F/P/T Advisory Committee on
Health Infostructure

Tactical Plan for a pan-Canadian Health Infostructure

2001 Update

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Nota:

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Introduction

THE ADVISORY COMMITTEE ON HEALTH INFOSTRUCTURE

The 2001 updated Tactical Plan of the Advisory Committee on Health Infostructure (ACHI) reflects a consensus achieved by Federal, Provincial and territorial jurisdictions on strategic first actions needed to implement the pan-Canadian health infostructure. The Tactical Plan, which is updated annually, is an important vehicle through which ACHI fulfills its on going role of providing advice to the Conference of Deputy Ministers of Health on strategic issues, priorities and tactics pertaining to the development and implementation of the pan-Canadian health infostructure. At a time when considerable work and investments are occurring across all jurisdictions on health infostructure, the need for the Advisory Committee to continue to ensure a coordinated, collaborative and pan-Canadian approach is all the more relevant and important.

THE CANADA HEALTH INFOSTRUCTURE

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, including implementation of new delivery models such as primary health care. There is a focus on improving efficiency, effectiveness, equity, 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 and their health care. It is also recognized that better information, can provide the evidence base for resource allocation decisions in the distribution of ever tightening health dollars at all levels within the health system.

The many drivers of change are commonly recognized. There is an agreement to put in place the structures and mechanisms that enable the continuous improvement of the health system. In this regard, information and technology are often identified as key enablers in meeting the challenges of the 21st century and there is a shared commitment to deploying them within the health sector in Canada.

Rising to the Challenges

At federal, provincial and territorial levels, this has been translated into numerous health information and technology initiatives. Varying considerably in scope and size, these include local systems planning projects to ambitious pan-Canadian initiatives aimed at addressing pressing information needs or introducing new technologies to improve service delivery.

While innovative work and activity are to be encouraged, we must 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 as a pan-Canadian framework or infostructure, intended to become the key information and communications foundation for the Canadian health care system. The vision for the Infostructure is provided by the document *Canada Health Infoway: Paths to Better Health*, the result of work undertaken by the Federal Minister of Health's Advisory Council on Health Infostructure.

THE NEED TO MAKE IT A REALITY

With the vision from the Canada Health Infoway report *Paths to Better Health* in place, there is now a need to plan the implementation of the pan-Canadian health infostructure in order to connect all the activities in a practical and meaningful way.

This is especially important, because at this time we are only beginning to understand the components necessary to achieve the Canada Health Info*way* vision or how the federal, provincial and territorial initiatives that are underway can contribute to it.

Consequences 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 and adopting a strategic approach to new investment. Otherwise:

Portability of information and quality of service is compromised Portability enables data and information to follow the patient and be transferred between service locations and between jurisdictions, thereby supporting both the delivery and the co-ordination of services. This is especially important for those who are among the most vulnerable in society; those who suffer from chronic illnesses and those who tend to be highly mobile and may frequently present themselves for services to different health care providers at different locations.

Accessibility and equity of service are 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 from remote areas, see inside anatomical structures as well as access and analyze massive amounts of data using sophisticated tools. However, these tools are not available to all that need to access and use them at the point of service.

Current and urgent issues are not resolved in a timely manner. The health care system is continually dealing with complex issues that need to be resolved quickly to ensure that the public confidence in the system is maintained. For example, the current concerns with medical errors or the threat of bio-terrorism must be addressed. An inadequate infostructure reduces the ability of the health system to respond appropriately.

Approaches to privacy and security are inconsistent. There is a universal need to address issues around privacy, security and access to personal health information. With no common context, individual jurisdictions are forced to develop local responses, without full knowledge about whether these responses comply with legislative requirements and national standards. As a result, the publics' confidence and trust that their personal health information is protected is in some cases weakened.

Opportunities for financial savings are lost Investment in health information and technology is significant and over the next decade it is expected to increase. It is important that this investment be undertaken in the most cost-effective manner possible. Not sharing information and technology developments creates redundancies and re-inventing of the wheel when like issues are addressed in isolation.

Development of high quality health information holdings is inhibited Without consistent standards and mechanisms for collecting health data across all provinces and territories, improved information holdings cannot be developed. Information holdings are a pre-requisite for identifying pan-Canadian health concerns, defining early responses to health risks, allocating scarce resources, conducting research and ensuring accountability.

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 a coordinated approach to implementing the pan-Canadian health infostructure benefits from strong, sustained leadership and provides an appropriate forum for discussion. The Conference of Deputy Ministers of Health, the Advisory Committee on Health Infostructure, the Canadian Institute for Health Information, the new Canada Health Infoway Inc. as well as the federal, provincial and territorial governments all have a responsibility to foster the co-operation and collaboration necessary to ensure the initiative's success.

Strategy and Detailed Plan—While the Canada Health Info*way* report provides some direction; the exact approach and methods for implementing a pan-Canadian health infostructure need to be clear. A comprehensive strategy is needed that provides this detail. This document, the Blueprint and Tactical Plan for a pan-Canadian Health Infostructure, initially developed in 2000 and to be updated annually, provides the high-level guidance in this regard.

Common Understanding—The components necessary to achieve the Canada Health Info*way* vision 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 Moves Forward

The Conference of Deputy Ministers of Health through its Advisory Committee on Health Infostructure (ACHI) completed the *Blueprint and Tactical Plan for a pan-Canadian Health Infostructure* in December 2000. It served to bring together the federal, provincial and territorial governments in a collaborative manner to articulate a set of tactical initiatives that provided focus and direction to the future health information and communications technology expenditures within Canada.

This plan – *Tactical Plan for a pan-Canadian Health Infostructure – 2001 Update* is a revision of the 2000 National Health Infostructure Blueprint and Tactical Plan and serves as a replacement for it. The objective of this new plan is to provide the Conference of Deputy Ministers of Health with:

- an update on the tactical initiatives that have occurred across Canada during the past 12

months;

- a more detailed set of tactical directions to guide their decision making over the next 12 to 24 months;

- direction for the initiatives to be undertaken by the new Canada Health Infoway Inc. and

- guidance for the other health information systems initiatives being carried out individually or in a collaborative manner, by federal, provincial and territorial governments (e.g. the National Health Surveillance initiative).

Taking Stock

It is change, continuing change, inevitable change, that is the dominant factor in society today. No sensible decision can be made any longer without taking into account not only the world as it is, but the world as it will be.
Isaac Asimov (1920-1992)

As a precursor to the development of the Blueprint and Tactical Plan, it is important to first understand the current health infostructure, both within Canada and globally. This 'taking stock' will allow us to identify the factors that should be considered in planning for the future infostructure.

THE INFORMATION AGE

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.

Information

The increasing amount, type and availability of information are 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 and what has an effect on it, as well as about the management and operation of the health system.

The enormous power of information is also beginning to be understood. At the clinical level, information supports requirements for coordinated patient assessment; treatment plans and reviews providing a basis for improving the quality and continuity of care among clinicians.

The potential benefits for decision makers and health managers include the support for planning and allocating of resources, measuring efficiency, as well as clinical audit and outcome measurement. At the community level, information can identify potential and real risks to health as well as potential contributors to health.

Technology

Technology has emerged as a major factor in shaping our environment, from the way we learn, the way we work, and to the very way we live. A more detailed description of the major information technology trends, from a health industry perspective, is provided in Appendix A. In summary they are as follows:

- **Internet**—its use will continue to increase exponentially. Security remains an issue, especially for personal health information and compliance with legislative requirements;

- **Interoperability**—systems will increasingly talk to other systems, creating a transparency of information—information can be located anywhere;

- **Demand for and access to information**—consumer and service provider demand for more information is increasing. Hand held and wireless devices will revolutionize data collection and access at the point of care;

- **Electronic health record and telehealth**—the implementation of electronic health record and telehealth solutions will continue to be limited until the issues of privacy, security, cost, reimbursement, licensure and the availability of consistent, high-quality, clinically relevant data are addressed; and

- **Standards consolidation**—a few standards will begin to dominate information and technology within the health care industry as the need for inter-operability increases—for example HL7.

CANADA

There are many relevant information and technology initiatives that are currently underway in Canada, both at a local and national level. Almost all federal, provincial and territorial governments across Canada have a strategic information systems initiative—HealthNet/BC, alberta we//net, Saskatchewan Health Information Network, Manitoba Health Information Network, Smart Systems for Health, Inforoute Santé, Nova Scotia Telehealth Network and PEI's IslandNet are all examples of these initiatives. At the federal level, Health Canada has the Canadian Health Network, Network for Health Surveillance in Canada, First Nations and Inuit Health Information System (FNIHIS) and the HISP/CHIPP projects; Industry Canada and CANARIE support ehealth and network infrastructure, and together CIHI, Health Canada and Statistics Canada have the Health Information Roadmap initiative underway.

During 2000/2001 the health system in Canada has continued to invest significantly in the health infostructure. These investments take the form of projects, commitments to regional collaboration and support for various funding and support agencies such as Health Canada's Office of Health and the Information Highway and its Canada Health Infostructure Partnerships Program (CHIPP).

Steady progress was made over the past 12 months through several key initiatives, namely;

- The ongoing progress of the ACHI and its working groups in the fields of Electronic Health Record, Telehealth, Health Surveillance, Protection of Personal Health Information, and Strategic Planning to develop the consensus and support for the design and implementation of a pan-Canadian health infostructure.

- The strengthening of commitment by the federal, provincial and territorial governments to implementing electronic health record initiatives that integrate health information and technology use across the spectrum of care.

- The continuing investment in IT systems by health regions and health service providers.

- CHIPP program funding to over 29 qualified projects many of which supported Telehealth implementations in rural and remote areas of Canada, and to electronic health record projects of a regional and collaborative nature such as Health Infostructure Atlantic (HIA) and the Western Health Information Collaborative (WHIC).

- The continued leadership of the Canadian Institute of Health Information (CIHI) to coordinate the standards development and adoption effort across Canada, including standards for unique identifiers (service recipient, service provider), electronic claims, lab tests, and minimum data sets for continuing care, primary care and mental health.

- The creation of a new organization, *Canada Health Infoway Inc.* and the allocation of $500 million to accelerate the development and adoption of modern systems of information technology in health care throughout Canada.

- The research and development work of OHIH in developing a policy framework for privacy issues, and its work on standards and integrated provider solutions.

- On-going progress of the Network for Health Surveillance in Canada including a new outbreak alert system; standards for communicable disease surveillance; and pilots now

poised for wider use, including: public health case management through the Canadian Integrated Public Health Surveillance (CIPHS) project, and ProdTox, a system for integrating existing databases from Poison Control Centres and sharing information on product-related poisonings in Canada via a se cure Web-based network.

Most of the major initiatives are funded either through provincial budgetary processes or by federal initiatives such as the Canada Health Infostructure Partnership Program (CHIPP). However many of these projects are also funded through other organizations such as health care facilities', health regions, foundations and research organizations. Together, all these local initiatives serve as major contributions to the pan-Canadian health infostructure.

The areas of focus for current initiatives, either as an expansion of existing programs or as new initiatives includes:

- **Electronic Health Records, including building block systems -** examples include New Brunswick's Teleoncology cervical screening program; Alberta's PIN, Quebec's MOXXI and IRIS projects; the Bridges to Better Child Health in B.C. Other examples; Ontario's Family Health Networks; and Nova Scotia's 32-site hospital information system; the WHIC Provider Registry; the Newfoundland and Labrador Unique Personal Identifier (UPI)/Client Registry; PEI's Common Client Registry (HIA); UPI/Client Registry project in the North West Territories. It should be noted that the increase in the number of electronic health record and building block systems initiatives can be attributed to the federal funding made available through the CHIPP program, the ongoing provincial expenditures in provincial initiatives, as well as local information systems renewal within health care facilities and health regions across the country.

- **Telehealth -** examples of initiatives include NorthNet (Ontario) expanding from 14 to 47 sites with links to Manitoba and into First Nations communities; Saskatchewan Northern Telehealth, the Health Infostructure Atlantic Tele -i4 PACS initiative; Ikajuruti Inungnik Ungasiktumi (IIU) Network in Nunavut, Telemedicine/TETRA; the Yukon Telehealth Network with care provider partners in BC and Alberta; the expansion of WestNet in the NWT to include an additional four sites and the BC Telehealth Network. It should be noted that the increase in the number of telehealth initiatives can be attributed to the federal funding made available through the CHIPP program. Development of ongoing Telehealth program such as alberta we//net and the Nova Scotia Telehealth Network continues to take place.

- **Integrated Provider Solutions -** examples of new initiatives in the past 12 months include, Canadian Doctors Network, the AMA Physician Office System Project (POSP), the Saskatchewan Medical Association and SHIN physician office pilot, the Doctor NS program in Nova Scotia, the CMA's GlobalMedic, and physician portals from Medbroadcast and Canadian Physician.

- **Health Information for the Public -** examples of new web initiatives include BC's HealthGuide (including a handbook), Calgary Health Region's "Your Health", and Medbroadcast. New telecare services include BC Nurseline, Ontario's telecare service in metro-Toronto (soon to be expanded to the entire province) and CapitalHEALTHLink in Edmonton.

- **Network and Computing Infrastructure -** While this is an ongoing activity in all regions of the country, the Smart Systems for Health initiative infrastructure investment in Ontario has commenced the implementation of its foundation infrastructure, similar to what HealthNet/BC, alberta we//net, the Saskatchewan Health Information Network and Inforoute Santé have focused on over the past few years.

As health infostructure initiatives evolve there is a clear pattern emerging of a strong movement towards regional, collaborative and standards-based activity. While provinces continue to maintain their autonomy with respect to infostructure delivery, it is clear that Canada is rapidly adopting a cooperative and collaborative approach based on achieving synergy, synthesis of common capabilities and economies of scale. It is expected that this will continue into the upcoming year and with success, jurisdictions will continue to seek out collaborative initiatives and innovative ways to fund and deliver value and share the results.

INTERNATIONAL ACTIVITIES

All western nations are faced with the same health care issues and are equally concerned about modernizing their health information systems. There is significant national information and communications technology planning activity taking place in countries other than Canada to support their respective health systems.

Canada and eight other countries surveyed have national health information and technology strategies, either in place or being developed (see table below). Further details of these activities can also be found in Appendix B.

Table 1: Activities in International Jurisdictions

	United Kingdom	New Zealand	Australia	USA	Italy	France	Japan	Germany
National Strategy	✓	✓	✓	In progress	✓	National Project	National Project	National Project
Standards	✓	✓	✓	✓	✓	✓	✓	✓
Privacy & Security 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	✓	✓	✓	✓	✓			✓

Tactical Plan

The Vision for a pan-Canadian health infostructure originates from the final report of the Minister of Health's Advisory Council on Health Infostructure. That vision states:

> *"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 of the determinants of Canadians' health."*

This vision has guided the work of ACHI in developing the Blueprint and Tactical Plan, and continues to frame the work on this update to the Tactical Plan. Information on the Blueprint components is described in detail in Appendix C.

GAP ANALYSIS

A Gap Analysis is necessary to bring a common understanding to which infostructure components are present today, which are missing, what the overarching issues are and how the health system should proceed to fill the identified gaps.

In addition, the Gap Analysis considered the "big picture" by taking the findings from all the individual key directions and considering them in an integrated manner. While a considerable proportion of the required components are already in existence, a detailed analysis identified significant gaps in Canada's existing pan-Canadian Health Infostructure. In summary the gaps identified were:

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 end of the 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 the content is sponsored. Neither the public nor the private sector has integrated their electronic health information provided to citizens with other health services (e.g. selfcare/telecare services and electronic health records). In addition there is still significant amounts of information missing that the public would like to access - by subject, for certain population groups (e.g. aboriginal populations) and in different languages (e.g. in French).

Information for Health Services Providers - Electronic information is not available in a convenient and integrated way for health providers like physicians, nurses and pharmacists. In part this is due to the limited availability of widely recognized proven solutions. In addition, health providers need to develop better skills in the use of electronic information and technology. As a result, electronic information and technology use by physicians, nurses and other health care providers in Canada is not well integrated with their professional practice. Further, there is still missing information, by subject, by population group and for specific uses. Finally, there are no trusted electronic health information standards for health service providers – either for content or by source.

Clinical Decision Support - While the potential payback is significant, clinical decision support is still in the early stages of its evolution. Coupled with low use of information and technology generally by health care providers, there is still limited availability of clinical decision support tools. Where they are available they are still not well integrated with professional practice. While there are recognized leaders in Canada promoting the use of clinical decision support tools there are gaps in the public policy required to support evidence -based care and accountability. The recent focus on quality of care and medical errors may serve to bring the required attention to improving clinical decision support mechanisms.

Electronic Health Record - The electronic health record is seen as critical to the successful integration of health services in Canada and elsewhere. However, weak health care provider skills in the use of electronic information and technology coupled with limited electronic collection of health information by physicians and nurses are barriers to the implementation of the electronic health record. In addition, the "feeder systems" (e.g. hospital, community clinic, long term care, physician office, laboratory and community pharmacy systems, public health) necessary to provide the clinical data for the electronic health record are either not in place, or have been implemented inconsistently. As a result the clinical data repositories, electronic health record systems and the associated messaging and routing infrastructure are rarely implemented.

Health Surveillance - In protecting people's health and preventing illness health surveillance requires the use of information to track emerging diseases and threats to health (e.g. contaminated food, bio-terrorism) and the integration of this information to act against these threats and remove or reduce them. A health surveillance tracking and alert system is another view into the clinical data repository – it requires a variety of "public health" feeder systems that are not in place today – for example communicable disease case management and immunization systems. As with the electronic health record, the necessary clinical data repositories, health surveillance systems and the messaging and routing infrastructure are not in place. Further, the standards necessary for health surveillance are not complete and additional work needs to be undertaken to increase the capacity of local public health practitioners to take full advantage of the information resources available to them in their everyday decision making.

Selfcare and Telecare - Selfcare and telecare services exist provincially in New Brunswick Quebec, Manitoba and more recently in British Columbia. There are limited implementations in at least 3 other provinces. At this time selfcare and telecare services are provided as a "standalone" service with only limited integration with "Health Information for the Public" or with electronic health records. Finally, there are no selfcare and telecare information and data standards in place to ensure a consistent implementation of the service across Canada (e.g. only some jurisdictions have implemented a provincial directory of health care services). Regardless, selfcare and telecare services are expanding across the country, with a significant increase in activity during the past 12 months.

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. Telehealth, like selfcare and telecare services to date has not been integrated with electronic health record systems. However, with the increased deployment of electronic health record systems and the increasing availability of telehealth technologies over the Internet the convergence of electronic health records and telehealth will begin to occur. Finally, the policies to enable telehealth are still not fully in place especially for provider reimbursement, clinical accountability and professional licensure. Regardless, telehealth implementations are increasing across the country, with a significant increase in activity during the past 24 months.

Health Data Holdings - There are extensive national and provincial data holdings in place today with a significant associated effort to keep them current. However the entire process of moving data from local sources to these data holdings is very inefficient. The tools to consistently and rapidly extract, transform and load data from the clinical systems and/or clinical data repositories are not in place. Further the pan-Canadian 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. data 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. There are significant efforts in the different jurisdictions across Canada to use health data for identifying potential health risks, as well as for planning, research and evaluation purposes. Further, there has been a very focused and successful effort by CIHI to improve the reporting of health status and health system performance to the Canadian public. Apart from the limitations of the data currently available, the major gaps include data analysis and reporting for evidence based decision-making in clinical, public health, research and management settings, as well as for health system accountability.

Privacy Protection- The major gap was lack of a harmonized approach to protecting privacy across all government jurisdictions in Canada. Currently, there are different rules in place within each jurisdiction that make the consistent sharing and use of personal health data problematic. This gap had to be closed before some of the key initiatives like electronic health records can move forward in a major way. In addition, privacy policies need to be translated into sound security policies and cost effective and robust security solutions.

Infostructure Standards - Many health infostructure standards exist and some like HL7 are becoming international in their use. While CIHI has been trying to bridge the gap with limited funds, there is there is still no "end-to-end" process to co-ordinate local, provincial, national and international standards development, implementation and maintenance across Canada. An electronic health record standard does not exist – a service encounter standard

that forms the basic building block of the record has yet to be agreed upon. Security standards especially for the electronic health record are not fully in place. Finally a "forum" to mandate the use of health information and technology standards does not exist in Canada.

Issues

The identified gaps have to be viewed within the context of a number of relevant issues that will impact and influence the direction of the pan-Canadian Health Infostructure.

Private Sector Involvement - The private sector dominates the provision of electronic health information and is rapidly shaping the provision of electronic health (eHealth) service delivery. 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 web-based technologies. The production of sophisticated health portals that provide fully integrated "one-stop" encounters for health professionals, as well as the public are proving immensely popular. In order to fill the infostructure gaps the private sector has to be encouraged to provide the solutions that are missing (e.g. community-based information systems solutions based on commonly accepted standards), that can be deployed across multiple jurisdictions and to minimize the development of custom solutions.

Change Management - The change management required to create an electronic information culture is significant and should not be underestimated. Many initiatives' failures lie in the lack of recognition of the human component to successfully implement health information and technology. This is particularly true for the major health professions in Canada – physicians and nurses. The way that health care tasks are carried out needs to be transformed; however health care providers need to be convinced that the change provides value to them. This is no small undertaking when considered on a pan-Canadian basis.

Human Resources - Linked to the change management is the need to educate health human resources in the use of health information and technology. Canada suffers from a severe shortage of health informaticians, to support clinicians and other users in the implementation of electronic health record and telehealth solutions. There are currently Health Informatics programs in some Canadian colleges and universities. However, there is a serious lack of accessible health informatics programs for health professionals who are already in the workplace.

Cost and the Return on Investment - The cost associated with the implementation of the required technologies is significant. In addition, the cost benefit of implementing some technologies has not been well established. Further, past experience has shown that investments in health information and technology in Canada have not always moved the stakes very far forward. This contributes toward the continued reluctance by many senior decision-makers to commit the required monies to health information and technology initiatives, especially in times of fiscal restraint.

Gap Analysis Conclusions

Until the use of electronic information and technology is part of the culture of health care professionals, especially for physicians and nurses, their benefits will never be fully realized. Initiatives should concentrate on encouraging health care professionals to use and benefit from electronic information and technology whilst integrating it with everyday practice.

While key components of the pan-Canadian Health Infostructure are not yet in place, efforts continue in all jurisdictions to achieve consensus regarding the design of the electronic health record, its supporting technologies and how it can be successfully implemented.

TACTICAL PLAN DIRECTIONS

Given the breadth of the Vision outlined in *Canada Health Infoway: Paths to Better Health*, the evolving information and technology trends; the activities of other jurisdictions; the identified gaps, issues and conclusions, what would be the most effective way for Canada to move forward? A number of selection criteria were used by the Advisory Committee on Health Infostructure (ACHI) to sharpen the focus of the initiatives to be included in the Tactical Plan as priority areas for first investment.

Selection Criteria

- **Critical for Future Health System Success:** key initiatives have to be address fundamental requirements for an integrated and sustainable health system. For example, an electronic health record that supports improvements in service quality, integration, effectiveness as well as health system decision-making and accountability.

- **A pan-Canadian Focus is Required:** the initiatives must address infostructure components that indeed do require a pan-Canadian focus and that need a sponsor that is able to lead their implementation in an coordinated manner.

- **Probability of Success is Improved:** in order to achieve success a small number of manageable initiatives are needed - three were selected.

- **Moves the Yardsticks Forward:** any initiatives must be strategic in addressing longer term health systems goals, yet capable of being developed through a series of incremental steps that can deliver early benefits from investments.

- **Aligned with Existing Initiatives:** the tactical plan initiatives need to complement, and expand upon, existing federal, provincial and territorial infostructure investments.

The Tactical Plan Initiatives

The Advisory Committee on Health Infostructure has concluded that the Tactical Plan should focus on the three Tactical Initiatives– in the following order of priority:

1. **Electronic Health Records and Telehealth** - beginning with an initial set of data elements and using a limited number of implementation projects, "drive the design and implementation" of the electronic health record, including privacy harmonization and standards for data, technology and security. Foster greater interoperability of telehealth solutions so that telehealth and electronic health record solutions converge over time into a longitudinal health record for clinical use in a variety of settings across the continuum of care.

2. **Integrated Provider Solutions** - information and technology solutions for health care providers [e.g. physicians, nurses, pharmacists] with the supporting technology infrastructure, which would provide "end-to-end" business, information and technology services. Initially the focus would be on integrated physician solutions that would be strategically linked to other "regional" information systems, including electronic health records, telehealth and clinical decision support services.

3. **Health Information for the Public** - a portal for the Canadian public that provides comprehensive and trusted health information to support selfcare decision-making. This initiative needs to build on the success of the Canadian Health Network and should be strategically linked to health care providers (i.e. via the integrated provider solutions), as well as to provincial and territorial selfcare and telecare services. It should also allow better access by specific, targeted populations, which have restricted access to quality

health information (i.e. remote, rural, aboriginal and minority language communities).

In developing these three specific initiatives there are common infostructure considerations that need to be addressed, namely:

- **The Network and Computing Infrastructure -** the telecommunication networks, integration brokers and associated computing hardware and software supporting the operation of the infostructure.

- **Privacy and Security -** harmonized health information privacy legislation and policies, as well as the supporting infostructure security mechanisms, to ensure that the public trust and confidence in the use of personal health information is maintained.

- **Health Information and Technology Standards -** the necessary information and technology standards that enable organizations and people to communicate, common tasks to be carried out, information to be shared, and technology to inter-operate.

- **Change Management Education -** implementation of infostructure components in a manner which health care providers can cope with and make wise use of. This includes steps to involve affected health professions in the design of systems solutions and then preparing them for changes in their business processes; developing the skills health professionals in using information and information technologies; and the development of greater health informatics capacity to improve health system use of new technologies.

- **Pan-Canadian Coordination -** the necessary leadership to ensure pan-Canadian infostructure is interoperable by fostering collaboration on common initiatives across jurisdictions and by supporting consistent approaches to local planning and deployment.

Since the concept of pan-Canadian coordination is central is to the Tactical Plan, it warrants further explanation as a prelude to further detailing the action plans for the three tactical initiatives and for addressing the common considerations listed above.

PAN-CANADIAN COORDINATION

An effective pan-Canadian approach requires thoughtful planning and strong leadership to ensure that the necessary coordination, development and deployment of inter-jurisdictional initiatives occurs in a manner that is timely, effective and meets the needs of health organizations that will deploy the infostructure components within their local setting.

ACHI, in its advisory role to the Conference of Deputy Ministers, provides the necessary leadership for overarching health infostructure strategy development at a macro level. This role is consistent with its mandate and the federal, provincial and territorial makeup of ACHI. This role is important in establishing the necessary consensus, priorities and strategies for guiding long-term development of a pan-Canadian infostructure. However, strong leadership and coordination is also required at the initiative or project levels to foster collaboration, coordinate developments and support consistent and effective adoption of pan-Canadian infostructure components and solutions across and within jurisdictions.

The necessary mechanisms for leadership and coordination of the pan-Canadian initiatives, are currently evolving. For the most significant initiative in the Tactical Plan, that is electronic health records, the new Canada Health Infoway Inc. has been established to accelerate developments and is expected to play a strong leadership and coordination role in electronic health record developments from this point forward. As future Tactical Plans

develop strategies for the Integrated Provider Solutions and Health Information for the Public initiatives, a focal point for pan-Canadian coordination for these initiatives will similarly need to be assigned in future years.

The necessary level of leadership and coordination will require stakeholder engagement, development of architectures for the tactical initiatives, ensuring the required standards are in place and providing incentives for infostructure implementation to occur in a coordinated manner. This implementation role most requires a collaborative environment where jurisdictions and health organizations can together identify common opportunities and common solutions to implement the health infostructure.

Inter-jurisdictional collaboratives such as Health Infostructure Atlantic, the Western Health Information Collaborative and the Canadian Integrated Public Health Information System Collaborative are at early stages in beginning to foster the development and deployment of common solutions for specific components or sub-components of the infostructure. Based on these early experiences ACHI has further developed the concept of a 'lead jurisdiction', where one jurisdiction assumes the primary role in the design, development and implementation of a solution that could be adapted for implementation by many jurisdictions. A lead jurisdiction would normally be a provincial, territorial, or federal agency that has a keen interest; has already completed extensive work; and has made an investment towards an electronic health record or telehealth solution.

Finally, vehicles to foster collaboration and the adoption of common solutions within jurisdictions are being used (e.g. SHIN in Saskatchewan, Inforoute Santé in Quebec). Local deployment, or the actual implementation of health infostructure within hospitals, long-term care facilities, community care programs, community health clinics, mental health clinics, laboratories, physician offices, pharmacies, is critical to the successful adoption of common solutions. By themselves they represent major undertakings that require the leadership and commitment of local boards, management and health care providers. Taken together, these local deployment initiatives represent the implementation of the pan-Canadian health infostructure.

Coordination and collaboration must occur at all levels for a pan-Canadian infostructure to become a reality – otherwise a fragmented infostructure that is not interoperable, would be deployed at significant cost and effort.

ELECTRONIC HEALTH RECORDS AND TELEHEALTH

The Advisory Committee on Health Infostructure has defined an electronic health record as,

" a longitudinal collection of personal health information of a single individual, entered or accepted by health care providers, and stored electronically. The record may be made available at any time to providers, who have been authorized by the individual, as a tool in the provision of health care services. The individual has access to the record and can request changes to its content. The transmission and storage of the record is under strict security."
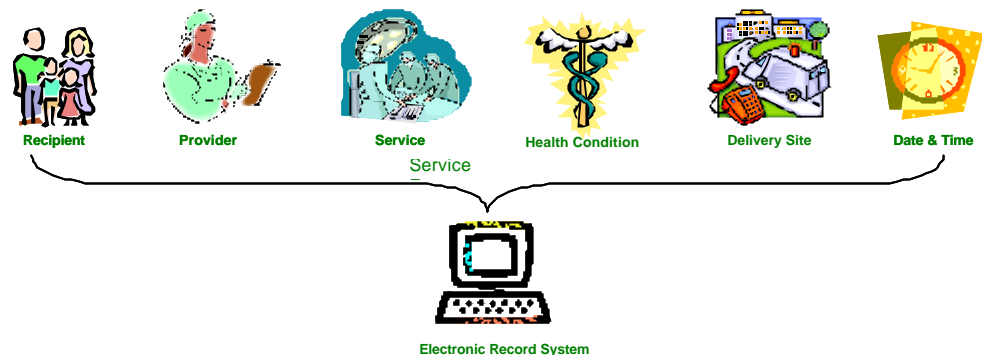
What is an Electronic Health Record?

With this definition in mind, the essential elements of an electronic health record are that it is:

- **electronic**…it consists of bits and bytes - voice, video, images and data

- **contains personal health information**…identifiable information about a person's health status and the events that have had an impact

- **longitudinal**…all relevant personal health information collected over a period of time that can be shared among health professionals

- **accepted by a health professional**…a record that can be accepted for use by a health professional in the provision of quality care

- **organized to support care** ... structured to support clinicians and their support staff in the delivery of health care services

- **under the custodianship of a known party**... under the management of a trusted entity that can ensure only approved access

- **virtual**…it does not reside all in one place and can be assembled as required

- **available to the individual**…a tool for the health consumer.

Successful deployment of electronic health records is dependent upon the ability to assemble standard service encounter information from many disparate clinical systems. In its simplest

form a service encounter consists of a health service provided by a service provider to a service recipient to address a health condition at a delivery site at a point or period in time.

The initial challenge with implementing electronic health records is knowing where to start. The pragmatic approach is to start small and then incrementally expand the implementation of the electronic health record system over time. The Advisory Committee on Health Infostructure has used the following criteria to guide the thinking about a first stage implementation of electronic health records across Canada:

- **Government support is in place -** a critical mass of federal, provincial and territorial government support is in place that builds on the current initiatives and their associated investment

- **Clinically relevant data is available electronically -** that the information needs of health care professionals can be met with high-quality, clinically relevant electronic data

- **Public interest and acceptance is high -** for the business areas selected the public will readily accept that an electronic health record is beneficial

- **The primary user groups are in agreement -** that the group of providers who would initially use an electronic record are agreeable to its implementation

- **Common business processes exist -** that the business areas selected have business processes that are fairly common in all jurisdictions across Canada

- **A common approach to standards development in place -** that an existing standards development process is in place to develop and maintain the necessary information and technology standards

- **Evidence of the value proposition exists -** there is growing evidence that supports the benefits to Canadians and to the health system of implementing electronic health record and telehealth solutions.

The development and implementation of a pan-Canadian electronic health record depends on the support of its stakeholders, especially health care providers. The route to a comprehensive electronic health record is through the collaborative development of a record that provides the maximum payback to stakeholders, with every jurisdiction moving the development forward within a common pan-Canadian framework of architectures and standards to ensure complete interoperability.

So what is a pan-Canadian electronic health record? Let us consider the following scenario:

In this scenario Billy's health information [i.e. both data and images] needed to be available to physicians in Prince Albert, Saskatoon and Edmonton. While most of Billy's health services have been delivered in Prince Albert, and to a lesser degree in Saskatoon, he is now in a situation where he is receiving health services in another province. The Edmonton heart specialist required access to Billy's electronic health record, the data of which resided in computer systems in 2 Saskatchewan cities. In addition, each time the heart specialist in Edmonton provides service to Billy he will want to update Billy's electronic health record, so that this information is available to his family physician in Prince Albert. In this scenario there is a requirement for a pan-Canadian electronic health record. The record includes both health record data and images – the integration of electronic health record and telehealth technologies. This trans-border provision of services within Canada has always occurred on a north-south basis, however with the rationalization and specialization of tertiary and quaternary acute care services is now increasingly happening on an east-west basis across Canada.
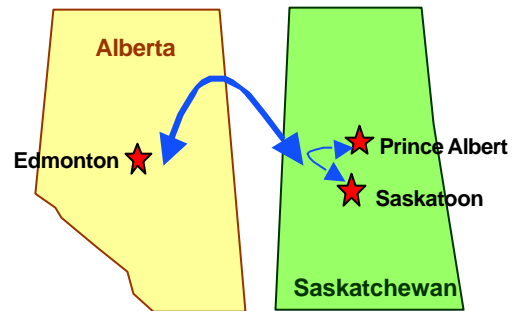
Supporting a Business Need

The immediate deployment of electronic health records that meet all the data requirements of every type health care provider in Canada today is simply not feasible. Implementations of electronic health records need to start small and evolve in a staged manner driven by immediate business needs – for example, primary health care, acute and ambulatory health care, health surveillance, continuing care, telehealth, aboriginal health care and so on.
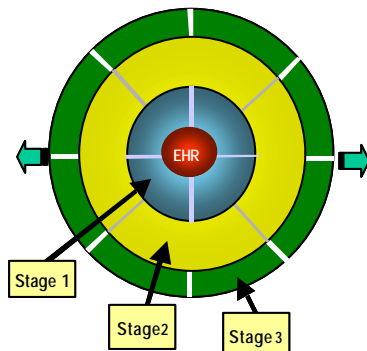
ACHI through its EHRTH Working Group has reconfirmed that given the priorities of health care providers across the country, the availability of clinically

relevant data, the known infostructure investments, the standards work completed or underway, and the need to start small, that the logical starting point for a pan-Canadian electronic health record - that is the **Stage 1 Electronic Health Record** - is with:

- **Client Data -** such as, names, addresses, contact numbers, date of birth, healthcare numbers, emergency contacts, languages, consent status

- **Provider Data -** such as, names, contact numbers, provider number, consent status

- **Laboratory Data -** such as, laboratory orders and laboratory results

- **Pharmacy Data** - such as, prescribed and dispensed medications.

This data would serve the needs of primary care physicians, primary care nurses, hospital physicians and nurses, laboratory physicians, pharmacists, public health physicians and nurses, as well as other allied health professionals and support staff.

Undoubtedly, the first step in implementing this electronic health record will be within facilities and health regions where the vast majority of health services are received, then among regions within a province, and then finally among provinces as a pan-Canadian record. They key to this staged approach will be the deployment of inter-operable electronic health record systems regardless of their location, and be dependent on continued inter-jurisdictional collaboration.

Building Block Systems

A pre-requisite for the successful implementation of the electronic health record the necessary client registration, provider registration, laboratory and pharmacy information systems need to be in place. These 'building block' systems are required to provide the data that populates the electronic health record. They include, but may not be limited to, physician office systems, hospital registration, laboratory and pharmacy systems, private laboratory systems, community pharmacy systems, community health facilities, as well as government client registry, provider registry, pharmaceutical systems and laboratory systems.

For example, in most provinces many of the health information systems required to implement the Stage 1 Electronic Health Record are in place or in development. They may include Ministry of Health client and provider registries, pharmaceutical and laboratory information systems, health region registration, community pharmacy systems, private laboratory information systems as well as the network and computing infrastructure. Together, these "building block" systems provide the needed standardized platform to support both program delivery and to populate the electronic health record and to support telehealth services.

Depending upon the jurisdiction, varying levels of investment will be required for the above-mentioned 'building block systems'; this investment is not just to support program delivery, but also to enable the deployment of electronic health records across the continuum of care. Due to the lengthy lead-time required to implement building block systems it is necessary to start planning for the second stage of the electronic health record and a further set of associated building block systems. Given the level of known investment and the current effort across the country, candidate subject areas for the **Stage 2 Electronic Health Record** could include, but are not limited to:

- Communicable diseases and immunization datasets and systems as being developed and enhanced through the National Health Surveillance Network and the First Nations Health Information System. In light of the current response to terrorism, there is an urgent need to accelerate the development and implementation of information systems to support the

detection and management of Communicable Disease threats and outbreaks in Canada.

- Diagnostic Imaging datasets and systems which would encourage the necessary integration of telehealth and electronic health record systems.

- Continuing care minimum data sets and systems that provide a standardized approach to client assessments and service provision, an area of immense growth within the health industry due to the aging population.

Currently there is an excellent knowledge of what systems initiatives are happening at a federal, provincial and territorial level. However, a better understanding is required of what 'building block' systems are in place to support service delivery needs at a local level - within facilities and health regions across the Canada.

Electronic Health Record Architectures

An electronic health record system is one that can access and assemble the data from multiple building block systems enabling the user to create or view a longitudinal health record. It is highly unlikely that a single electronic health record architecture will be deployed across Canada because of the extensive legacy investment already in place. Currently, there are three different information systems architectures that can be used to assemble health records electronically. These are:

- **Visual integration -** permits a user to access multiple systems at the same time to view and update patient data. Unlike the other options it does not present the data as a single electronic health record. This architecture is being piloted at the Vancouver Richmond Health Board in Vancouver, British Columbia.

- **Data integration -** through the use of clinical data repositories, integrated or mirrored data sets are created that assemble the data from source systems for viewing in a single electronic health record. In some, but not all cases the electronic health record system may be permitted to update the source clinical systems. This architecture has been implemented in the eCHN project at the Hospital for Sick Children in Toronto.

- **Message integration -** through the use of messages, data from the source systems are extracted and integrated via an integration broker (i.e. in addition, a clinical data repository may also be used) prior to being displayed in the electronic health record system. Again, in some, but not all cases the electronic health record system may be permitted to update the source systems. This architecture is implemented in some of the new physician office medical record systems available from commercial vendors.

The significance of these three architectures is not that they exist, but rather in how they would be deployed within a pan-Canadian health infostructure. To ensure interoperability there is a need to harmonize the architectures so that electronic health record systems work together effectively. More knowledge and experience is required to know each of these architectures can be optimally deployed.

EHR-Telehealth Integration

Over the past several years, there has been significant investment made in telehealth programs across Canada. The relative size of Canada, it's dispersed population and the scarcity of human resources required to deliver healthcare services have made using telehealth technologies a logical choice. Telehealth can offer a cost effective means to deliver healthcare services, particularly to those individuals who are at significant distance from the resources they require. Telehealth also allows those receiving care to remain closer to home that significantly reduces the cost of care. In addition, telehealth enables individuals to access care they may not have otherwise been able to obtain.

As noted previously in this document, telehealth is being implemented in a piecemeal fashion across Canada. This has created inconsistencies in how telehealth has been implemented and the standards under which projects and programs operate. There is now clear recognition of the need to develop consistent national standards on the clinical and technical components of telehealth. This is particularly important where programs are provided across jurisdictions.

It is safe to say that telehealth programs were initiated without fully understanding and resolving some key issues. The issues of licensure and reimbursement continue to slow the evolution of telehealth and can be an impediment to care providers who want to use telehealth as a means of care delivery. There are telehealth initiatives occurring in every province and territory across Canada with extensive support for project initiation coming from federally funded programs such as CHIPP. As these projects mature into operational programs, there is a need to ensure that they will be sustainable over the long term.

While a significant investment is planned for electronic health records the investment in telehealth initiatives is already significant and is increasing rapidly. The integration of telehealth and electronic health records is inevitable. Some integration is already possible where only data and lower resolution images are required. However, the deployment of advanced telehealth technologies (e.g. advanced video conferencing), because of bandwidth availability and quality reasons, still requires expensive high-bandwidth dedicated communication lines or satellite services. In light of the significant resources invested in telehealth, there is a pressing need to perform rigorous evaluation of selected telehealth projects in order to develop the necessary evidence base to guide future development and investment. Additionally, there is a need to determine which projects across Canada should immediately focus on the integration of their telehealth and electronic health record technologies. Addressing the integration of electronic health records and telehealth technologies will also assist Canada Health Infoway Inc. in its future planning for accelerating the development and adoption of modern information and communications technologies in the health sector.

Moving Forward   As part of the ACHI consultation conducted in 2000, provincial governments and health regions indicated a keen interest in commencing the implementation of electronic health record systems. While a pent-up demand exists, the issues (organization, people, process, data, technology, standards and project issues) are not minor. 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 ideal starting points to fully develop electronic health record concepts, test them and implement them in Canadian settings. Pan-Canadian co-ordination and investment is important to fostering the development of these solutions in a consistent way so that they can be replicated in other jurisdictions.

2.0   ELECTRONIC HEALTH RECORDS and TELEHEALTH

Recommendation
It is recommended that the first stage of a coordinated pan-Canadian electronic health record initiative be centered on client, provider, laboratory and pharmacy data. In addition, steps should be taken to accelerate the development and implementation of the necessary supporting systems in all regions of the country. The electronic health record initiative should involve the selection of demonstration sites to test and evaluate different types of electronic health record systems in locations where most of the enabling information and communications technologies are already in place. Concurrent with this work, strategies to accelerate the development and integration of telehealth and electronic health record services should be aggressively pursued.

Action Items

1. *Pan-Canadian Health Infostructure Assessment* - *in support of the Stage 1 electronic health record and telehealth, complete an assessment of the information and communications technologies in Canada, to determine the gaps and opportunities arising from the currently available, or planned system, network, computing infrastructure.*

2. *Business Requirements Definition* - *engage health care provider groups and others in defining business and clinical needs, as well as information and systems requirements for the Stage 1 electronic health record [i.e. with client, provider, laboratory and pharmacy data] across multiple jurisdictions.*

3. *Electronic Health Record Architectures* - *identify the electronic health record architecture components, the different types of electronic health record architectures and the requirements to ensure electronic health record inter-operability for the Stage 1 Electronic Health Record.*

4. *Enabling Electronic Health Record Systems* - *develop or acquire the supporting messaging and routing technologies for the implementation of the Stage 1 electronic health record.*

INTEGRATED PROVIDER SOLUTIONS

The objective of integrated provider solutions is to significantly improve the ability of health care providers to access and use electronic information and technology. Ideally, health care providers, such as physicians, nurses and pharmacists will access integrated, electronic business, information and technology services.

By way of example, a physician could obtain access to integrated business services (e.g. access to an electronic health record, recalls of hazardous health products notices, advisories on new drug interactions, online CME, online purchasing), information services (e.g. access to medical news, online journals and academic research, medical discussion communities), and technology services (e.g. access to the Internet, access to hospital scheduling).

One of the constraining factors identified in the gap analysis was the low use of electronic information and technology by health care providers, especially physicians. However, the recent studies have shown that this gap is starting to close. In the 2000 Medical Post Survey of Canadian physicians, 57% of the survey respondents stated they have online access at home and at work. Of these 42% use email to communicate with their colleagues and an increasing number use email to communicate with their patients.

Recent Activity Over the past 12 months there has been a flurry of activity to implement integrated provider solutions across Canada. Leading the way have been the national and provincial medical associations who with the provinces and territories commenced initiatives to support physicians in their need for integrated solutions. This effort is consistent with what these organizations told ACHI during the stakeholder consultation in the fall of 2000. In addition there has also been some private sector activity from a few Canadian firms (e.g. Canadian

Physician and Medbroadcast) who have also entered the marketplace. Some of the notable recent examples of integrated provider solutions in Canada are included in the following table.

Initiative	Status	Description	Stakeholders
Alberta Medical Association and Alberta we//net *Physician Office System Project (POSP)*	Pilot phase underway; New $15m phase has commenced	Physician office: information, EHR, some DSS tools, and the network and computing infras tructure integrated with the health system	Alberta physicians and pharmacists
Saskatchewan. Medical Association and SHIN	Pilot phase	Integrate physician systems and provide access to online information; EHR is a future service	Saskatchewan physicians
Ontario Medical Association	In Operation	Provide a broad range of information services to physicians	Ontario physicians
Nova Scotia Medical Society *"DoctorNS*	In Operation	Medical Association information and services	Nova Scotia physicians
Ontario [Hospital for Sick Children]- eCHN *"Profor"*	In Operation	Information for providers of child health care	Ontario physicians
Quebec [McGill, Montreal *MOXXI*	Planned (Feb/2002)	Medical Office of the 21st Century – EHR services and clinical decision support tools	Montreal physicians and pharmacists
Canadian Medical Association *GlobalMedic*	Planned (Oct/2001)	Physicians resource & virtual health care community for physicians	All Canadian physicians with special services for CMA members
Canadian Physician *www.canadianphysician.ca*	In Operation	Physician portal providing a broad range of business and information services	Canadian physicians (mostly northern Ontario at present)
Medbroadcast *www.mdbmd.com*	Planned	Physician portal providing a broad range of business and information services	Canadian physicians
Public Health Portal	Planned GIS aspect operational 2 years	Provide access to online information services	Canadian public health professionals
Canadian Doctors Network	In Operation	Physician portal providing a broad range of business and information services	Canadian physicians

Given the current state of integrated provider solutions in Canada, the Advisory Committee on Health Infostructure needs to continue its monitoring activity to ensure physician, pharmacist and nurse solutions evolve in an integrated manner and can support the implementation of electronic health records. Over the next 24 months the success of the current initiatives will become better known. Collaboration needs to be fostered so that the benefits of different approaches can be better understood and shared.

HEALTH INFORMATION FOR THE PUBLIC

The objective of health information for the public is to significantly improve the ability of Canadians to make health and health care decisions. There are a large number of health information portals and websites that the public can now access to obtain health information, e-health services, as well as participate in other more interactive services such as discussion groups. Some sites even provide the opportunity for the public to keep their own health diary– the consumers' electronic health record of themselves. In addition there is an increasing number of provincial selfcare and telecare services using a combination of paper, telephone and computing means to provide information and advice to the public.

Health information portals for the public were initially conceived and implemented in the United States, with companies like Dr. Koop.com leading the way. Within Canada the first major effort was the Canadian Health Network, which is a collaborative of health organizations across Canada who provide health promotion and disease prevention information to Canadians. There are also a number of excellent disease specific health information sites such as the Arthritis Society of Canada that have been in place for a number of years.

Recent Activity With the recent decline in the economy and the associated impact on many of the new dot-com companies there has been a rationalization of the health information for the public portal market. Regardless the major players in this field are still US firms, like WebMD or the other public portals like MSN and Yahoo, who use WebMD's content. However, within the past 12 months there has been an increase in activity to implement Canadian public health information sites on a regional or provincial basis. The most notable examples are in British Columbia with BC HealthGuide, the Calgary Health Region's Your Health including its service directory service and the Electronic Childrens' Health Network (eCHN) in Ontario. Examples of current "Health Information for the Public" initiatives in Canada are included in the following table.

Initiative	Status	Description	Stakeholders
Canadian Health Network	Operational 3 years	Health information; also a health information "network of networks"	Canadian public
BC Ministry of Health *BC HealthGuide*	Operational 6 Months	Selfcare and telecare information for the BC public available via telephone, internet and book	BC residents with a BC health number
Calgary Health Region *"Your Health"*	Operational 1 year	Health information and a local health services directory	Calgary region residents
Ontario Hospital Association *Your Hospital @ Home*	Planned	Comprehensive health information service	Ontario residents
The Arthritis Society	Operational	Arthritis information and a services directory	Canadian public
The Hospital for Sick Children *ECHN*	Operational	Children's health information	Ontario residents
Private Sector Sites: Medbroadcast; Sympatico Yahoo, Healthonline, Dr Koop, WebMD and so on	Operational	Health information portals with some selfcare tools	Global audience, but usually either Canadian or US based
"Canada Health Portal"	Planned (03/2002 - Prototype)	One-window to health information and services	Canadian public [e-Government focus]
Canadian Institute for Health Information	Planned (Spring/2002)	CIHI e service portal	Authorized users and the Canadian public

The initial implementation of telecare services in Canada was in Quebec, New Brunswick and Manitoba. Although they all approached the service differently they have provided telecare services to all residents within their respective provinces. In the past 12 months there has been a further expansion of telecare services across Canada - in British Columbia, Calgary, Edmonton, and metropolitan Toronto, with the rest of Ontario to receive the service by the 2002. Only British Columbia has strategically linked its call centre that provides telephone triage advice, to the information on its public website, and to the BC HealthGuide, a selfcare handbook provided to all households in the province. Notable examples of "Selfcare and Telecare" initiatives in Canada are included in the following table.

Initiative	Status	Description	Stakeholders
BC Ministry of Health *BC Nurseline – integrated with BC HealthGuide*	Operational 6 Months	Selfcare and telecare information for the BC public available via telephone	BC residents with a BC health number
Okanagan / Similkameen Health Region, BC *HealthLink*	Planned	Local telecare service (complementary to BC Nurseline)	Okanagan region residents
Crowfoot Village Medical Practice, Calgary Alberta *24 Hour Nurse Helpline*	Pilot	Primary Care 24/7 advice and triage service	Calgary residents associated with the clinic
Capital Health Region, Edmonton, Alberta *CapitalHEALTHLink*	Operational 1 year	Telecare service. Health advice (80%) and health information (20%)	All residents of 3 health regions in Alberta, including Edmonton
Winnipeg Regional Health Authority *HealthLinks*	Operational 7 years	Telephone triage and medical advice	Manitoba residents
Government of Ontario *Telehealth Ontario*	Operational for 1 year; province wide in 2001	Provincial telecare service with info and advice on any health or social problem	Residents of 416, 647, 519, 613 and 905 area codes (greater Toronto
Sogique, Quebec *Info-Sante*	Operational 10+ years	Provincial telecare service with info and advice on any health or social problem	Quebec residents
Clinicare, New Brunswick *Tele-Care / Telesoins*	Operational 4 years	Telephone triage and health advice	New Brunswick Residents

Over the past 12 months there has been a significant change in the landscape for public health information solutions. It is clear that each province and territory will eventually deploy its own telephone triage and health advice line. Some jurisdictions are complementing this service with web-based health information services and electronic health care services (e.g. service directories). However at this time no jurisdictions have made the link between telecare and electronic health records. Further, there is no pan-Canadian approach to providing telephone triage, health information and advice and electronic health services to the public based on a set of commonly accepted standards, which in turn would support health record portability and service equity.

4.0   HEALTH INFORMATION FOR THE PUBLIC

Recommendation
It is recommended that the capacity of Canadians to access and effectively use electronic health information and electronic health care services continue to be enhanced, especially within the context of electronic health record deployment.

Action Items
1. ***Health Information for the Public Tactical Plan*** *- further develop and coordinate, across jurisdictions, tactics to provide trusted health information, advice and other health care services to the public in an integrated manner through a variety of formats including public websites, telephone advice lines, selfcare books, and public interfaces to their electronic health records.*

NETWORK & COMPUTING INFRASTRUCTURE

No investment in electronic health records, integrated provider solutions or health information for the public solutions will have the desired impact without a commitment to the development and maintenance of a suitable network and computing infrastructure.

There are provincial and territorial jurisdictions in Canada where the necessary network and computing infrastructure is simply not in place to support the provision of health services. This is especially true in some rural, remote and aboriginal communities. For example the implementation by Health Canada of the First Nations and Inuit Health Information System (i.e. primarily a public health immunization and communicable disease system) has been hampered by the availability of an adequate systems infrastructure in many of the aboriginal communities. If all jurisdictions across Canada are to move the stakes forward and support the provision of health services electronically there will need to be an investment in the implementation of a basic systems infrastructure.

This is of course not just a problem for the health industry. To address the connectivity issue the Minister of Industry for the Government of Canada set up the National Broadband Task Force. In its report *The New National Dream: Networking the Nation for Broadband Access*, the task force outlines its recommendations to the Government of Canada about how best to make high-speed broadband Internet services available to all Canadian communities by the year 2004.

In this instance broadband is defined as a minimum speed of 1.5 Mbps and capable of supporting full-motion, interactive video-conferencing. However the report clearly recognizes the need of new applications such as peer-to-peer file interactions and videoconferencing that in some instances will require much greater bandwidth. For example,

hospitals were identified as needing bandwidth in the 10 Mbps to 1Gbps range for telehealth applications. Therefore the size and cost of the networking challenge is significant - not just for the health industry, but for Canada as a whole.

5.0   NETWORK AND COMPUTING INFRASTRUCTURE

Recommendation
It is recommended that as part of the pan-Canadian Health Infostructure implementation, investments be made in locations where the basic systems infrastructure is inadequate – especially in rural, remote and aboriginal communities.

Action Items
1. ***Network and Computing Infrastructure Assessment*** *- on a province/territory basis, identify what infrastructure is in place by community - including connectivity, computing capacity, and information systems support services. [Note: this action item could be completed in conjunction with the Infostructure Assessment in Recommendation 2].*

2. ***Determine Future Network and Computing Infrastructure Directions*** *- through linkages to Industry Canada, CANARIE and others to monitor broadband connectivity development across Canada, as well as to evaluate emerging technology solutions [such as wireless and band -width conserving approaches] especially to support telehealth-electronic health record integration.*

PRIVACY & SECURITY

Canadians 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 that are derived from improved access and use of health information by authorized service providers. Regardless, privacy requirements are the single most important factor that will influence the implementation of electronic health records.

Harmonization The Advisory Council on Health Infostructure, in: *Canada Health Info*way*: Paths to Better Health*, recommended that jurisdictions harmonize and strengthen the protection of personal health information. This commitment to a consistent, pan-Canadian approach has been re-affirmed at different stages in the current development of the health infostructure. In December 2000, Deputy Ministers accepted the *Resolution of Ministers of Health on Principles for the Protection of Personal Health Information Co llected, Used and Disclosed in the Health System* (the Harmonization Resolution). Since then ACHI through its Protection of Personal Health Information Working Group has commenced work on clarifying a number of issues in section 12 of the resolution (e.g. definition of personal health information, methods to protect personal health information transferred between jurisdictions and exceptions to informed consent). This effort needs to continue.

Privacy legislation and codes are designed to provide individuals with the means to prevent exploitation of their personal information or its use in ways over which they have no control. Ultimately, privacy legislation acknowledges individual control over use of personal information, that is, over the collection, use, disclosure, retention and disposal of their information by collecting organizations.

For electronic health records in Canada privacy policy is encompassed in a set of federal, and provincial statutes. *The Personal Information Protection and Electronic Documents Act* will by 2004 have a wide-reaching impact on the management of personal information in Canada. Provincial legislation, whether it be Freedom of Information and Protection of Privacy Acts or more specific Health Information Privacy legislation are also applicable to personal health information. The future relationship between The Canada Personal Information Protection and Electronic Documents Act and provincial legislation has yet to be fully determined.

Health Information Privacy Principles

The 'privacy principles' originally developed by OECD and expanded upon by the Canadian Standards Association provide the best insight into the requirements that will be placed on electronic health records, namely:

- **Accountability** - An organization is responsible for personal information under its custody or control and shall designate an individual or individuals who are accountable for the organization's compliance with the privacy principles.

- **Identifying Purpose** - The purposes for which personal information is collected shall be identified at or before the time the information is collected.

- **Consent** - The knowledge and consent of the individual are required for the collection, use, or disclosure of personal information.

- **Limiting Collection** - The collection of personal information shall be limited to that which is necessary for the purposes identified. Information shall be collected by fair and lawful means.

- **Limiting Use, Disclosure, and Retention** - Personal information shall not be used or disclosed for purposes other than those for which it was collected, except with the consent of the individual or as required by law. Personal information shall be retained only as long as necessary for the fulfillment of those purposes and as required by law.

- **Accuracy -** Personal information shall be accurate and as up-to-date as necessary to fulfill the purposes for which it is collected.

- **Safeguards** - Security safeguards shall protect personal information against loss or theft, as well as unauthorized access, disclosure, copying, use or modification, through all phases of its life cycle, regardless of the format in which it is held.

- **Openness** - Specific information about policies and practices relating to the management of personal information shall be made readily available. An individual shall be informed of the existence, use and disclosure of his or her personal information.

- **Individual Access** - Upon request, an individual shall be given access to his or her personal information. Exceptions to the right of access must be limited and specific. An individual shall be able to challenge the accuracy and completeness of the information and have it amended as appropriate.

- **Challenging Compliance** - An individual shall be able to address a challenge concerning compliance with privacy requirements to a designated individual or individuals.

These privacy principles provide some direction as to what will be required for the infostructure generally, and the protection of personal health information in electronic health records specifically. For example the principles of appropriate health record governance, the management of consent, use on a 'need to know' basis and individual access to the record will all cause changes to the way business is currently conducted when that health record is in electronic form, and especially if the electronic health record is shared among different health organizations.

Security Mechanisms

The translation of privacy policies into security requirements and then into security mechanisms is not a simple task. This is especially true for electronic health records. By way of example of infostructure security requirements, the security framework for electronic health records needs to include the following

- **Security policies -** All information aspects of the electronic health record will be categorized. Threats to the confidentiality and integrity of the record will be analyzed. A security organization will be detailed, including governance and management responsibilities for all security aspects of the electronic health record.

- **Identification and authentication mechanisms -** the healthcare providers and others who will use the electronic health record system will be identified and registered as users. This will include not only *who* they are, but typically also *what* they are (physician, billing clerk, lab technician, etc.), *how* they can interact with the system and *which* patient records they are allowed to access. Proper identification forms the basis of user authentication. Users are authenticated, that is they have to prove *they are who they say they are* before they can gain access to the electronic health record system.

- **Communications security -** Communication security (also called transmission security or network security) is needed to ensure that the confidentiality of personal health information is always maintained as data is transmitted from the electronic health record system to the user (and vice versa). Data integrity must be maintained to ensure that information isn't lost in transit or maliciously altered.

- **Access control -** Access control is sometimes also called trust management. It ensures that users are: authorized to gain access to the records they are requesting, and are authorized to carry out each action they are attempting to perform with the record. Trust management of electronic health record systems is especially complex because patients can be receiving care from several health care providers, each of who may have access to only a subset of the patient's total record.

- **Safe data storage -** Electronic health record databases must be protected to ensure confidentiality is protected and data integrity is maintained.

- **Non-repudiation -** Sophisticated electronic health record systems provide a digital equivalent to the common practice of having health care providers sign and date additions to paper based health records. These digital signatures prevent a user from adding information to a record and later denying having made the addition.

- **Audit and compliance -** The final component of the electronic health record security framework is audit and compliance. This ties us right back to the security policies that we started with – ensuring that an operational system can be properly evaluated against its design criteria and that the outcome of the implementation can be properly assessed.

For each component of the security framework there are enabling technologies that support the appropriate level of security to be applied to personal health information. The most promising technology combination for electronic health records appears to be a combination of Trust Management (e.g. role or work-group based access control) and Public Key Infrastructure technologies, possibly enhanced with the use of smart cards and biometrics. Again, the significance of the security framework components is not that they exist, but rather how they would be deployed within a health organization, as well as among health jurisdictions in a pan-Canadian health infostructure. This is especially true for personal health information held in electronic health records. Canadians recognize the importance of establishing the appropriate safeguards to protect an individual's right to keep their personal

health information private and the benefits that are derived from improved access and use of health information by authorized service providers. Privacy requirements are the single most important factor that will influence the implementation of electronic health records.

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6.0   PRIVACY AND SECURITY

Recommendation
It is recommended that an approach that is respectful of the rights of Canadians regarding the protection of their personal health information be implemented in all jurisdictions across Canada to enable the secure exchange of personal health information on a need-to-know basis.

Action Items
1. ***Privacy Policy Issue Resolution*** *- continue to address outstanding health information privacy policy issues associated with CSA principles and the Harmonization Resolution, as well as clearly understanding the implications of The Personal Information Protection and Electronic Documents Act.*

2. ***Electronic Health Record & Telehealth Privacy Analysis*** *- identify how health information privacy principles, business rules and security mechanisms should be applied to electronic health record and telehealth implementations across Canada. [Note: this action item could be completed in conjunction with Electronic Health Record Architectures in Recommendation 2).*

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STANDARDS

Standards for health sector data and communication technologies are critical to the implementation of an inter-operable pan-Canadian Health Infostructure. The issue with standards development and use is threefold:

- There is an immense effort required to develop information and technology standards for a pan-Canadian Health Infostructure.

- A pan-Canadian standards coordination process that builds on existing efforts is required.

- An approach to effectively mandate, audit and sustain use of standards is needed within the health system.

A pan-Canadian Coordination Process

Efforts are increasingly being initiated to develop health information and technology standards in Canada. Much of this work has been carried out at local levels with guidance and support provided by the Canadian Institute for Health Information (CIHI). At a pan-Canadian level, CIHI is leading the development and adoption of data and information standards (e.g. data coding, minimum data sets, health data messaging).

A recent example of this has been the NeCST project which has a unique collaboration of public sector, private and provider associations. The project has demonstrated that pan-Canadian standards collaboration can result in significant new standards development. Internationally, CIHI operates HL7 Canada as a forum to review and adopt HL7 standards for use globally and in Canada. Further CIHI is the liaison to the International Standards Organization (ISO) Technical Committee on Health Informatics and its work on electronic health records, telehealth, security and other standards. Finally, CIHI through its Partnership

for Health Information Standards has been successful in creating a public-private sector collaborative that participates in certain standards development efforts. It is critical that this leadership continue to be supported.

While there has been progress made by CIHI over the past 12 months with developing standards that could be used for electronic health record initiatives (e.g. client, laboratory and pharmacy), there remain important gaps. For accelerated progress to occur, formal electronic health record initiatives will need to be put in place to drive the development of electronic health record standards. The security standards, especially for the electronic health record and telehealth are currently not in place. Finally a "forum" to mandate the use of health information and technology standards does not exist in Canada.

CIHI has been trying to bridge the standards gap, with limited funds; however, there is still no agreed-upon "pan-Canadian" process to co-ordinate local, provincial, national and international standards development, implementation and maintenance.

Electronic Health Record and Telehealth Standards

A pan-Canadian set of approved standards is prerequisite to the implementation of electronic health records and wider use of telehealth solutions. Of paramount importance is the identification and approval of standards for the electronic health record and telehealth architecture components, including:

- **clinical processes standards** to advance pan-Canadian electronic health record and telehealth implementation;

- **electronic health record data** for the stage 1 electronic health record implementation [i.e. client, provider, laboratory and pharmacy data];

- **security management**, especially privacy and security policies, identification, registration and authentication, access control and non-repudiation standards;

- **data protocol management**, especially data message standards such as HL7 and XML for client, provider, laboratory and pharmacy electronic health record data messages;

- **message routing**, especially standards for directory services, such as X.500 and LDAP, UDDI, Novell NDS and eDirectory;

- **message protocol management** within and between health organizations including the work associated with existing or emerging standards such as CORBA, J2EE, DCOM, ODBC and SOAP;

- **network protocol management** standards for disparate networks (e.g. ATM, ISDN, Frame Relay, FDDI, SNA and the association with TCP/IP); and

- **other key standards** for:
    - nationally funded Pan-Canadian initiatives – e.g. CHIPP, FNIHIS, health surveillance or primary care funding
    - the stage 2 electronic health record data set either within local deployment projects, inter-jurisdictional initiatives or as a national project.
    - emerging standards being developed internationally through ISO TC 215 on health information system data, messaging and interoperability.

While some of this work is already underway, it needs to be accelerated and integrated into a pan-Canadian electronic health record initiative. Funding for any electronic health record implementations has to require compliance with these standards, otherwise the risk of implementing health records that cannot be shared will increase significantly.

7.0   STANDARDS

Recommendation

It is recommended that an immediate investment be made in accelerating standards development and the implementation of a pan-Canadian health information and technology standards coordination function, as well as an investment in the implementation and use of standards within the local, inter-jurisdictional and pan-Canadian Health Infostructure initiatives.

Action Items

1. ***Standards Coordination Process*** *- that an adequately resourced pan-Canadian standards development, adoption, approval, compliance and ever-greening process be put in place that coordinates standards activity and provides the necessary educational services in support of local, inter-jurisdictional and pan-Canadian projects, with links to national and international standards efforts.*

2. ***Stage 1 Electronic Health Record Standards*** *- that an immediate investment be made to accelerate standards development and adoption for electronic health records beginning with the Stage 1 electronic health record data, security management, data protocol management, message routing, message protocol management, and network protocol management.*

3. ***Telehealth Standards*** *- that an immediate investment be made in accelerating the development of standards for interoperability at clinical and technical levels, to ensure sustainability of telehealth programs in place or to be developed in the future.*

CHANGE MANAGEMENT

For meaningful change to happen, all the infostructure initiatives need to clearly demonstrate added value to health care providers and the public. Without this understanding the adoption of health information and communication technologies especially by health care providers will continue to be slow. Change management deals with the human aspect of implementing the health infostructure. Whereas, change is the emergence of a new situation, transition is the human reorientation to the change. Transition typically begins long before, and remains long after, the change is implemented. Effective transition management has been identified as one of the critical success factors that lead to successful change, and is critical to the implementation of a pan-Canadian health infostructure.

Change management includes organizational redesign, business process redesign, role development, training, communications, as well as coaching and mentoring. Techniques deployed include conflict resolution, impact analysis, performance metrics, and team building and facilitated group decision-making. All aspects of health infostructure implementation will require the use of these methods and tools. An example of effective change management is the innovative focus on capacity-building and governance strategies which is being adopted by Aboriginal communities as they deal with change management issues.

The implementation of electronic health records, telehealth as well as integrated provider solutions will trigger a major change in the way health care providers will carry out their duties. By way of example the changes in privacy policies and security mechanisms associated with transactions and with managing consent will be significant. The existing

approach used by health care providers to access personal health information held by another health care provider will become much more formalized with stricter recording and reporting requirements. The business process redesign, role development, training, as well as communications requirements for physicians, nurses and pharmacists and their support staff will be significant. The effort required to ensure a successful transition for these professions will be a major undertaking and needs to be carefully planned and executed.

There is a compelling need to develop a strategy and clear recommendations to address human resource issues in health informatics. Canada suffers from a severe shortage of health informaticians who can understand, manage and apply electronic information and technology to the health care sector. This shortage has also impacted the implementation of electronic health record and telehealth strategies. While there are now education programs available through some colleges and universities, there remains a serious lack of readily accessible health informatics education programs for practicing health professionals so they can upgrade their health informatics skills.

What is needed is a concerted approach to build a critical mass of qualified health informaticians, online health informatics content and flexible programs that can be easily accessed from multiple institutions by health professionals across the country. In addition, there is a need to support Canadian clinical training programs (e.g. nursing, medicine and others) to enhance their curriculums with health informatics knowledge so a new generation of clinicians will understand the application of informatics to support evidence-based care and decision support tools. The creation and delivery of such a strategy will be critical in optimizing and ensuring the success of the significant information and systems investments that are planned for the pan-Canadian health infostructure.

8.0   CHANGE MANAGEMENT

Recommendation

It is recommended that as part of the health infostructure implementation, enable and support the change management processes required for the rollout of the new business processes and technologies to health care providers, such as physicians, nurses and pharmacists.

Action Items

1.   *A Change Management Strategy - develop a broad change management strategy that creates a coordinated and collaborative process for governments and health care professional associations and provider groups to support the implementation of the pan-Canadian health infostructure.*

2.   *Electronic Health Record and Telehealth Change Management Approach - develop a tailored change management approach for health care providers and other support staff for implementing electronic health record and telehealth solutions, with an emphasis on business process change, skills training to use information systems, as well as privacy and security requirements.*

3.   *Health Informatics Education - in order to address the shortage in health informatics personnel and providers qualified to use health informatics:*
   - *support Canadian clinical training programs (e.g. nursing, medicine, pharmacy and others) to enhance their health informatics curricula.*
   - *create innovative health informatics educational options such as online programs accessible to providers. This will ensure that practicing providers can attain current and sufficient knowledge and skills in health informatics to be able to interact with electronic health records and other technologies.*

Next Steps

The next steps for the pan-Canadian Health Infostructure are critical ones – they will determine ongoing success. They must encompass a pragmatic approach that allows the participants to "think big, start small and expand rapidly". The next steps must remain focused on the goal – the implementation of a pan-Canadian Health Infostructure with an initial focus on electronic health records.

The action items identified in the Tactical Plan have also been grouped to form a set of next steps, with two timeframes:

- **Short to medium term** – action items that need to be initiated and preferably completed within the next 2 years. This includes activities that are ongoing and don't have a fixed timeframe for completion.

- **Medium to long term** – action items that need to initiated and preferably completed in the 2 to 5 year timeframe. Short to Medium Term Action Items.

Short to Medium Term Action Items		
Rec	**Action Item**	**Action Item Description**
1. 0 Pan-Canadian Coordination	**1.1 Pan-Canadian Infostructure Initiative Coordination Roles**	that key sponsor(s) and lead-jurisdictions are designated for the three tactical initiatives, and that consistent processes be adopted for leading the implementation of pan-Canadian health infostructure initiatives, beginning with electronic health record solutions.
	1.2 Pan-Canadian Infostructure Common Opportunities	that the key sponsor(s) and lead-jurisdictions adopt a collaborative process to identify common opportunities and common solutions that will allow the pan-Canadian health infostructure to be implemented in a cost effective manner.
2.0 Electronic Health Records and Telehealth	**2.1 Pan-Canadian Health Infostructure Assessment**	in support of the Stage 1 electronic health record and telehealth, complete an assessment of the information and communications technologies in Canada, to determine the gaps and opportunities arising from the currently available, or planned system, network, computing infrastructure.
	2.2 Business Requirements Definition	engage health care provider groups and others in defining business and clinical needs, as well as information and systems requirements for the Stage 1 electronic health record [i.e. with client, provider, laboratory and pharmacy data] across multiple jurisdictions.
	2.3 Electronic Health Record Architectures	identify the electronic health record architecture components, the different types of electronic health record architectures and the requirements to ensure electronic health record inter-operability for the Stage 1 Electronic Health Record.
	2.4 Enabling Electronic Health Record Systems	develop or acquire the supporting messaging and routing technologies for the implementation of the Stage 1 electronic health record.

Electronic Health Records and Telehealth - con't	**2.5 Demonstrate Electronic Health Record Systems**	select a limited number of locations across Canada to quickly demonstrate the merits of alternative approaches to electronic health record implementation. The demonstrations would serve to improve our understanding of the impacts of to electronic health records, evaluate how well they work, share the lessons learned, identify the costs and benefits, as well as determine their sustainability and generalization of use.
	2.7 Electronic Health Record and Telehealth Integration	accelerate the integration of electronic health record and telehealth technologies; rigorously evaluate the experience with telehealth in order to develop the necessary evidence base to guide future investment and to assist the integration process; and address key issues such as licensing, reimbursement and liability (Also refer to Recommendation 7.0 Standards).
5.0 Network and Computing Infrastructure	**5.1 Network and Computing Infrastructure Assessment**	on a province/territory basis, identify what infrastructure is in place by community, including aboriginal communities - including connectivity, computing capacity, and information systems support services, where there are not currently plans in place to address them [Note: this action item could be completed in conjunction with the Infostructure Assessment].
6.0 Privacy and Security	**6.1 Privacy Policy Issue Resolution**	continue to address outstanding health information privacy policy issues associated with CSA principles and the Harmonization Resolution, as well as clearly understanding the implications of The Personal Information Protection and Electronic Documents Act.
	6.2 Electronic Health Record & Telehealth Privacy Analysis	identify how health information privacy principles, business rules and security mechanisms should be applied to electronic health record and telehealth implementations across Canada [Note: this action item could be completed in conjunction with Electronic Health Record Architectures in Recommendation 2).
7.0 Standards	**7.1 Standards Coordination Process**	that an adequately resourced pan-Canadian standards development, adoption, approval, compliance and ever-greening process be put in place that coordinates standards activity and provides the necessary educational services in support of local, inter-jurisdictional and pan-Canadian projects, with links to national and international standards efforts.
	7.2 Stage 1 Electronic Health Record Standards	that an immediate investment be made to accelerate standards development and adoption for electronic health records beginning with the Stage 1 electronic health record data, security management, data protocol management, message routing, message protocol management, and network protocol management.
	7.3 Telehealth Standards	that an immediate investment be made in accelerating the development of standards for interoperability at clinical and technical levels, to ensure sustainability of telehealth programs in place or to be developed in the future.
8.0 Change Management	**8.1 A Change Management Strategy**	develop a broad change management strategy that creates a coordinated and collaborative process for governments and health care professional associations and provider groups to support the implementation of the pan-Canadian health infostructure.
	8.2 Electronic Health Record and Telehealth Change Management Approach	develop a tailored change management approach for health care providers and other support staff for implementing electronic health record and telehealth solutions, with an emphasis on business process change, skills training to use information systems, as well as privacy and security requirements.

For the medium and long term the following action items have been identified.

Medium to Long Term Action Items		
	Action Item	**Action Item Description**
2.0 Electronic Health Records and Telehealth	**2.6 Stage 2 Electronic Health Record**	identify all the components, required coordination and funding of the stage 2 electronic health record so that the necessary standards work can focus on accelerating the deployment of the associated 'building block' systems within F/P/T initiatives. This work needs to keep in mind the current effort underway in the provinces and territories in primary health care, health surveillance, aboriginal health, and continuing care.
3.0 Integrated Provider Solutions	**3.1 Integrated Provider Solution Needs Assessment**	review currently available integrated provider solutions to assess experience to date.
	3.2 Integrated Provider Solution Strategies	identify high level strategies to foster the implementation of integrated provider solutions, initially for physicians, nurses and pharmacists and ensure a linkage to electronic health records development work.
4.0 Health Information for the Public	**4.1 Health Information for the Public Tactical Plan**	further develop and coordinate, across jurisdictions, tactics to provide trusted health information, advice and other health care services to the public in an integrated manner through a variety of formats including public websites, telephone advice lines, selfcare books, and public interfaces to their electronic health records .
5.0 Network and Computing Infrastructure	**5.2 Determine Future Network and Computing Infrastructure Directions**	through linkages to Industry Canada, CANARIE and others to monitor broadband connectivity development across Canada, as well as to evaluate emerging technology solutions [such as wireless and band-width conserving approaches] especially to support telehealth-electronic health record integration.
8.0 Change Management	**8.3 Health Informatics Education**	In order to address the shortage in health informatics personnel and providers qualified to use health informatics: • support Canadian clinical training programs (e.g. nursing, medicine, and others) to enhance their health informatics curricula • create innovative health informatics educational options such as online programs accessible to providers. This will ensure that practicing providers can attain current and sufficient knowledge and skills in health informatics to be able to interact with electronic health records and other technologies.

An immediate next step is a clear delineation of who does what – what is the role of the federal, provincial and territorial governments, of the new Canada Health Infoway Corporation, of the Advisory Committee on Health Infostructure, of the Canadian Institute for Health Information, and of individual facilities and providers. Leadership is a critical requirement if the Canada Health Info*way* is to be implemented in a collaborative and mutually beneficial manner. The appropriate responsibilities and accountabilities need to be confirmed as soon as possible.

The above recommendations need to be considered as a whole because they are the basic building blocks for a pan-Canadian, inter-operable Health Info*way*. The challenge of Federal, Provincial and Territorial governments will be to develop and implement the components of the Canada Health Info*way* in a collaborative and mutually beneficial manner. This goal is already well underway through the activities of the Advisory Committee on Health Infostructure.

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