Empower the public** to make informed choices about their own health, their health care and health policy.
- **Strengthen and integrate health care services** to improve their quality, accessibility and efficiency.
- **Create information resources** for accountability and continuous feedback on factors affecting the health of Canadians.
- **Improve privacy protection** within the health sector.

Key Directions

Through the Info*way* report, the Advisory Council described a number of key directions for the Infostructure.

Key Direction	Description
Empower the Public	
1. Health Information for the Public	Empower the public by providing access to trusted health information
Strengthen and Integrate Health Care Services	
2. Information for Health Providers	Empower health service providers by providing them with access to trusted health information to support evidence based decision making
3. Clinical Decision Support	Provide tools and information to support health professionals in their clinical decision making
4. Electronic Health Record	Make an electronic health record accessible to health care providers on a "need-to-know" basis
5. Health Surveillance	Make a health surveillance tracking and alert system available to monitor the health of a region, province or Canada as a whole
6. Selfcare/Telecare	Provide telephone triage, selfcare information and tools to improve access and enable citizens to care for themselves where appropriate
7. Telehealth	Implement information technologies to deliver health services and transmit associated health information over a distance. This usually refers to interactions between health professionals (e.g. telemedicine) and between a health professional and their patient (e.g. tele-homecare
Create Information Resources	
8. Health Data Holdings	Create integrated, consistent, relevant, flexible and secure quality data holdings that support research and analysis of Canadians' health and of the Canadian health system
9. Health Information Analysis and Reporting	Provide health information in an accessible and user-friendly form, that measures health system performance, the health status of Canadians, as well as the determinants of health
Improved Privacy Protection and Standards	
10. Privacy Protection	Provide a secure environment that protects the privacy of a person's health information with access on a need-to-know basis
11. Standards	Harmonize the standards used in provincial and territorial information systems to allow for information haring and technology interoperability

The key directions were used to guide the development of the components and sub-components of the Infostructure, as described later in this document.

PRINCIPLES

In an effort to ensure that the Infostructure vision, goals and directions are consistent with the Infoway report, a set of principles were developed to guide the development of the Blueprint and Tactical Plan. These principles state that the Infostructure:

Collaboration

... is created and used collectively by stakeholders, with an intent to share in its benefits.

It will be the key information and communication foundation for the Canadian health system but must build upon, and add value to, existing systems, networks and technical infrastructures. This will result in a heterogeneous pan-Canadian "network of networks." This is only possible through a process of collaboration.

Needs-Driven

... must support existing and emerging needs of the Canadian health system

It must assist front line health professionals in their day-to-day work; serve managers and policymakers in health strategy, policy initiatives and business activities; and be a valuable resource for members of the public and researchers.

Accessibility

... must improve the availability, reliability, quality and management of health information.

There needs to be a recognition of the differing end uses of information, the local and regional variances in availability of computer technology, communications infrastructure and digital literacy and skills, in order to develop solutions that are user-friendly and appropriate to needs and circumstances.

Interoperability

... must use a standards-based approach to ensure connectivity among systems.

It must allow the necessary level of information flow to be done securely throughout the entire Canadian health system, regardless of location.

Protection

... must improve the protection of personal health information.

It must ensure the protection of personal health information, and provide for security measures to guarantee that access will occur only by authorized persons, on a strictly "need-to-know" basis.

BLUEPRINT COMPONENTS

> *… a component is an independently functioning piece of information technology that has explicit "edges", expects specified conditions, provides specified benefits, can be designed and developed independently and used in various combinations to meet differing requirements.*
>
> -- Minister of Health's Advisory Committee on Health Infostructure

The third part of the Blueprint describes the five major components that would comprise the Infostructure. They are: organizations and people; processes; information; technology; and standards.

Components

Organization and People - defines the stakeholders of the Infostructure who will create the health data and information, build the technology supporting the Infostructure, use the Infostructure to receive, deliver, maintain and improve health-related services, and provide governance for the development and use of the Infostructure.

Process - defines both the personal health processes and the health system business processes that will be supported by the Infostructure. The personal health processes are those that a person uses to manage their own health, irrespective of whether they use the health system. Health system business processes are those that service providers, mangers, researchers and policy makers use to deliver health services, as well as plan, manage and evaluate the health system.

Information - defines the health information, data holdings and data needed to support communication among health professionals, as well as the decision making and learning related to health and health care required by the public and health professionals alike.

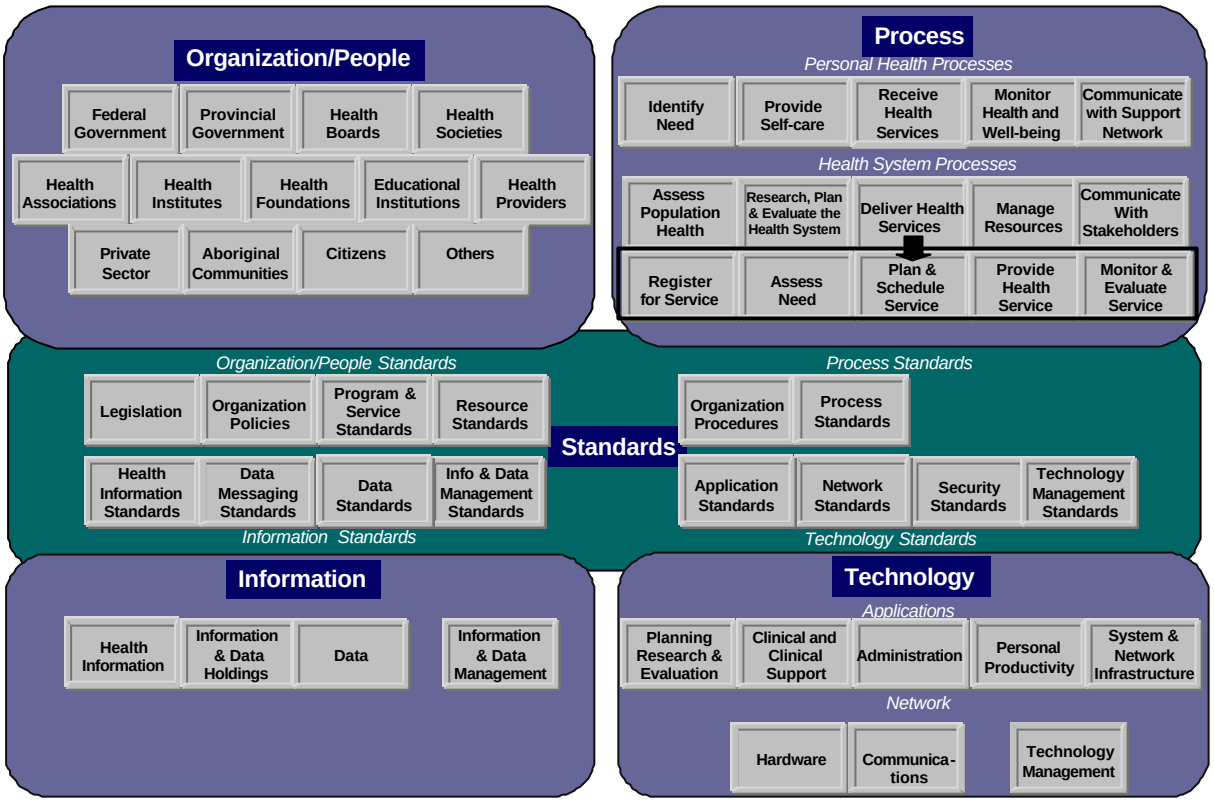
Technology - defines the application and network components that provide the supporting technological framework for the health Infostructure.

Standards - defines the rule s that enable organizations and people to communicate, tasks to be carried out, information to be shared, and technology to inter-operate. Standards enable people to speak a common language and to work together on common matters. In the health domain this is done through secure information systems.

Sub-components

The diagram which follows details the Blueprint components to a further level of detail - as 54 sub-components. The sub-components have been depicted as buttons to convey that a further level of detail would exist behind each of the sub-components that could be displayed if the button were clicked. For the purpose of this Blueprint, only the first level of sub-components has been defined. Definitions of the sub-components can be found in Appendix D, as well as the vignettes used to define and validate the sub-components.

Sub-components:



Assembling the Components

The Blueprint components can be assembled to collectively enable providers to electronic ally access an integrated set of services within their health services network.

Access - the "gateway" into the Infostructure. It can take many forms—a doorway for physical access, a telephone or a computer for electronic access. Whatever form it takes, access must be appropriate to the needs and circumstances of the user and secure.

People - the expected communities of users of the Infostructure: the public; health providers such as physicians, nurses, and pharmacists; managers and policy makers; and researchers.

Services - the integrated services that are accessed via the Infostructure:

- Business Services - examples include diagnostic and therapeutic services, consultations, remote monitoring, continuing education, claims administration and purchasing.

- Information Services - the provision of health information and data for the public, for local communities and for health providers. These can include access to health records, data holdings, news, resource directories, health promotion and selfcare materials, academic literature and discussion groups.

- Technology Services - the provision of application and network services. For example the provisioning of a hospital scheduling application to a physician's office, or the provision of internet services by an Internet Service Provider (ISP) to a community clinic.

Environment - the health services network of organizations and people in a given geographic area (e.g. a group of hospitals, a health region, a province, or however the network is defined).

This approach to assembling the components is consistent with industry trends that reflect the exponential increase in interoperable web-based technologies that can provide timely access to information and application services.

The Tactical Plan

GAP ANALYSIS

A gap analysis was conducted to ensure a common understanding of which Infostructure components existed today, which ones were missing, and how the health system could proceed to fill the gaps.

Approach for Discovering the Gaps

For each of the key directions identified, the gap analysis included a:

- Vision that articulates what was desired for each key direction
- Current state of what exists
- Gaps in essential elements
- Issues to address to fill the gaps
- Opportunities and suggested responses to the fill the gaps
- Conclusions regarding the gaps, issues and opportunities

In addition, the gap analysis considered the "big picture" by taking the findings from all the individual key directions and considering them in a integrated manner.

While a considerable proportion of the required components already exist to some degree or other, a detailed analysis by individual key direction identified significant gaps in Canada's current health infostructure initiatives. A summary of that analysis follows.

The Gaps

Health Information for the Public - The public sector has a limited presence in providing health information to the public in an electronic form - the most notable effort in Canada is the Canadian Health Network. The private sector on the other hand, especially US firms, have entered this market with highly capitalized ventures providing dynamic, graphic information content. The criticism leveled at these private sector initiatives is whether their health information can be trusted, especially if it is "sponsored" content. Neither the public or private sectors have integrated their electronic health information provided to citizens with other health services. In addition there is still a significant lack of information available on certain subjects or topics, for population group (e.g. Aboriginal populations) and in French.

Information for Health Service Providers - The public sector has a limited presence in providing electronic information to health providers like physicians, nurses and pharmacists. In addition, many health providers have limited ability to use computers and information technology, and thus are not strong proponents of their use in their practice. While information technology offers new opportunities to providers for improving their practices and service delivery through increased standardization, for example, the necessary support for change-management is often lacking. As a result, information technology use is not well integrated with practice. For health providers electronic information is not as extensive as paper – there is still missing information, by subject, by population group and for specific uses. There are no trusted health information standards for providers – either for content or by source.

Clinical Decision Support - Tools to support clinical decisions are still in the early stages of evolution. Coupled with low provider use of information and technology generally, there is limited availability of clinical decision support tools. Where they are available they are still not well integrated with practice.

Electronic Health Record - The electronic health record is seen as critical to the successful integration of health services, in Canada and elsewhere. However , limited skills in the use of electronic information and technology, coupled with limited electronic collection of health information by physicians and nurses at the point of care, are barriers to the implementation of the electronic health record. In addition, the "building block systems" (e.g. hospital, community clinic, long term care, physician office, laboratory and community pharmacy systems) necessary to provide the clinical data are either not in place, or have been implemented inconsistently. As a result, clinical data repositories (which bring together information on patients) and electronic health record systems (applications that allow providers to view into the clinical data repository) are rarely implemented. Finally, the necessary standards have yet to be fully developed in Canada to allow the Infostructure "building block systems", the electronic health record, and ensure privacy and security.

Health Surveillance - Systems are needed to identify and track health surveillance alerts, but they require essential "public health" building block systems. However, those building blocks are not in place for either health surveillance or the electronic health record. And the standards necessary for health surveillance are not complete.

Selfcare/Telecare - At the time of writing this report, Selfcare/Telecare services existed provincially in New Brunswick and Quebec, and there is limited implementation in at least 3 other provinces. Selfcare/telecare services are provided as a "standalone" service with very limited integration with "health information for the public" initiatives or with the broader continuum of care. The selfcare/telecare information systems being used today are not integrated with other clinical systems or an electronic health record system and the information and data standards to ensure a consistent implementation of the service across Canada are not in place.

Telehealth - Telehealth is being implemented in a piecemeal fashion across Canada. There is currently no clear strategy for remote, rural and Aboriginal communities where the business case exists for telehealth services. There has been limited deployment of high bandwidth telehealth because of the significant cost involved. Finally the policies to enable telehealth are still not in place, especially provider reimbursement, clinical accountability and professional licensure. Regardless, telehealth implementations are increasing across the country, with significant increase in activity in the past 24 months.

Health Data Holdings - There are national and provincial data holdings in place today and there is a significant effort underway to keep them current. However, the entire process of moving appropriate data from local or point of care sources to these data holdings is very inefficient. The tools to consistently and rapidly extract, transform and load data from the clinical data repositories, or the routing systems to send the data to local, provincial and/or national data holdings are not in place. Finally, many data holdings are missing (e.g. for accountability purposes) or are of limited quality for research and analysis (e.g. medical claims data holdings)

Data Analysis and Reporting - The use of the health data holdings for analysis and reporting is a critical requirement to enable evidence-based clinical decision-making, improved management decisions and increased accountability of the health system. However, the state of data analysis and reporting processes represents a major gap.

Privacy Protection - At the time of writing, the major gap is the lack of harmonized privacy legislation across Canada. ACHI and Health Canada are jointly working in that regard. Such a harmonization would provide the basis for consistent policies that would ensure the Infostructure is developed in a way that protects individual privacy, while supporting more effective use of information systems in health care delivery.

Infostructure Standards - Many health infostructure standards exist and some like HL7 are becoming international in their use. In Canada there is still no "end-to-end" process to co-ordinate local, provincial, national and international standards development, implementation and maintenance. An electronic health record standard does not exist – a service event standard that forms the basic building block of the record has yet to be agreed upon. The security standards (e.g. PKI) especially for the electronic health record are not in place. Finally a "forum" to mandate the use of health information and technology standards does not exist in Canada.

Infrastructure in remote, rural and Aboriginal communities – Information and communication technologies require infrastructure that is appropriate to local needs and circumstances. This includes equipment, technical support, human resources capacity, training and upgrading and management. In many remote, rural and Aboriginal communities, this infrastructure is insufficient, or even totally absent. In addition to which the lack of affordable communications bandwidth is often a major barrier to the introduction of ICTs, such as telehealth and telemedicine applications.

Issues

The identified gaps have to be viewed within the context of a number of relevant issues as these may influence the direction of the Infostructure.

Private Sector Involvement - The private sector in the USA is a powerful player in the field of provision of electronic health information. As a result, it is rapidly shaping the way in which electronic health services are delivered. This is happening in Canada also, but to a lesser extent. The major players in this market are highly capitalized and are rapidly extending the provision of health information to include sophisticated health business transactions using the Internet and web-based technologies. Sophisticated health "portals" that provide fully integrated "one-stop" encounters for health professionals as well as the public are garnering a lot of attention. Consequently, it will be vital to engage the private sector in the development of the Infostructure.

Change Management - The change management required to create an electronic information culture in the health sector is significant and should not be underestimated. Many initiatives' failures lie in the lack of recognition of the human component to successfully implement information and technology. This is particularly true for the major health professions in Canada (e.g. physicians and nurses). Attitudes, working relationships and work practices will need to adapt. This is no small undertaking on the scale required to attain the vision proposed for the Infostructure.

Cost and the Return on Investment - The cost associated with the implementation of the required technologies is significant. In addition, the benefits from implementing some technologies are not always well proven. Further, past experience has shown that large investments in health information and technology in Canada have not always been very productive. This contributes toward the reluctance by many senior decision-makers to commit the required monies to health information and technology initiatives.

Gap Analysis Conclusions

Until the use of electronic information and technology becomes a normal and accepted part of health professionals' culture and everyday practice, its benefits will never be fully realized. Initiatives should concentrate on motivating health professionals to use and see the benefit of electronic information and technology whilst integrating it with everyday practice.

There is a bewildering array of information, leading to a situation where there is both "too much and too little" In the former case, information needs to be better compiled and organized so it is easy to use; in the latter case, information needs to be collected in ways that are effective and support front-line health service delivery.

Many of the required elements (technology, software, standards) for the Infostructure are missing. In particular the electronic health record remains to be defined and developed. A collaborative effort needs to be undertaken in that regard, including the supporting technologies.

The public sector needs to provide leadership in responding to health information and technology needs. Governments need to do this by ensuring the information and the technology is accessible, relevant, user-friendly, supports selfcare/telecare, can be trusted and is supported by appropriate standards.

TACTICAL PLAN DIRECTIONS

As a result of this analysis, based on technology trends; and consistent with the responses of jurisdictions regarding gaps, ACHI needed to determine what was needed to move Canada forward. The following criteria were decided upon to determine the selection and focus of the initiatives to be included in the Tactical Plan.

Selection Criteria

- **Critical for Future Health System Success:** the key initiatives must be a fundamental and critical requirement for an integrated health system (e.g., the electronic health record is central to the future success of the Infostructure).
- **No Sponsor Exists and a National Focus is Required:** the initiatives needed to have a national focus, and a sponsor who is able to lead their implementation in an integrated manner.
- **Probability of Success is Improved:** in order to achieve success a small number of manageable initiatives were identified - three were selected.
- **Moves the Stakes Forward:** the tactical plan initiatives have to balance the requirement for incremental progress with a need to transform the client-provider relationship with the use of electronic technologies.
- **Aligned with Existing Initiatives:** the tactical plan initiatives need to complement existing federal, provincial and territorial infostructure projects.

The Tactical Plan Initiatives

The Advisory Committee on Health Infostructure concluded that the Tactical Plan should focus on three broad areas:

Health Information for the Public - a portal that could provide comprehensive and trusted health information to support selfcare decisions. This initiative would build on the success of the Canadian Health Network and be strategically linked to providers (e.g. via the provider portal), to provincial/territorial selfcare and telecare services and to local, regional directories to guide the public when seeking services.

Integrated Provider Solutions - a portal for providers [e.g. physicians, nurses, pharmacists], that would provide "end-to-end" business, information and technology services. Initially the

portal could focus on physicians and would have appropriate linkages to other "regional" information systems, including telehealth and clinical decision support services.

Electronic Health Record - develop and implement the electronic health record and associated building block systems, taking into consideration the required privacy, data and technology, standards and security processes. The focus of the electronic health record could be, for example, on a minimum data set longitudinal health record, that could be applied across the continuum of care. Special consideration should also be given to investing in locations where the basic systems infrastructure is inadequate – especially in rural, remote and Aboriginal communities.

Health Information for the Public

The Health Information for the Public initiative could consist of the following elements:

Canadian Health Network - the objective would be to significantly enhance the Canadian Health Network to become the trusted health information portal for the Canadian public, in both official languages. The Canadian Health Network today is primarily a directory service. It needs to evolve to a portal with a comprehensive set of services. New subject areas would be created, including dynamic news and information feeds, real-time discussion groups, live chats and expert presentations – most likely in partnership with an existing private sector vendor using a "private labeling approach". There would be an emphasis on information of relevance to Canada's Aboriginal peoples. An innovative approach could be for the CHN to *co-brand* with other health organizations across Canada, thereby including information on local services and how they can be accessed. Finally, the portal would link to provincial selfcare/telecare services and the physician portal.

Selfcare and Telecare Services - strategically linked to the Canadian Health Network, the introduction of provincial/territorial call centres that would provide telephone and online triage services and selfcare information and advice to the public. Some of call centers could serve multiple jurisdictions. This would build on existing initiatives in Quebec and New Brunswick by providing these services in a consistent and comprehensive manner across the country.

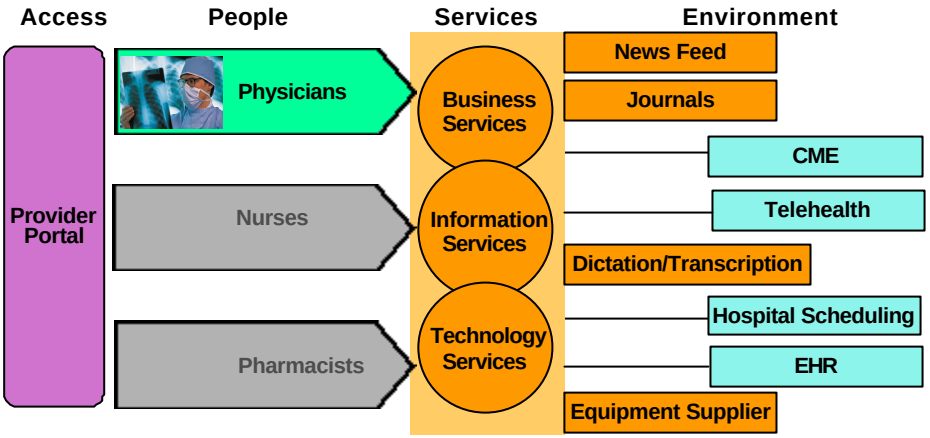
Health Information Standards - to ensure information credibility, develop and maintain a Canadian "Trusted Health Information" standard, including the criteria for site and content certification.

Integrated Provider Solutions

The Integrated Provider Solutions initiative could consist of the following elements:

Provider Portal - the objective would be to significantly improve the ability of providers to access and use electronic information and technology. One approach could be to develop a provider portal that would initially focus on physicians and would provide "end-to-end" business, information and technology services. The aim would be to connect a significant number of physicians across Canada in about 5 years. The portal would have appropriate linkages to the health information portal for the public, local and regional health information systems such as hospital, community health centre, Aboriginal health information systems, telehealth and clinical decision support services. This initiative would need to consider issues related to physicians requirements (e.g. hardware, software, communications, training and support as well as system integration – provincial and/or regional information systems).

A portal approach would provide integrated business services (e.g. online access to electronic health records, hospital scheduling, CME, purchasing), information services (e.g. online access to medical news, journals and academic research, medical discussion groups) and technology services (e.g. online access to the Internet, hospitalscheduling, clinical decision support tool). As shown in the diagram below some of these services could come "bundled" with the portal (e.g. news feed), while others would need to be "interfaced" to the portal (e.g. CME)..The final design would allow a great deal of flexibility



Clinical Decision Support Tools - the gap that was identified with clinical decision support tools is not so much their availability, as their "culture of use" in Canada. In part this is due to the lack of focus on provider and health system accountability in Canada, when compared to some other nations. Given these findings and the lack of automation of key provider groups like physicians, clinical decision support tools need to be supported in a manner that can foster a culture of increased use and accountability within health organizations. Ways also need to be found to integrate these tools into the work processes of busy health professionals.

Tele health Implementation - the key gaps identified for telehealth are the lack of policies for licensing and reimbursement across borders, as well as the speed of technology diffusion in remote and rural communities, where the most benefit can be obtained. The objective for this initiative would be to accelerate the implementation of telehealth technologies in remote, rural and Aboriginal communities across Canada (note: there are approximately 250 telehealth sites in Canada at the time of writing). In addition, national standards would need to be instituted to ensure the interoperability of products from the different vendors. Finally, telehealth services would also be made available via the physician portal.

Electronic Health Record

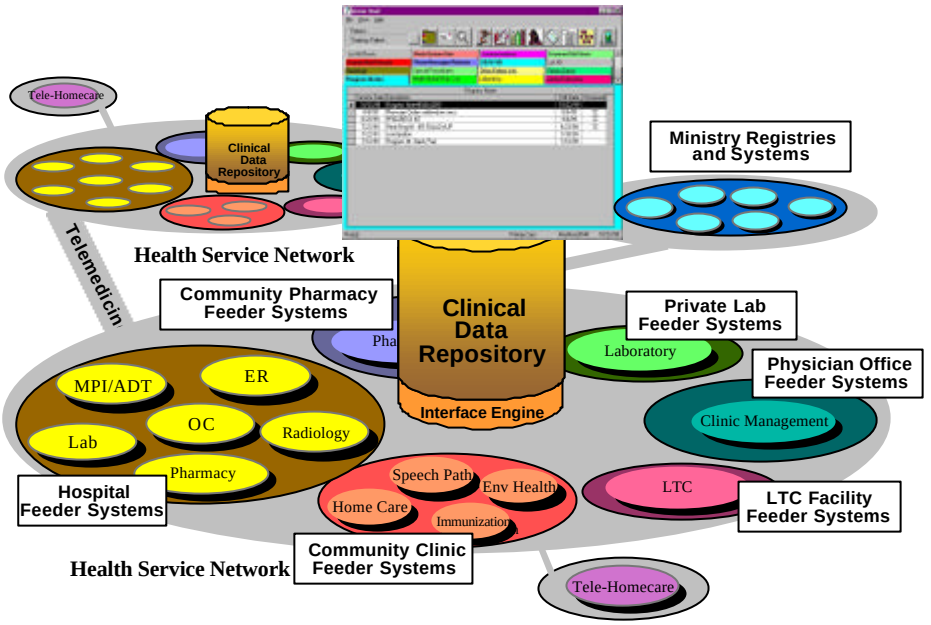
The third initiative is the Electronic Health Record. One approach is shown below, and would consist of five parts:

Electronic Health Record Implementation - the focus would be on deploying electronic health record technologies within selected health service networks across Canada, including rural, remote and Aboriginal communities. One approach could be to use a core data set to

"drive the design and deployment" of the electronic health record. This would include addressing issues of privacy harmonization and standards. The implementation would interface key "building block systems" already in place in hospitals, community health centres, long term care facilities, physician offices, community pharmacies, laboratories and other key provincial registries to clinical data repositories and electronic health record systems within these health service networks.

The Electronic Record System would require the following elements:

- Data "feed" from for example Hospital, community clinic, Long Term Care, Physician Office, Private Laboratory Community Pharmacy as well as Ministry of Health registries and information systems within a health service network.
- A clinical data repository and interface engine with interfaces to the building block systems.
- An electronic health record system that can view the health data about a person from the clinical data repository.
- Access to this environment could be made easier via a provider portal which contains directory, metadata and access control services.



Health Surveillance - to date the focus has been on a number of pilot projects: the Canadian Integrated Public Health Surveillance (CIPHS) focusing on laboratory, immunization and communicable disease tracking; the Global Public Health Information Network (GPHIN) for global disease environmental event tracking; and SPHINX a spatial data decision support tool for public health analysis and reporting. For the next 3 years the Health Surveillance project will focus on the development and deployment of the "public health building block systems" necessary to support the population of the electronic health record, as well as the routing of data to health surveillance tracking and alert system (e.g. for communicable disease outbreaks).

Data Holdings – a data holdings initiative would serve complement the Roadmap Initiatives currently being led by the Canadian Institute for health Information. It would design and develop processes for managing (e.g. editing, anonymizing, etc) the data from produced by the electronic health record initiative and routing that data to data holdings where it would be accessible for approved research, analysis and reporting purposes.

Privacy Harmonization, Security and Electronic Health Record Standards - the Privacy Harmonization, Security and Electronic Health Record Standards project will develop a national approach to health information privacy to ensure consistency across jurisdictions. It will also develop the security standards and design the PKI infrastructure necessary to protect personal health information. In addition an Electronic Health Record standard will be developed that defines the data elements that constitute the shared record, identifies the classification and coding systems to be used, the standard messages to feed the electronic

health record and subsequently the national data holdings, as well as the security standard to ensure that privacy is protected. This project will build on work already done internationally and within Canada that is being coordinated by the Canadian Institute for Health Information.

Benefits

The benefits of implementing the Tactical Plan would be to:

Empower Canadians with reliable health information and a clear set of health care choices - by providing comprehensive and integrated public information, selfcare and telecare services.

Enhance the Quality of Care Provided to Canadians - by making available, longitudinal health record information at the point of care, evidence based clinical practices to health care providers, as well as information and tools to support providers in remote and rural regions.

Demonstrate Better Management of Health Care Costs - by reducing duplication in provincial/territorial/federal infostructure investments and sharing what works.

Improve provider and health system accountability - by enabling health care providers to improve the level of care, by assisting agencies within the health system to better manage resources and by helping patients and the general public to better understand decisions they make about their health and the health of their families.

Operate within a secure and trusted environment that respects personal privacy - by promoting and supporting a harmonized privacy protection approach , and by promoting national standards such as would be the caser for the electronic health record and its related security requirements.

STAKEHOLDER CONSULTATIONS

In order to obtain guidance and gauge the reaction to the Health Infostructure Blueprint and Tactical Plan, the Advisory Committee on Health Infostructure undertook a targeted consultation with over 100 stakeholders in August and September, 2000. The consultation was intended to get a representative collection of feedback from federal, provincial and territorial governments, health regions, health districts and health facilities, as well as provider organizations and individual providers. This was obtained by reviewing each of the three key initiatives in the Tactical Plan and asking the following questions:

- Does the key initiative make sense and should it be pursued?
- What factors (opportunities and impediments) need to be considered as the key initiative is implemented?
- How does the initiative "fit" with existing national and provincial infostructure initiatives?
- Who needs to be involved in the implementation of the key initiative?
- Do you have any information to support the cost of the key initiative?

Consultation Results - Health Information for the Public

There is general support for the Health Information for the Public initiative, but of the three key initiatives in the Tactical Plan it is seen as the third area in which to make a significant investment. The Health Information for the Public initiative was viewed positively because it provides benefits directly to the public in a practical manner that integrates local, provincial and federal projects already underway. In particular, the co-branding of the Canadian Health Network with local and provincial health organizations was seen as particularly beneficial.

Factors that need to be considered in the implementation of this initiative include:

National Approach - a national approach to a consumer health portal is required to achieve economies of scale and avoid every health organization developing their own portal. However, there is concern that funding spent on a consumer health portal may be better spent on other initiatives that would more directly impact on health care quality.

Local Approaches - the Canadian Health Network co-branding approach received very positive reactions. However, the Canadian Health Network has to allow local customization and/or local addition of content - a generic portal for all Canadians is not suitable

Private Sector - it is widely recognized that the Canadian Health Network needs to be capitalized for the long term and significantly enhanced. There is a strong feeling among stakeholders that the Canadian Health Network will need to partner with the private sector if it hopes to keep pace with private-sector consumer health portals. In addition, some stakeholders believe that a consumer health portal needs to be arms-length from government.

Impact of the Canadian Health Network - the Canadian Health Network needs to become evidence driven. Stakeholders questioned whether the impact of the information provided today is known. Does the Canadian Health Network impact the selfcare decision making of Canadians in a positive manner?

Canadian Health Network Marketing - the Canadian Health Network has to be marketed. Currently, the Canadian Health Network has low visibility. It has to be front and centre in the public's mind - many said "it needs to be marketed like "Participaction". The Canadian Health Network and its content also needs to be positioned in other media - the Health Network on television and in print media - not just the web medium.

Users of the Canadian Health Network - it was unclear to stakeholders whether consumers have been adequately consulted about the Canadian Health Network and if it meets their needs. An important user group of the health system - the uneducated, the poor and children, are not seen as high users of the service and require other avenues to obtain information. Further, a bilingual portal is required (i.e. not just translated English content), and a special focus needs to be placed on health information for Canada's Aboriginal peoples. This latter would need to be developed with their full involvement. .

Selfcare/Telecare Services - selfcare/telecare are seen as a provincial services because they are directly tied to the delivery system, which is provincially governed. Standards for telecare need to be nationally developed, but these are not in place today. Finally, if selfcare/telecare and consumer health portal services are to be integrated, "signoff' will be required from professional groups, especially physicians and nurses.

Trusted Health Information - there is strong agreement that trusted health information is required, but that this is very difficult to attain. It is unclear if a cost-effective approach exists to certify sites and monitor information quality. The current approach used by the Canadian Health Network (i.e. internal quality control) may be all that is affordable.

The Health Information for the Public initiative was seen as a way to empower consumers and as being a good fit with where stakeholders want to go. However, the initiative needs broad stakeholder involvement and there is a feeling that the existing model for the Canadian Health Network will need to evolve in line with the directions proposed in this Plan.

Consultation Results – Integrated Provider Solutions

There is general acknowledgement that the Integrated Provider Solutions initiative would be beneficial. However, the support is contingent upon having an electronic health record in place first. It was widely recognized that an attitudinal change, accompanied by change-management processes are required in provider use of electronic information and technology, but caution would need to be exercised when determining the scale and implementation approach for this initiative.

Factors that would need to be considered in the implementation of this initiative include:

Physician Use - the physician portal solution is attractive and, if the right incentives were in place, would be used. Physicians clearly recognize the requirement to increase their use of computer technology. However, the provision of information is not enough. The key to physician use would be an electronic health record, especially where laboratory and medication information is provided.

Physician Involvement - for physicians to use computer technology there will have to be a major training and change-management process to support its introduction. The issues of who owns the initiative, the portal, and the information and to what degree physicians will contribute data to an electronic health record are still outstanding issues that will need to be resolved. Finally, any introduction of physician portals and electronic health record systems will need to consider the integration of a number of existing systems within the physician's office.

Project Scope and Approach - the scope and scale of the physician portal project is seen as too large and is still faced with some significant security issues (e.g. PKI) if electronic health record systems are part of the solution. In some provinces, the timeframe to complete this project would be 5-6 years, minimum. The key to success with this project is physician buy-in and use. Physician organizations indicated that they would want to take the lead and also involve the private sector.

Clinical Decision Support - there was agreement from some groups interviewed that a major investment in clinical decision support is not warranted at this time. The provider motivation is still not there. However, it is recognized that this area is important and still needs to be supported.

Telehealth - many stakeholders indicated that the concept of telehealth is starting to blur with what is now becoming eHealth. It was recognized that the use of tele-conferencing technologies has increased in the past 2 years with about 250 sites in Canada today. However, lack of telehealth standards is an issue, licensure and reimbursement still major barriers to use and telehealth is not yet web-based. There was support to accelerate the investment in telehealth, especially to rural, remote and Aboriginal communities.

The Integrated Provider Solutions initiative was seen as a way to trigger the deployment of electronic information and technology within professional groups, such as physicians. The initiative is seen as being a good fit with where professional groups and health organizations want to go. However, the initiative needs to be led by the professions (e.g. physicians) and most likely with private sector involvement if it is to be successful. Finally, to ensure use, the deployment of provider portal solutions should only occur only where an electronic health record system is being implemented.

Consultation Results – Electronic Health Record

The Electronic Health Record initiative was seen by the stakeholders consulted as the place to start. It was recognized that there is frustration within the health care community that electronic health record systems are not yet in place. There was agreement that while electronic health record implementations are complex and difficult, they must be done and are of the highest priority. Stakeholders feel that this initiative has to be part of a long-term strategy that extends well beyond the initial 5 years.

Factors that need to be considered in the implementation of this initiative include:

Project Approach - an electronic health record project needs national coordination and will need clear objectives and outcome if it is to be successful. A complete longitudinal electronic health record implementation is not possible today – so it will need to be done in stages. The core data set approach is seen as a desirable way to start because this will quickly define the scope of the project, including what the electronic health record will be used for and by whom. However, the project should not proceed without a major change-management dimension, as well as the development of a national set of relevant data, application, technology and security standards.

Provider Involvement - physician involvement is critical, but could be difficult. Physicians would be reluctant to contribute data for an electronic health record if that same data was to be used for other purposes. Some stakeholders questioned whether the collaborative provider networks needs to support the deployment of an electronic health record exist.

Filling the Gaps - a critical consideration when developing and deploying the EHR will be to address the requirements of locations where the basic systems infrastructure is inadequate – especially in rural, remote and Aboriginal communities.

Ownership, Control and Access - an over-riding issue will be who "manages" the record, its content and its access. Privacy and security will remain tough issues. In some provinces the record needs to be more than a health record (e.g. include social services) to be useful. Further, in some provinces there are legal restrictions as to where repositories of clinical data can reside (e.g. Quebec clinical data repositories have to be located in hospitals). Finally, for Aboriginal communities, the critical issues of data ownership, control and access will need to be adequately addressed.

The Technology - the missing building block systems, clinical data repositories and electronic health record systems are still a major gap, primarily because of the lack of funding to develop and acquire these systems. However, there is a concern that there are only a few clinical data repository and electronic health record systems in the market that are "open" enough to allow a publicly-funded, "enterprise" electronic health record to be created.

Standards - stakeholders recognize that standards are the key element to having a viable and effective electronic health record, that can be shared across the continuum of care. This work should be commenced as soon as possible.

Health Surveillance - an integrated process for national health surveillance (i.e. tracking and alerts) is supported by stakeholders for communicable diseases and outbreak control. However, it would need to be evaluated more carefully for chronic diseases.

Consultation Conclusions

In addition to providing comments about the 3 key initiatives outlined above, many stakeholders also stated that the initiatives need to be presented to stakeholders, and Canadians in an integrated manner, and not as different pieces. The example below illustrates a possible approach. However, as stated earlier, the predominant view of stakeholders was that the development and implementation of the Electronic Health Record was the starting point and the key building block for an integrated, pan-Canadian health infostructure.

EXAMPLE:

An Integrated Approach

The client (mother with child) could obtain access to selfcare information via a selfcare handbook or a consumer health information portal. Alternatively, the client could access her physician or a triage nurse directly, either by phone or by computer. The physician, supported by a physician portal, and the nurse by a nurse portal which would be interfaced to an electronic health record about the client. In addition, via their respective portals the physician and triage nurse could access the consumer health information portal to support the client's selfcare decision making.

CONCLUSIONS AND RECOMMENDATIONS

A Collaborative Approach

Within the Canadian health system, there is agreement by health care providers and health administrators that the strategic deployment of health information and communications technologies (ICTs) can improve the ability of all stakeholders to make informed decisions about health, health care and the health system. More importantly, there is a shared view that progress will only be made if the infostructure is implemented in a collaborative manner. Based on the findings of the stakeholder consultation process outlined earlier in this document, as well as from the direction and advice of members of the Advisory Committee on Health Infostructure, it is clear that:

- All three priority directions proposed in the Tactical Plan should be acted upon by governments.
- Notwithstanding the importance of all three initiatives, the Electronic Health Record needs to be actioned first in order to accelerate the integration of the health system. The development of an Electronic Health Record is essential to allow the development and implementation of integrated health care provider solutions and to allow for substantive gains in the area of health information for the public.
- Standards, security and protection of personal health information are critical areas that require concerted action by all levels of stakeholders and governments.
- Actions need to be taken with regard to health information to the public and integrated provider solutions.

Considerations

There are a number of important considerations that must be taken into account in order to assist the Advisory Committee on Health Infostructure move toward implementation of the recommendations that are listed below.

- Consideration needs to be given to the status of initiatives in the provinces and territories: whether they are at an advanced stage of development or just beginning.
- Consideration needs to be given to a balance of initiatives, in urban, rural, remote and northern regions. It is important to remember that improved access to services will be a major benefit resulting from these initiatives, and that will depend to a great degree on gains being made specifically outside the urban centres.
- The implementation of the recommendations that follow should not necessarily be sequential. The health infostructure is made up of interdependent building blocks, which will need to be developed concurrently in mant cases. This will be particularly important for standards and privacy and security issues – they will need to be addressed in concert with those of the Electronic Health Record.

RECOMMENDATIONS

The following recommendations reflect, according to ACHI, the necessary steps for making significant advancements in the development of the pan-Canadian Health Infostructure.

Electronic Health Record

The development of the Electronic Health Record requires investments in the following areas:

- A systems infrastructure.
- Health care information systems.
- Interface engines to and from health information systems, clinical data repositories, and associated electronic health record viewers.

Systems Infrastructure - no investment in EHR and associated systems will have the desired impact without a commitment to the development and maintenance of a sufficiently robust technology infrastructure. Infrastructure in this case includes telecommunications (i.e. wiring, cable, satellite communication, etc), hardware (i.e. computers, servers, etc) and human capacity (i.e. trained personnel).

There are currently jurisdictions where this infrastructure is not in place, or insufficiently so. This is especially true in some rural, remote and Aboriginal communities. If all jurisdictions across Canada are to move forward and support the provision of health services electronically, they will need to invest in such basic systems infrastructure.

> ***Recommendation 1****: as part of the Electronic Health Record implementation, investments are required in locations where the basic systems infrastructure is inadequate – especially in rural, remote and Aboriginal communities.*

Along with the issue of systems infrastructure lies the equally important issue of developing the human capacity and change-management processes. Efforts, be they in urban, rural or remote communities must be undertaken with the needs of the people involved foremost in mind.

> ***Recommendation 2****: as part of the Electronic Health Record implementation, enable and support the change management process with the roll-out of the new technologies and processes with health providers.*

Health Care Information Systems - these are information systems used to support the provision of health care: they include hospital, community clinic, long term care, physician office, laboratory, diagnostic, and community pharmacy systems, as well as Ministry of Health registries and systems. These 'building block' systems are required to provide the data that will populate the electronic health record core data set. For the initial implementation of the core data set (i.e. demographic, registration, laboratory, diagnostic and medication data) the necessary registration, laboratory, diagnostic and drug information systems would need to be in place. For example, in a province like British Columbia the required health information systems to implement the initial electronic health record core data set are commonly in place and include the Ministry of Health's client registry and drug information system, health region registration/ADT, laboratory, diagnostic and pharmacy

systems, as well as private laboratory information systems. However, an additional investment is required in provincial provider and facility registries and standard interfaces to ensure the core data set is populated completely and in a standard manner. Depending on the jurisdiction, varying levels of investment will be required in the 'building blocks of the health information systems' before any meaningful EHR development can take place.

> ***Recommendation 3****: that the necessary funding be provided to accelerate building block system development in provinces and territories for core EHR dataset elements, using national standards and interfaces.*

Electronic Health Record Solutions - the consultations showed a willingness and readiness by many provincial and health region representatives to implement electronic health record technologies. However, while this demand exists, the underlying issues (organizational, human capacity, processes, data, technology and project issues) still need to be addressed, and they are not minor by any definition. As a result, implementation locations for the electronic health record need to be selected carefully. At a minimum, locations where electronic health initiatives are underway or about to commence should serve as reasonable starting points to develop electronic health record concepts – which can then be replicated across other Canadian settings. Some jurisdictions have been working on electronic health record systems for some time and others are well positioned to move forward – Newfoundland and Labrador (single vendor institutional system across the province), PEI (IslandNet), New Brunswick (CSDS and single vendor institutional system across the province), Quebec (McGill/Laval), Saskatchewan (Regina and Saskatoon) are some examples where existing infrastructure and/or electronic health record projects could be easily leveraged. National co-ordination and national investment are needed to foster the development of these solutions in a consistent way that can be replicated in other jurisdictions.

> ***Recommendation 4****: that the initial electronic health record implementations be coordinated and fostered in locations that have much of the required information and communication technologies infrastructure in place and can display the required level of leadership and organizational commitment to make the implementation a success.*

Standards and Security

Standards and Security

Standards:

Information and technology standards have been identified as a key building block in the development of EHR. These standards enable the exchange of information and the interoperability of EHR and its support systems. Any investment in EHR must include the identification of an appropriate organization to review, recommend, distribute and maintain standards for various components of the EHR.

More specifically, if the EHR implementation is to be successful there is a specific requirement for a national set of approved standards related to the EHR. Of paramount importance is an expandable electronic health record core data set that, at a minimum, should include standards for demographic, registration, laboratory, diagnostic and medication data,

but that might also include communicable disease, immunization, community and continuing care and mental health data. These future incremental additions to the core data set would enable the electronic health record implementation to be extended across the continuum of care. There is also the need for the adoption of electronic health record data messaging standards that support the exchange of data in a structured format between systems and the adoption of technology standards as well as the development and adoption of security standards.

More generally, and beyond the development of the EHR, an investment needs to be made in a standards development, coordination and implementation function to coordinate the development and adoption of health information and technology standards from local and Canada-wide levels, and with international jurisdictions.

In Canada, F/P/T governments, through the Canadian Institute for Health Information (CIHI) have moved the health information and technology standards agenda significantly forward. However, this work needs to be expanded so that a national coordination function is implemented to support a pan-Canadian Health Infostructure, including Electronic Health Record implementation. At a national level, CIHI has led the development and adoption of core data sets, health data messaging standards, as well as technology and security standards for the health industry. Internationally, CIHI provides the liaison to HL7 via its operation of HL7 Canada, as well as to the International Standards Organization (ISO) through its partnership with the Canadian Standards Association.

> ***Recommendation 5****: that an immediate investment be made in accelerating standards development and the implementation of a national health information and technology standards coordination function, through CIHI, as well as investment in the implementation and use of standards within the local, provincial, territorial and federal health organizations that participate in the development of a pan-Canadian Health Infostructure.*

Security:

Health system communications can involve the transfer of sensitive personal health information. In order to support the secure movement of this health information within and across the pan-Canadian Health Infostructure it is necessary to authenticate and verify the parties involved in sending and receiving the data -- a Public Key Infrastructure (PKI) is required. The PKI is centred on “public’ and ‘private’ encryption/decryption keys working together in pairs to secure the exchange of sensitive data through a trusted third party or

Certification. While the Canadian Institute for Health Information has completed much of the detailed work to define the requirements for a Public Key Infrastructure in health, a national approach involving the cross certification of certificate authorities has yet to be put in place.

> ***Recommendation 6****: that a comprehensive approach to securing health information, including public key infrastructure, be supported across Canada.*

Privacy:

Canadians believe that improvements can be made in their health status by enhancing the management of health information, which includes the use of national information sharing initiatives/arrangements, as well as the use of new information and communication technologies. However, they also demand that this be done in a manner that protects their personal health information. Further, they believe that there is a need to recognize the importance of establishing the appropriate balance between an individual's right to keep their personal health information private and the benefits to Canadians that are derived from improved access to, and use of, health information by authorized persons, on a strictly need-to-know basis, to ensure effective health services, improved patient care, improved public health measures, and the maintenance of a health system that is sustainable, effective and efficient. The Advisory Council on Health Infostructure, in its 1999 report entitled: *Canada Health Infoway: Paths to Better Health*, identified improving privacy protection within the health sector as one of four strategic goals for the development of the pan-Canadian Health Infostructure. Furthermore, the Council recommended that jurisdictions harmonize and strengthen the protection of personal health information. This commitment to a consistent, Canada-wide approach has been re-affirmed at different stages in the current development of the health infostructure.

> ***Recommendation 7****: that an approach that is respectful of the rights of Canadians regarding the protection of their personal health information, and respectful of agreed-to standards, be implemented in all jurisdictions of Canada to enable the effective exchange of information when required.*

Health Information for the Public and Integrated Provider Solutions

Health Information for the Public and Integrated Provider Solutions Initiatives - Health Information for the Public and Integrated Provider Solutions are important initiatives that need to be pursued. However, consideration needs to be given to the timing and the approach associated with these initiatives. It is understood that there are currently pockets of work already underway in these areas by federal, provincial, regional, local health bodies as well as medical professional organizations. Although the Electronic Health Record remains the first of the three initiatives that needs to be developed, it is essential the ACHI continue to work towards developing national level working models in the other two areas.

As a consequence, it is important that the ACHI, as a first step undertake to work with Health Canada and other national bodies to determine what are the strategies they are working with in these areas.

> ***Recommendation 8**: that ACHI continue to evolve its strategy with respect to Health Information for the Public by reviewing with Health Canada its strategy as it pertains to the Canadian Health Network. Likewise, that ACHI should identify the needs of the provider community for integrated provider solutions with particular reference to implementing Electronic Health Records.*

In closing, it is important to stress that the above recommendations must be considered as a whole, because they are the basic building blocks for a pan-Canadian, inter-operable Health Infostructure. The challenge of federal, provincial and territorial governments will be to develop and implement the components of that infostructure in a collaborative and mutually beneficial manner. That goal is already well underway through the activities of the Advisory Committee on Health Infostructure and the strong support accorded to this work by the FPT Conference of Deputy Ministers of Health.