

Vision and Strategy for Knowledge Management and IM/IT for Health Canada

December 1998

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Foreword

The Department commissioned this vision and strategy at a critical time in its evolution. As in other departments and the wider world, we are on the verge of a shift both in the way we work and the way we think about our work. This shift is a continuation of a process that has been underway for some time, the catalyst for which has largely been the adoption of information technologies such as e-mail and the Internet.

Over the years, Health Canada has made extensive investments in information technology. We have reaped and continue to reap many benefits from these investments; however, there is a sense that we have not been able to exploit their full potential. The technology for accessing and using information has changed, but our ability to use that information to support our work has not.

More intensive use of information has created a corresponding awareness that it is the people who use the information, and not the information itself, who are the primary source of value. This vision and strategy consequently addresses not just information systems and technology, but also the skills, experiences, and informal connections - in short, the knowledge - of people in the health system.

People aren't used to thinking about what they know. When I commissioned this vision and strategy in September 1998, it was with the understanding that the process of developing it would be a learning process for all involved. Simply establishing the scope of the project was a significant endeavor for the participants. With this in mind, I invited senior representatives from a cross-section of our Branches and business lines to participate in a small "visionary" committee. To this committee I assigned the task of crafting a vision and strategy that could guide the Department in its thinking about how to use information and knowledge to help Canadians maintain and improve their health. The vision and strategy could then be presented to the rest of the Department as a starting point and a foundation for discussion.

This vision and strategy was tabled at the Health Information Strategy Steering Committee (HIS) on December 9, 1998. After extensive discussion, members concluded that it was ready to be brought forward to the Department as a whole for continued discussion. Members furthermore recommended that operational plans be developed to continue the momentum. This vision and strategy, in the context of the debate that I hope it inspires, will serve as a founding directional piece to bring us toward a state where we generate and use knowledge consistently and comprehensively to support business goals.

I would like to take this opportunity to thank all who took part in this project for the hard work and intellectual vigour they applied to it. The Department now has an excellent starting point from which to open the debate internally, and with our colleagues and partners, on how we can use knowledge strategically to support our mission. I invite anyone with an interest in the health system to review this document and consider its messages in light of your own work requirements, both current and anticipated.

Executive Summary

The demand by the public for faster and better access to information, and the untapped potential of the Information Highway, led Health Canada into quite a few knowledge and information initiatives by the Summer of 1998. The HIS Internal Steering Committee, chaired by Alan Nymark, commissioned the development of a vision and strategy for Knowledge Management and IM/IT in September 1998 to align the department to work in concert toward a consensus vision, tied strategically to departmental business.

A "Visionary Committee", chaired by Marie Fortier, of senior officials in the Department was established to develop a strawman vision and strategy for review by the HIS Internal Steering Committee. Members were chosen from a cross-section of Branches and business lines. The group felt that as a department "We don't know what we know"---"We don't know what we need to know"--and---"We don't know what information we have (or need), or where it is, or how to find it."

It was clear that a more strategic approach to managing knowledge and information was critical to support current and future initiatives. We cannot create knowledge helter-skelter without clear means to capture it, classify it and make it accessible.

The Committee felt that the shift in culture within the Department from a traditional, more industrial model, to one in which knowledge and innovation are valued, needs to be acknowledged by all, and supported strategically by Management to focus on common goals.

The Committee recommends that the following vision be adopted for the way in which we would like Health Canada to be, and be perceived, in three to five years :

Health Canada analyses, creates, shares and uses knowledge strategically to maintain and improve the health of the people of Canada in the following ways: through its knowledge management processes and strategies, which are tailored to advance the business lines of the department; as a model knowledge organization; and as a leader, facilitator and partner, in the development of a Canadian health infostructure.

Health Canada defines knowledge management as a departmental strategy for ensuring that health knowledge and information are identified, captured, created, shared, analysed, used and disseminated to improve and maintain the health of Canadians. The strategy acknowledges and builds upon the need for Health Canada to assist in improving -- and to interact as a valued partner in -- the health system through influence and outreach, through world-class analysis and research products and capacity, and through

connecting and empowering employees via IM and IT infrastructure, tools and services. Working within an intricate policy and legislative environment, the strategy must support departmental priorities and business lines, recognizing that in one way or another, all Branches and the department as a whole are in the health knowledge business. The strategy must also rely on and build from our professional and societal values to nurture and sustain a learning and knowledge culture. The Committee recommends that the following **principles** be adopted as the foundation upon which the strategy is built :

Committed leadership must be exercised in valuing, analysing, creating, sharing and using knowledge.

Health knowledge must be: analysed, created and captured wisely; easy to access; shared thoughtfully; and managed well.

The **strategy** for building a knowledge and learning culture in Health Canada begins with building capacity, skills and tools to capture, create and share knowledge from targeted and improved health research and analysis. From a more strategic and collaborative approach to analysis and research, the demand for knowledge, information and data can be determined. Analysis and research would be shared, disseminated and communicated, for various audiences, using a variety of formats and media.

Several strategic initiatives are proposed to assist in achieving the vision:

1. **Develop a knowledge** culture including the establishment of a Chief Knowledge Officer, the creation of a capacity to improve and implement knowledge strategy (frameworks, priorities, plans), and to lead knowledge culture initiatives (communities of practice, knowledge-maps, sharing). It also recommends the establishment of knowledge business specialists who would ensure that knowledge, information and data are developed, found or acquired and that technology tools (discussion databases, intranet) are identified and built, to meet business needs.
2. **Conduct analysis and research** by creating an internal capacity (staff, analytical frameworks, methodologies, publications, reports, briefing notes, seminars, conferences), influencing the national health research agenda, and developing skills (all staff), and "absorptive" capacity.
3. **Create health infostructure** by identifying, nurturing, investing and partnering in projects, consulting stakeholders (Ministers Advisory Council on Health Infostructure, CIO Forum, etc.) and developing and influencing policy and standards (privacy, security, connectivity).
4. **Provide enterprise IM and IT services** by developing and maintaining architectures, infrastructure and tools.

If the strategy is successful, the result will be

- a strengthened federal role in health for Health Canada, through value-added, strategic and policy-driven information and analysis, developed by a critical mass of world-class in-house expertise,
- improved policy research-and-development products, advice and abilities,
- better and consistently improving service to Health Canada clients, and
- strong support by Health Canada to the priorities of the Clerk of the Privy Council.

The establishment of the Information, Analysis and Connectivity Branch in November 1998 demonstrates departmental commitment to this vision and strategy.

I. Vision

I.1 Narrowing the Gap Between the Status Quo and our Desired Future

Health Canada needs to strategically and aggressively narrow the gap between the status quo as described in the adjacent text box, and its desired future as follows :

The Status Quo - At Health Canada we do not,

- know what our employees know,
- know what information we have
- know what information we need
- have a coordinated approach to the capturing of employees' knowledge, or
- have a guiding blueprint for investments in knowledge, information, applications or technology.

- knowledge is recognized as a tangible, mission-critical resource;
- knowledge management is integrated into business initiatives and processes as a means of fulfilling business requirements;
- Health Canada's Management supports and invests in knowledge initiatives which continue to build knowledge and IM/IT infrastructure, tools and services to support the department's business lines;
- Health Canada employees at all levels have fully endorsed and adopted a knowledge and learning culture;

- Health Canada is a recognized leader in the development and implementation of a Canadian health infostructure which is built on common infrastructure and standards where logical and cost-effective;

Health Infostructure is defined as :

The application of communications and information technology in the health sector to allow the Canadian public, patients and caregivers, as well as health care providers, health managers, health policy makers and health researchers to communicate with each other, share information and make informed decisions about their own health, the health of others, and Canada's health system.

- Health Canada systematically creates knowledge and influences the conduct of research where there are knowledge gaps, shares this knowledge securely and uses new and existing knowledge effectively in taking evidence-based decisions; and
- Health Canada is a respected business partner and active participant in communities of practice, nationally and internationally.

I.2 The Vision Statement

Health Canada analyses, creates, shares and uses health knowledge to maintain and improve the health of the people of Canada :

Health Canada's Mission

To help the people of Canada maintain and improve their health.

- through its knowledge management processes and strategies which are tailored to advance the business lines of the department;
- as a model knowledge organization; and
- as a leader, facilitator and partner, in the development of a Canadian health infostructure, responding to national and international trends and opportunities.

I.3 Working Definitions of Knowledge Management Terms

The term 'knowledge' is used extensively in this document and often appears in association with, and can be confused with, the terms, 'information' and 'data'. To clarify the distinction, 'knowledge' is defined as follows :

Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provide a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. T.H. Davenport and L. Prusak, Working Knowledge

Working Definitions of KM Terms

Data are facts, observations, or measures that have been recorded but not put into any meaningful context. A single musical note is data.

Information is data that has been arranged in a systematic way to yield order and meaning. A series of notes arranged into a tune is information.

Knowledge is information in the mind, in a context which allows it to be transformed into action. A musician is able to play a tune because of his knowledge.

The two key distinctions to be made among knowledge, information and data are firstly, that knowledge exists in the mind, and secondly, that knowledge is a framework for evaluation. If, for example, a heart surgeon writes down instructions for performing a new transplant procedure on a piece of paper, the contents of the paper (i.e., information) will become knowledge when read by another heart surgeon who understands the context and how to apply it. It remains information when read by a non-surgeon who understands only the general concept of a heart transplant, and it becomes data when viewed by a person who does not speak the language in which it is written.

It is because knowledge is contextual that knowledge management initiatives have to be described as sets of information management / information technology (IM/IT), learning, and business initiatives. These initiatives aim to get information to the people who need it, give them the tools and freedom to analyse it and fill gaps, and give them a framework in which to apply it. The actual transformation of information into knowledge occurs at all stages in people's minds and becomes evident only in the decisions they make and the actions they take. Knowledge management, therefore, aims to create the same fluid mix of framed experience, values, contextual information, and expert insight within the organisation that exists within the individual mind, thereby providing the organisation with a framework for evaluating and incorporating new experience and information. The transformation to a knowledge management culture would consequently only become evident in the decisions the organisation makes.

The Giga Information Group (March 1998) has advised its clients that knowledge management will never possess the kind of crisp definition afforded its individual components. Knowledge management tends to be defined by the organization applying it and by the organization itself.

Health Canada has defined knowledge management as per the adjacent text box, to provide a common understanding of the way in which knowledge management will be applied to meet today's needs and prepare people for a future, more knowledge-based health system and society. Knowledge management will be different and applied differently in each of the business lines of Health Canada. In some cases, it is the creation and dissemination of knowledge that constitutes the business line, and in other cases the business line relies on ready access to knowledge.

As program operations should influence knowledge management, so should knowledge management be a strength called upon in the design and delivery of the business of the department. Knowledge management, with IM and IT as "enablers", should add significant value to the management of the department's business, by providing techniques for comprehensive evidence generation and assessment, more economical delivery, better service and improved efficiency.

Health Canada Operational Definition of Knowledge Management

A departmental strategy for ensuring that health knowledge is identified, captured, created, shared, analysed, used and disseminated to improve and maintain the health of Canadians.

Health knowledge is defined to encompass information, skills, expertise and experience related to and supporting health and the health system, nationally and internationally.

I.4 Rationale - The Business Case for Knowledge Management at Health Canada

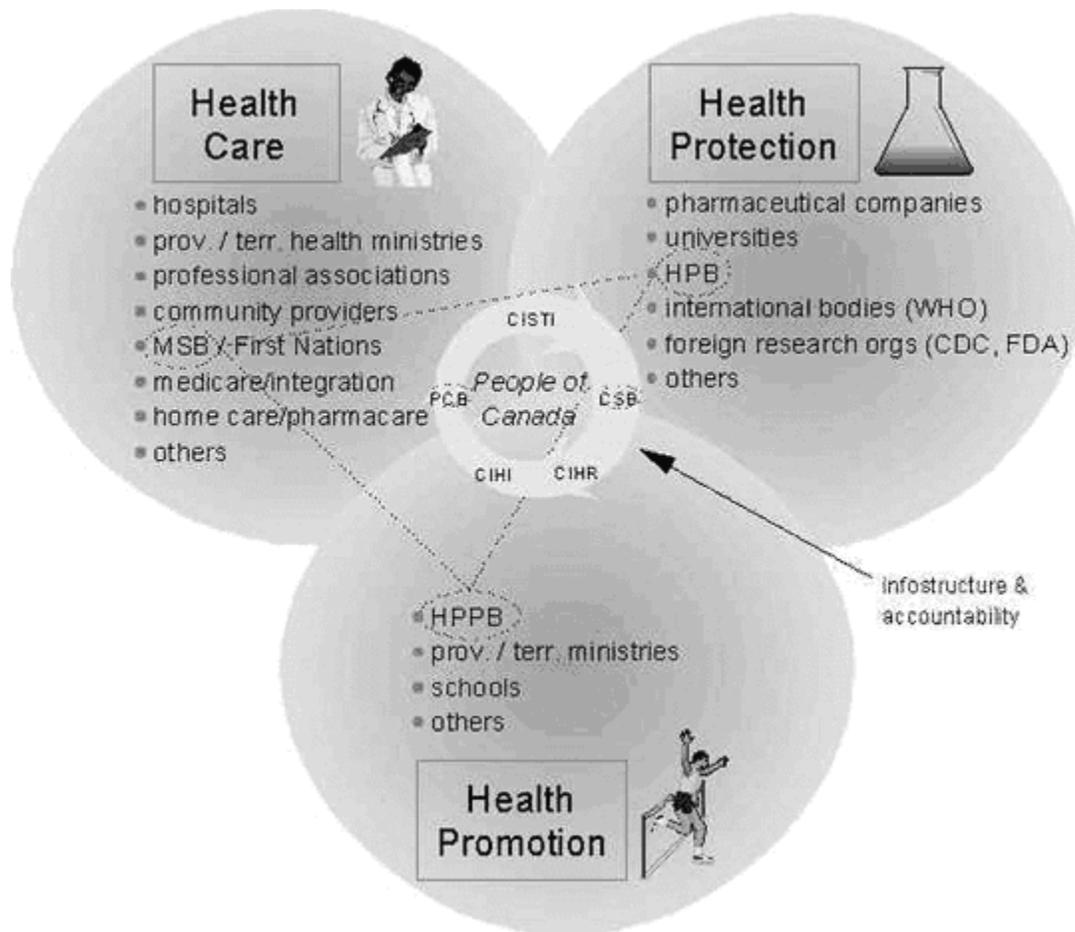
Better health decisions will be made if health knowledge is created strategically, shared effectively and managed efficiently. Health consumers can hold providers to account, and providers can better serve consumers, when knowledge provides the evidence base for health decisions. Strategic investments in knowledge and commitment to knowledge culture, then, are instrumental in maintaining and improving the health of Canadians.

Health Canada's Strategic Learning and Development Policy - The Foreword

The world is moving into a "knowledge economy" where the performance of organizations will depend more and more on the acquisition, sharing and application of knowledge. This is why Health Canada considers Learning and Development activities, aimed at enhancing knowledge and skills, to be a priority and an essential business investment that contribute to the attainment of departmental objectives and of employee career goals. It is through the development of knowledge that Health Canada can achieve enhanced service to the public and greater organizational performance.

Health Canada is prepared to provide leadership in the development of a national health infostructure, building on existing and future Canadian and international infostructures, to strengthen the ability of people to make informed choices about their own health, the health of others and Canada's health system (as per the following graphic).

Participants in the Health System

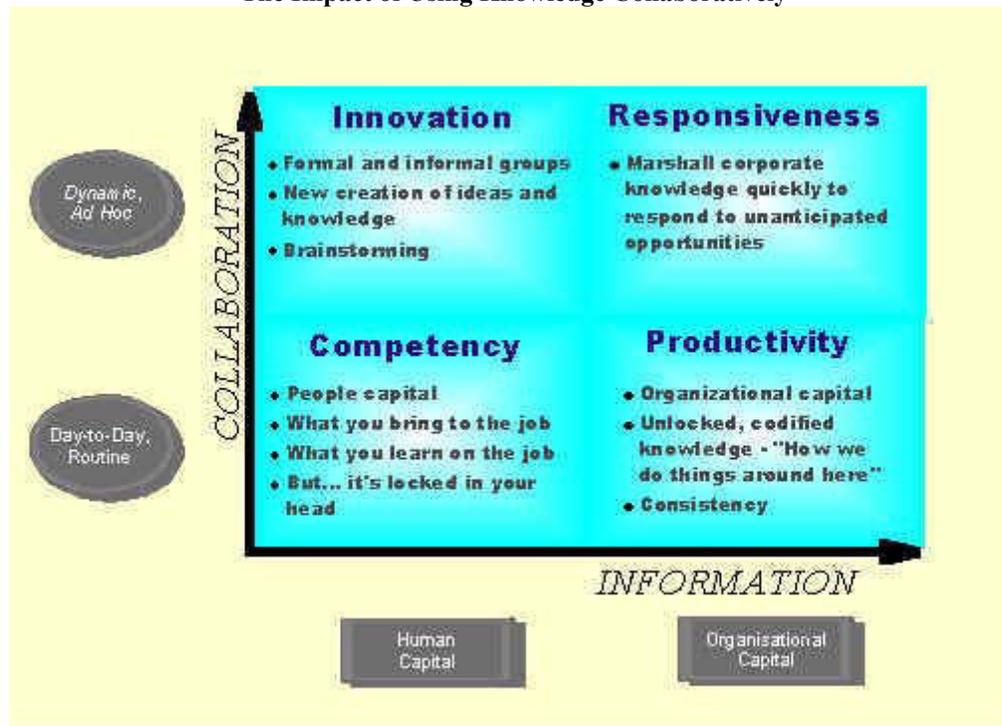


Health Canada recognizes the central role of knowledge in improving the health system, and is committed to investing in learning and development, IM, and IT to build and maintain business-driven knowledge management infrastructure, tools and services.

This commitment is consistent with the three priorities of the Clerk of the Privy Council: to strengthen policy capacity (in our case, by creating, sharing and using health knowledge strategically and across departments); to modernize service delivery (by

developing a national health infrastructure); and to build a vibrant national Public Service adapted to future needs (by developing health knowledge workers).

The Impact of Using Knowledge Collaboratively



Adapted from a graphic of Lotus Corporation's KM model

II. II. The Knowledge Environment at Health Canada

II.1 Both Enterprise- and Health System-Views – "We are but one player"

The Health System-View *(Our Facilitative Role)*

Knowledge management begins with a strategic approach to the creation of knowledge, usually by assessing gaps between the supply of, and demand for information in a given health information domain. Health Canada cannot alone assess critical health information gaps. Nor can Health Canada work alone in the conduct of its business. Health Canada is one part of a much larger national health system, which itself is part of a much larger international health system. Any approach that Health Canada adopts for knowledge management, then, must align the department with partners in the health system, while at the same time creating and managing knowledge that allows it to be an effectively functioning contributor to the health system.

In the initiative to create a Canadian health infrastructure, Health Canada is one player among many representing provinces and territories, health professions, academia, health organizations, First Nations, the private sector, the general public and the rest of the federal government. The approach to knowledge management must assist the department to fulfill its role in the national health infrastructure, which will empower the public, strengthen and integrate health services and create the information resources for accountability and continuous feedback on factors affecting the health of Canadians.

The Enterprise-View *(Our Operational Role)*

The approach to knowledge management must assist the department in meeting the commitments laid out in its Business Plan, in delivering on all of the legislative and operational requirements of the department's business lines and in ensuring

that knowledge improves the department's ability to establish and meet these obligations in the future.

Is there a difference?

The enterprise-view focuses on resources within the department; whereas, the health system-view may deploy resources into the health system, outside the department. The enterprise-view ensures interoperability within the department and, as one node on a larger national health web, seamless communication with health partners. The health system-view promotes common standards, national strategies for privacy and security and investments in information and technology infrastructure. The department too needs common standards to minimize costs of information and technology, common strategies for privacy and security and timely investments in information and technology. In both views, the department must show leadership in bringing together people, information and technology to create, capture and use health knowledge.

II.2 Culture and Values

Health Canada is committed to maintaining and improving the health of Canadians. The values that are reflected in this commitment are honesty, integrity, trust, responsibility, transparency, hard work, teamwork, innovation, cooperation, fairness, dignity and respect. At the same time, employees of Health Canada have very strong allegiances to the health constituencies they serve and to own organizations within the department. As a result, there is a need to overcome organizational boundaries when they become an impediment to sharing knowledge. We should, therefore, build on our strengths and model our knowledge culture on our values.

The accuracy, completeness and value of knowledge in the organization are completely dependent upon the full and informed participation of all employees. Departmental business and functional line managers and employees are key partners in operationalising the knowledge management vision for the department. To fully exploit existing information, create it where required and share it with colleagues across traditional barriers, a cultural shift is required in the department. Managers must lead by example, demonstrating this shift by both words and action.

Recently Health Canada has been subject to much public scrutiny. Commitment to capturing the knowledge that is used in decision-making processes will place the department in a position to explain responsibly why decisions were taken, given the environment, context and information known and available at the time. The 1998 internal audit of Health Canada's record keeping practices suggests that there is much work to do to better manage records, let alone information or knowledge. The adoption of a record keeping culture is a part of the necessary cultural shift.

There are changes taking place in Health Canada, leading to an environment that is now ready both for a concerted approach to knowledge management and to foster the knowledge culture. We have the values, we need to nurture and sustain the culture.

Management styles are beginning to shift at Health Canada, as they are in the rest of government and the private sector, toward those of a knowledge culture (see table on following page):

Evolving Management Styles at Health Canada		
Management Domain	From: Traditional / Industrial (Financial Capital)	To: Knowledge / Innovation (Human Capital)
Basis of Power	– information holding	– information sharing
Basis of Authority	– jurisdiction	– accountability
Performance Measures	– financial – static – \$ as assets – counting inputs	– comprehensive – dynamic – relationships as assets – assessing outputs, outcomes
Structure /	–hierarchical	– horizontal

Culture	<ul style="list-style-type: none"> – competitive – market-share – borders and boundaries – inward focus – reporting on training taken 	<ul style="list-style-type: none"> – collaborative – sets of alliances – value-adding – outward focus – learning organization
People / Leadership	<ul style="list-style-type: none"> –cost / expense – profitability – train for new tasks – enterprise-view 	<ul style="list-style-type: none"> – revenue / investment – sustained growth – continuous learning – enterprise- and health system-view
Process	<ul style="list-style-type: none"> – independence – segregated, discrete – opinion-based recommendations 	<ul style="list-style-type: none"> – interdependence – integrated, holistic – evidence-based analysis
Information	<ul style="list-style-type: none"> – boxing paper records until the warehouses are full – small library acquisition budgets – paper drug approvals with scattered process trails 	<ul style="list-style-type: none"> – creating good paper and electronic records, classifying them for easy retrieval, retaining those with operational value, safeguarding those with historical and archival value – strategic approach to the creation and acquisition of needed information – electronic drug approvals, with links to all related information
Technology	<ul style="list-style-type: none"> –firewalls to exclude outsiders – information processing – warehousing 	<ul style="list-style-type: none"> – firewalls to welcome trusted partners – knowledge creation and management – using and sharing; flows, processes

II.3 Departmental Priorities

The Health Canada Business Plan for 1998-99 to 2000-01 indicates that one of three challenges for this time frame is "to enhance the quality and availability of health information and knowledge for decision-making". All of the business plan priorities require improved knowledge creation and management. Priority 5 of 6 is, in fact, to "Enhance the Availability of Health Information and Knowledge for Decision-Making".

The department is recognizing that health knowledge is a public good held in the hands of the few, but required by many. The people of Canada deal with this imbalance by relying on "the few", the health providers, to interpret this complex knowledge, and make recommendations on their health. Traditionally governments have been involved in the health system to improve and maintain health through prevention, promotion, cure and care. Each of these areas relies strongly on knowledge and information. This, plus the growing demand by the public for information on their own health, has led government into health information infrastructure to rectify the imbalance, and empower Canadians to make better decisions regarding their own health.

Improving health information aggressively and strategically is not only a new and very important priority for Health Canada, but also integral to supporting the government-wide priorities of transparency and accountability:

II.4 Legislative and Policy Environment - Overview

The legislation upon which Health Canada is founded is the Department of Health Act. This Act defines a number of roles and responsibilities for the department, ranging from promoting the well-being of Canadians to protecting Canadians against diseases to establishing safety standards for consumer products. Similar health legislation exists in provinces, other countries, and other jurisdictions, and these contribute to the overall environment in which the department operates.

The department is also responsible for adhering to various cross-governmental policies and legislation which govern the accessibility, use and management of government information, such as the Access to Information Act, the Privacy Act, the National Archives Act, and the "Management of Government Information Holdings" policy. Other cross government policies, such as the Federal Identity Program and the Official Languages Act, govern the provision of

information and knowledge to employees and the public.

Given that it will encompass both the department's business and its information, a knowledge management strategy can serve as a bridge between the legislation governing Health Canada's role and the legislation governing the management of its information. See Appendix B for an expanded description of the policy and legislative environment.

III. Principles

The vision comprises five defined principles :

- III.1 Committed leadership must be exercised in valuing, analysing, creating, sharing, using and investing in knowledge.
- III.2 Health knowledge must be analysed, created, and captured wisely.
- III.3 Health knowledge must be easy to access.
- III.4 Health knowledge must be shared thoughtfully.
- III.5 Health knowledge must be managed well.

These principles capture the ways in which health knowledge is treated in business processes. Each business line treats knowledge somewhat differently. See Appendix C for an example (provided by the Pest Management Regulatory Agency) of knowledge being used to protect the health of Canadians.

1. **Committed leadership must be exercised in valuing, analysing, creating, sharing, using and investing in knowledge.**

Health Canada will demonstrate leadership by valuing, analysing, creating, sharing, using and investing in health knowledge to improve and maintain the health of Canadians.

Common sense and business case discipline will be exercised in determining how much information to create, how much to share, and how much to make readily accessible. Knowledge management will be tailored to each business line, according to its need, and not become an end in itself. Efficiency and effectiveness considerations will provide the basis for making investments in the public good. Strategic alliances with health partners will be formed where knowledge, expertise and experience can be shared to maintain and improve the health of Canadians.

Management will provide a framework within which employees can develop new and innovate ways to provide service, and will work with employees to create an environment that encourages appropriate risk-taking. Management will be prepared to accept the consequences of flexibility and reasonable risk-taking.

Knowledge management will be integrated with business processes to ensure that the right information is applied at the right time, and that products are comprehensive and logically linked to decisions, processes, inputs, functions and business lines. Strategic and operational outputs will emerge from logically redesigned knowledge-driven business processes. Otherwise, one risks "paving the cow path".

The knowledge, expertise and experience of employees and health partners will be respected and valued. Innovations will be fostered and used, and intelligent entrepreneurship will be celebrated. Employees will be provided with opportunities to share their knowledge. A learning culture will be fostered, to facilitate the development of new knowledge, the acquisition of new skills and the sharing of this knowledge and skills with others.

2. **Health knowledge must be analysed, created, and captured wisely.**

Health knowledge will be analysed comprehensively and health decisions will be made on the basis of analysis. The field

of health analysis will be developed and treated as a discipline. Gaps in knowledge that emerge in the course of analysis will be identified and measures taken to ensure they are resolved. Research will be planned in a coordinated fashion and conducted to fill identified knowledge gaps and otherwise create the analytical base for informed decisions. Information will be created to promote transparency and accountability for health strategies and expenditures.

3. Health knowledge must be easy to access.

Existing and new information will be structured for easy access and exchange using fully integrated business and technical protocols. Existing knowledge will be identified, located, and otherwise made explicit to the organisation using knowledge maps. Knowledge maps will furthermore identify who is accountable for what knowledge.

4. Health knowledge must be shared thoughtfully.

Knowledge will be actively documented, shared and re-used where better health decisions could result, not only as a clear business need, but as a performance expectation. Existing knowledge sharing networks will be recognised and supported. Official Languages legislation and Communications policies will be observed, and common definitions used wherever possible.

5. Health knowledge must be managed well.

Knowledge will be managed well to help fulfil the department's mission. Managers will understand that responsibility for knowledge management belongs to them and will know how to integrate knowledge management practices into their work. Organisational roles will be defined to ensure that managers and employees are provided with the support they need to manage knowledge well.

IV. Strategies and Strategic Initiatives

The following strategies, each with a complement of strategic initiatives are proposed to address the principles listed above. Strategies focus on both the health system view and the enterprise view, as described in II.1 above. They are summarized below and then described in detail on the following pages.

IV.1 Exercise committed leadership in valuing, analysing, creating, sharing, using and investing in knowledge.

- 1.1 Establish a Chief Knowledge Officer, accountable for the knowledge management function.
- 1.2 Establish a framework for knowledge management.
- 1.3 Support knowledge management initiatives proactively.
- 1.4 Invest in a sustainable and modular health infostructure.
- 1.5 Value the knowledge, expertise and experience of health workers.
- 1.6 Evaluate progress in adoption of knowledge management culture.

IV.2 Create an integrated analytical and decision-making capacity.

- 2.1 Create a culture in which decisions are founded on evidence-based analysis.
- 2.2 Improve the department's capacity to analyse health system performance and outcomes.
- 2.3 Create an integrated analysis and research function in the department.

IV.3 Make health knowledge easy to access.

- 3.1 Create knowledge maps.

- 3.2 Create and enhance data and information models.
- 3.3 Adopt tools and protocols for sharing information electronically.
- 3.4 Remove barriers to access.

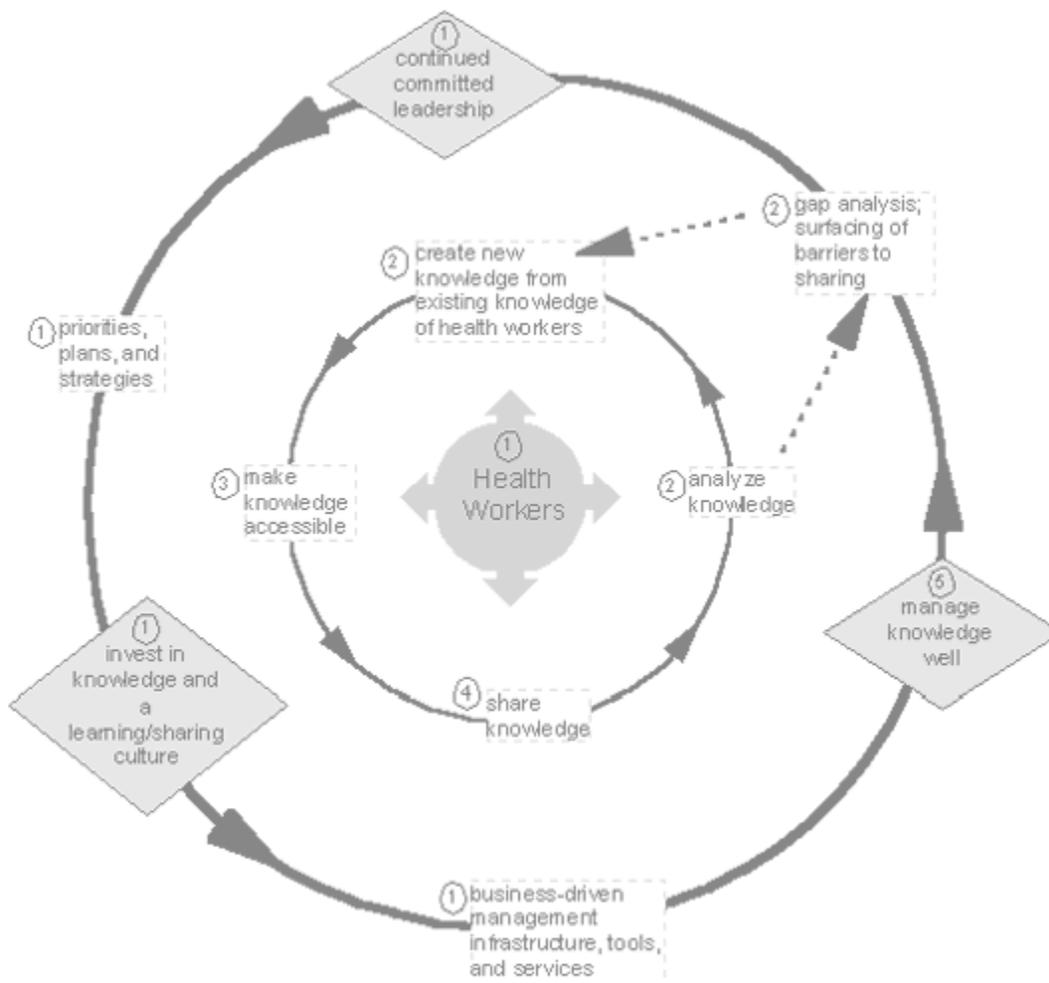
IV.4 Share health knowledge thoughtfully.

- 4.1 Encourage the formal and informal identification of and support to communities of practice.
- 4.2 Facilitate sharing proactively.
- 4.3 Communicate health knowledge effectively and efficiently.

IV.5 Manage health knowledge well.

- 5.1 Establish knowledge business specialists.
- 5.2 Manage records through their life cycle.

The purpose of these strategies is to build the infrastructure required to support and enhance the knowledge management life cycle (KMLC), which is illustrated in the graphic below. Note that in the graphic, the circled number next to each component of the life cycle indicates which of the numbered strategies would most support and enhance it.



V.1 Exercise committed leadership in valuing, analysing, creating, sharing, using and investing in knowledge.

- 1.1 Establish a Chief Knowledge Officer, accountable for the knowledge management function.
- 1.2 Establish a framework for knowledge management.
- 1.3 Support knowledge management initiatives proactively.
- 1.4 Invest in a sustainable and modular health infostructure.
- 1.5 Value the knowledge, expertise and experience of health workers.
- 1.6 Evaluate progress in adoption of knowledge management culture.

1.1 Establish a Chief Knowledge Officer (CKO), accountable for the knowledge management function.

The CKO would guide the evolution of knowledge management in Health Canada and act as the knowledge business specialist (see Strategy 6.1) for the whole department. The CKO would coordinate the integration of knowledge management into existing frameworks and initiatives in the health system, function as a source of expertise on the frameworks and initiatives that relate to knowledge management, and flag potential knowledge management initiatives or barriers to knowledge management in the health system. The CKO would represent Health Canada on national initiatives such as the Canadian Institute for Health Information (CIHI) or the Canadian Institutes of Health Research (CIHR), and/or coordinate between the departmental representatives. The CKO would also be responsible for leading the cultural change.

1.2 Establish a framework for knowledge management.

A framework to facilitate responsible management of knowledge-related assets (people, knowledge, information, software, hardware) and the provision of knowledge-related services (knowledge, information, applications and technology), through good governance (policies, standards, guidelines and consensus-seeking committees) and good planning (strategic, investment, project, operational).

The Knowledge Management Architecture

- 1. Governance and Planning (Managing).
- 2. Knowledge and Information (Informing))
- 3. Applications & Technology (Applying Technology)

A Knowledge Management Architecture (KMA) for the department (see proposed structure in Appendix D) is proposed as per the text box above. It would assist the department in determining how it wishes to invest in and manage knowledge assets. The information management subcommittee of the departmental executive committee, the DEC-IM, requested the development of an IM/IT architecture to complement a good vision and strategy for IM and IT, at its March 1998 meeting. The KMA would respond to this request and augment it with a knowledge and knowledge management optic. It would also situate better the role of the CKO, and assist in refocusing the IM/IT governance structure in a knowledge environment. The KMA would support employees at all levels by providing the tools necessary to use knowledge to help Canadians maintain and improve their health.

We must integrate knowledge management into existing frameworks for IM/IT and human resources planning, business planning, health system renewal, learning and development, and others. Planners are finding it difficult to integrate new knowledge management approaches into changing business processes, especially given the lack of vision, strategy and frameworks. One example of an approach to integration, in the light of such complexity is provided in Appendix E. It is the approach proposed for integrating Health Canada's contribution within the overall Canadian health infostructure, but it is also applicable more generally to knowledge management.

1.3 Support knowledge management initiatives proactively.

The proactive creation and use of knowledge should be promoted, valued and acknowledged. The department should seek out and support knowledge sharing initiatives whose aim is to improve and maintain the health of Canadians, both those that arise internally and those that arise from interactions with partners.

Management should participate visibly in initiatives and fora which seek to advance the state-of-the-art and the state-of-the-practice. Everyone should lead by example, regardless of position in the organization, to demonstrate the added value from creating, sharing and using knowledge innovatively and from collaborating with colleagues and partners.

Management should explain the benefits of knowledge management to new employees and seek ways to incorporate knowledge management meaningfully into their work. Management should identify and remove barriers to the creation, use and sharing of knowledge.

1.4 Invest in a sustainable and modular health infostructure.

The department should continue to support the work of the Minister's Advisory Council on Health Infostructure by leading the federal government's contribution to the establishment of a nation-wide health information system. This must be done in conjunction with internal and external partners, to enhance evidence-based decision-making and accountability for health expenditures.

By improving availability and accessibility to health-related information, a health infostructure can help provide more accurate intelligence on the effectiveness of the system and its strengths and weaknesses. An infostructure allows greater integration across the continuum of care, encompassing promotion and prevention, and the various kinds of direct health care. As such, an infostructure enables knowledge management across the entire health system. The Office of Health and the Information Highway (OHIH) is already sponsoring initiatives in this area, the Canadian Health Infostructure (CHI) projects among them.

To develop Health Canada's position on, and coordinate the department's contribution to, the textboxed and other potential initiatives, there is a need to develop a capacity within Health Canada to identify new ideas and proposals for knowledge

Comments on the Health Infostructure and Health Canada Challenges by the Deputy Minister and the Associate Deputy Minister to "Wrap-up" the September 1998 Management Council

- we do live in a networked world
- this is quite a change for the public and for the public service in general; the job ahead of us is ambitious
- all staff should be involved and engaged
- all staff should be provided with an opportunity to review and respond to the recommendations in the Interim Report of the Minister's Advisory Council
- it does and should mean empowerment; the generation of new ideas is important; if we do not try new things we do not make progress
- we will stand behind you if you fail trying something new
- recognize the innovations and achievements of your staff
- think positive, think service, but above all, think

For the health infostructure initiative to succeed, targeted, strategic investments are required, but which ones first? and with what scope? Potential initiatives include :

- provincial and territorial systems that encourage patient oriented systems and accountability (data collection and reporting) systems at the local level
- the continued development of privacy standards that reflect the concerns and priorities of Canadians
- the development of national "networks of networks" among key stakeholders, such as voluntary sector organisations, First Nations, community health centres, and medical libraries
- the development, spearheaded by CANARIE, of a very high bandwidth optical network and the corresponding development of broadband applications that could be applied to a health context, for example, satellite linkages for remote areas
- the creation of large scale applications in priority areas such as "telehealth", home care, pharmacare, and waiting lists
- the continued development of national and international data interchange and technology standards

management projects, define them, incubate them to the point that their viability can be assessed, and rank them according to the priorities set by the department in its strategic health information plan (see IV.2.2).

It is proposed that a Knowledge Innovation and Investment Office (KIIO) be established to develop this departmental position. It is further proposed that a committee be established, (or an existing one be used) to review and choose initiatives to pursue or support. Examples of projects for such consideration would be :

- the concept of creating a national health library for Canada, a network of health libraries and their networks;
- the integration of departmental data models with CIHI's national health data model; and
- the many sub-projects and application ideas that make up the CANARIE initiative for creating a broadband optical network.

In addition to incubating new initiatives, the Office would look ahead several years to determine which technologies are emerging globally, identify those which could be used to improve the department's delivery on its business priorities, and propose projects accordingly.

The Office would recognize, promote and communicate knowledge initiatives.

1.5 Value the knowledge, expertise and experience of health workers ¹.

Explain the benefits of proactive creation and use of knowledge, based on the expertise and experience of health workers :

Continuous learning culture is one in which employees have ready access to learning opportunities which prepare them for the challenges of meeting current and future business needs.

Knowledge culture is one in which knowledge is treated as a valued resource and applied strategically to meet business needs

- promote knowledge management success stories;
- focus groups of employees should be held to establish grassroots ideas on ways to establish knowledge and learning culture;
- learning initiatives should be further upgraded to include knowledge management content; and
- a 'dog and pony' show on knowledge management should be developed.

Seek out opportunities to transform individual knowledge into organisational or health-system knowledge. Encourage innovations which lead to the creation, sharing or use of knowledge. Promote the adoption of procedures and tools which allow health workers to document (i.e., codify), and thereby share, their domains of expertise, knowledge and experience.

1.6 Evaluate progress in adoption of knowledge management culture.

Progress toward effective use of knowledge in business processes should be evaluated through the performance appraisal process, through monitoring take-up on knowledge-related initiatives, and through assessments of the impact of these initiatives on the business line.

¹ Health workers are employees of Health Canada dedicated to improving and maintaining the health of the people of Canada. On a broader level, health workers are composed of the myriad of people involved in health care and are actively at play in the health system across Canada. They are researchers, health economist, social marketers, social worker, inspector, scientists, chemical or bioengineers, nurses, dentists, pharmacists, hospital administrators, physicians, etc. who contribute or have contributed in some way to public health.

IV.2 Create an integrated analytical and decision-making capacity.

- 2.1 Create a culture in which decisions are founded on evidence-based analysis.
- 2.2 Improve the department's capacity to analyse health system performance and outcomes.
- 2.3 Create an integrated analysis and research function in the department.

2.1 Create a culture in which decisions are founded on evidence-based analysis.

Create a culture in which research and knowledge development activities are translated into informed policy decisions. Build links between the health policy development function, the health research function, and the IM/IT and human resource development functions.

Under the direction of the departmental executive committee, assess the current alignment and disposition of these functions in the department for the purpose of :

- identifying the types of research that are needed for policy development
- determining what conditions will support "policy relevant" research
- exploring the connections between research and policy that are needed to ensure that research is relevant and useful to the policy development process
- identifying the IM/IT and human resource frameworks and architectures that will support research and policy development

Develop plans for the integration and alignment of the policy and research functions at the departmental level (see Appendix F for an overview of a proposal for building a policy/research capacity in Health Canada). Continue to support the evolution of health research in Canada as a whole from the capacity building stage, where the focus is on making targeted grants, toward a fully networked, integrated stage in which research results are operationalised in clinical practice.

As part of the process of evolution, create mechanisms for filling knowledge gaps as they become apparent. The process can be focussed either internally or externally.

Internally, develop strategic information plans for filling knowledge gaps within the department, whether by :

- improving access to data and information as outlined in section IV.3;
- sharing knowledge as outlined in section IV.4; or
- managing knowledge better, as outlined in section IV.5.

Externally, create a capacity for developing the Health Canada position on the setting of health research priorities, and for representing these with the major research institutions and granting agencies (IV.2.1). By taking a coordinated, departmental approach toward the setting of research agendas, this entity will help target health research more effectively to build capacity in the health system.

The department will improve its own capacity in this regard, and the capacity of the health system as a whole, by participating actively in and serving as a link between, the initiatives described below :

- the department's Fall Strategy to improve accountability for health expenditures and outcomes by creating new health knowledge on the long term impacts of health care interventions and on the management and cost-effectiveness of the health sector, and by supporting better health policy formulation and analysis.

- the Health Information Needs Project, a collaborative initiative between the Canadian Institute for Health Information, Statistics Canada and Health Canada. This Project is tackling the current inability to capture data pertaining to health outcomes, appropriateness of services and overall system efficiency and effectiveness.

Priorities of the Health Information Needs Project

- building capacity at the provincial, regional and community level for information use and evidence-based decision-making.
- distributing information on health to consumers
- decreasing cycle times, be it in terms of policy development, analysis and reporting
- improving quality of health system performance based on comparability of outcomes at all governance and population levels
- increasing system efficiency and affordability

- the Policy Research Initiative, which was founded in July 1996 by the Clerk of the Privy Council and tasked with examining the pressure points Canadian society is likely to experience in next ten years, identifying gaps in our knowledge, creating a research plan to fill the gaps, and working horizontally.

Policy Research Initiative (PRI) Draft Interim Report (October 1996) (p.356)

An important function of policy research must be the transformation of leading-edge theoretical and empirical research into recommendations for pragmatic policy initiatives. In that respect it is crucial that the research function cement close ties with the policy development functions. In practice, however, this means there needs to be a forum to consider and discuss the results of research work

- the Canadian Population Health Initiative, formerly the National Population Health Institute, which was proposed by the National Forum on Health and given the mandate to aggregate and analyse data, develop data standards and common definitions, report to the public on national overall health status and health system performance and act as a resource for the development and evaluation of public policy.

- the Medical Research Council (MRC) and its proposal for Canadian Institutes of Health Research (CIHR), which are to foster a cross-country network of research centres that share knowledge and help set national health research priorities. The CIHR aims in the long term to develop a 'centres of excellence' approach to health research, in which similar projects emerging from different jurisdictions are linked around a theme.

MRC Presentation to Ottawa Life Sciences Council, 23/10/98: CIHR Targeted Outcomes :

- 1000 new grants
- doubling size of each grant [to internationally competitive levels]
- 10% of world biotechnology market
- boost translational research
- anticipation, prevention of health care crises
- 50,000 new jobs

- the federal granting agencies for health research, including :
 - the National Health Research Development program (NHRDP), which is Health Canada's program for supporting extramural Canadian health research and researchers
 - the Canadian Health Services Research Foundation (CHSRF), which facilitates the production, dissemination and uptake of research for evidence-based decision-making in the management, organization and delivery arrangements to health services
 - The Social Sciences and Humanities Research Council (SSHRC), which is Canada's federal funding agency for university-based research and graduate training in the social sciences and humanities.

- the Science Advisory Board, which reviews the scientific, technical and policy aspects of HPB programs. The Board uses knowledge to determine whether HPB's science and technology base is adequate for meeting its business requirements and to identify areas where improvements could be made.

Scope and Purpose of the Science Advisory Board (excerpt from Terms of Reference)

- recommending, as appropriate, new or revised criteria or standards for setting priorities for public health issues and programs;
- reviewing and advising on new information needs and on future human resource needs for scientific and technical programs;
- providing advice on partnerships and strategic linkages with local, regional and international agencies....; and
- reviewing and advising on scientific and technological trends in a global context and the issues and opportunities that are driving this change.

2.2 Improve the department's capacity to analyse health system performance and outcomes.

Support the development of health analysis as a discipline. Support the creation of a body of theories, techniques, and tools for analysing health system performance. Establish meaningful measurements and metrics, comparable to those used in economics or sociology, with which to evaluate the health system, assess the outcomes of decisions on the health of Canadians, and set long term performance goals. Establish standards for ensuring the integrity and quality of the evidence generated through analysis. Establish protocols for packaging and disseminating the evidence generated by analysis.

To create these competencies, the department will :

- identify, support, and sponsor formal and informal communities of practice in the field of health analysis (see IV.4.1);
- in the context of communities of practice, implement practices and procedures that will encourage the identification, development, and documentation of techniques of applied health analysis;
- invest resources in developing the skills of existing analysts and recruiting new analysts, for example, by means of a university recruitment campaign;
- participate actively in cross departmental, national, and international initiatives that make extensive use of health analysis (see IV.2.1 for examples), and sponsor the creation of modules within one or several of those initiatives specifically devoted to the formulation of analytical techniques;
- improve the overall capacity of departmental employees to conduct, use, and understand analysis;
- raise the profile of health analysis in the department as a whole by encouraging key staff to pursue innovative approaches to using analysis to resolve health questions, whether through public opinion polling, collection of administrative health information, intensive statistical analysis, or other means.

2.3 Create an integrated analysis and research function in the department.

Create a cadre or critical mass of subject matter experts in the department who are capable of conducting in-house health analysis and research and absorbing externally produced analysis and research. Build this cadre's capacity to package and disseminate the evidence thus generated for programs and clients to use in making decisions. Clearly define this cadre's role in the department with respect to the programs.

The function will :

- identify and establish analytical methodologies and best practices by

The Health Canada Strategy for Introducing Knowledge Culture

such means as adapting and adopting internally and externally developed analytical techniques;

Invest in staff to improve analytical skills

Conduct good analysis to support recommendations.

Determine the information and data required to support analysis.

- identify and analyse health system problems and issues and make recommendations, both independently and in support of program requests;
- develop the Health Canada position on the setting of health research priorities, and represent these with the major research institutions and granting agencies;
- identify gaps in knowledge in the department and the health system;
- establish long range plans and directions for knowledge management;

IV.3 Make health knowledge easy to access.

3.1 Create knowledge maps.

3.2 Create and enhance data and information models.

3.3 Adopt tools and protocols for sharing information electronically.

3.4 Remove barriers to access.

3.1 Create knowledge maps.

Establish criteria for assessing which types of knowledge should be identified. Identify key knowledge centres in the department and the health system and poll them to ascertain their respective knowledge bases. Publish this information in the form of a knowledge map which all participants can use as a reference. Establish protocols for maintaining and validating this information.

"Knowledge Sharing via Intranet", Information Week, Oct. 5, 1998

"[Becton Dickinson & Co. employee Roberta] Smigel sold the idea of creating a knowledge-sharing application that captures the combined wisdom of the company's 19,000 employees. One example is a technical database of best practices. This database is populated by information written by employees and serves as a contact resource and corporate technical encyclopaedia. Using the database of expertise, anyone in the company can find an in-house expert in plastic injection moulding in a few keystrokes. Likewise information on clinical microbiology, another core competency of the company, is readily available online... until the advent of an intranet, employees had no systemic way to share knowledge among departments..."

Begin by creating an employee directory, which is a list of all employees, along with their addresses, telephone and fax numbers, e-mail addresses, cell phone numbers, in addition to job title, duties and organization, academic training, skills, experiences, expertise, publications, areas of interest, community and volunteer work, etc. If useful, the concept could be expanded to outside of Health Canada. This type of directory is one of the first tools developed in companies adopting knowledge management. It is the "people roadmap". There are existing tools to build on (e.g., Corporate Services Branch's Directory, Policy and Consultation Branch's Lotus Notes database of non-governmental organizations). Knowledge maps like this assist communities of practice in establishing themselves, as they make common areas of responsibility or expertise visible and thereby encourage sharing.

3.2 Create and enhance data and information models.

Create models with which to structure health data and information.

In the case of health information, continue to refine and expand the Health Canada Business Model. Promote the business model as a tool for structuring all departmental information regardless of format and business line. Continue to incorporate the business model into records management processes and the organisation of the departmental website.

National Health Data Model

The Canadian Institute for Health Information (CIHI) is leading the development of a national health data model which would serve as the umbrella for all health data models in Canada. The project, which was initiated in October 1997, involves representatives from Health Canada as well as the Ministries of Health for British Columbia, Alberta, and Ontario. At a recent data modelling session, representatives from the provinces and every branch in Health Canada, including care providers, researchers, and surveillance people, achieved concord on what the basic data elements were and how they related to each other within the health system.

In the case of health data, continue to support and participate in the CIHI Information Model Group's efforts to create a national health data model to facilitate the sharing of data across jurisdictions and technical platforms. Identify and support existing and proposed Health Canada data models and integrate them into CIHI's emerging national health data model. Identify areas in which the data model could be 'drilled down' to enable sharing across databases. Use modelling techniques to map and improve existing business processes.

3.3 Adopt tools and protocols for sharing data and information electronically.

Adopt standard technologies and business processes for structuring data and information to enable electronic access and exchange. Adopt, in consultation with partners, standards that ensure openness, search and retrieval capability, and continued structural integrity. Adopt associated business processes to ensure that data and information are captured and used seamlessly in the course of executing the business function. Examples of protocols include the SGML format for structuring textual information (used in the Therapeutic Products Directorate of the Health Protection Branch), the Win Dais tool for accessing large numbers of databases from one point (used in the Health Programs and Promotion Branch), and intranets for organising and giving one-window access to corporate information (used in Industry Canada and elsewhere).

"XML: A New Tool for Government to Do More with the Web?" by John Dingwall in Canadian Government Executive, vol 4 # 4

"Organizations and 'communities of practice' can develop standard structures and components for documents like memoranda, analyses, reports or journal articles. It will then be possible to search across the sets of documents for items such as conclusions, recommendations, abstracts, and summaries, and to retrieve and assemble these in various useful ways."

Use business case approach to adoption of new technologies. Continue to integrate business and IM/IT planning, through IM/IT committees. Implement mechanisms by which business managers who identify a need can get the required assistance, be it technical, business, or human resources related, in formulating a solution. The project management office in the Information Management Services Directorate of the Corporate Services Branch does this for Health Canada already, but a mechanism for dialogue and collaboration with partners and other departments on similar projects should be identified or established in order to avoid 'reinventing the wheel'. National Archives, for example, maintains an inventory of electronic initiatives in the area of records management and sets general guidelines in consultation with other departments. Initiatives of this kind should be identified and news of them disseminated.

Promote awareness of the capabilities of electronic access tools through the use of information sessions and forums. Establish an inventory of relevant entrepreneurial projects both within and outside the department. Provide forum for those who are implementing structured information and reengineering processes to share information. Identify and publish best practices.



Health Canada Home Page

As quick hits, adopt and expand proven technologies such as an intranet, extranet, and Internet. Develop the intranet for Health Canada to share information as a working tool for employees. Develop an extranet capacity within Health Canada to allow for communities of practice to extend outside of the HC Enterprise Network, to include trusted partners (e.g., one could develop an extranet to link certain areas of Health Canada to provincial networks, in such a way that one could control which areas of the Health Canada Enterprise Network were accessible by the provinces). Continue to improve the Health Canada World Wide Web (WWW) site both as a source of information on health and the health system and a gathering place for health professionals and the public.

3.4 Remove barriers to access.

Assess the overall policy and procedural framework within which partner organisations currently grant access to information. Liaise internally and with partners to identify the major policy, procedural, and cultural barriers to granting access across jurisdictions and determine where these barriers are most problematic. One problem that has been identified by population health researchers is difficulty gaining access to statistical information that is stored with Statistics Canada.

Polling conducted for the Cabinet Committee on Communications

Canadians said they would like to see data banks centralized so they don't need to redo medical tests. Some also saw this as an illustration of integration... If it is linked to positive health outcomes, there is less concern about privacy... There would be concern if the goal was to create consumer profiles that individuals don't know about and for credit rating purposes. But for security and health concerns, they are prepared to suspend some of the control over personal information.

It is thought that partners, in turn, may have difficulty gaining access to information held within Health Canada. An example of a barrier that limits access in both directions is the requirement for all partnership information to be considered as departmental records and managed as such. The department needs to raise this issue with the National Archives, not only for the health system, but for all departments as all departments are entering into cross-jurisdictional partnerships.

Participate in and support CIHI's six working groups in defining and adopting emerging standards for health informatics/telematics and "enable the development of national, longitudinal electronic health records, accessible to health providers, researchers, policy makers, as well as health monitoring and surveillance agencies." The affected areas range from adopting common technical standards to defining privacy considerations.

IV.4 Share health knowledge thoughtfully.

- 4.1 Encourage the formal and informal identification of and support to communities of practice.
- 4.2 Facilitate sharing proactively.
- 4.3 Communicate health knowledge effectively and efficiently

4.1 Encourage the formal and informal identification of and support to communities of practice.

Establish a capacity to help communities share information proactively, using learning resources and groupware technology. Identify and build on existing initiatives and communities, such as the Canadian Health Network, the cancer group, and the Health Protection Branch's IM Working Group. Develop a plan for institutionalizing a capacity to assist workgroups to work more collaboratively. Identify best practices and successful groupware and disseminate this knowledge. Promote learning and the exchange of knowledge through informal practices.

Community of Practice

A community of practice is a group of individuals, defined by similar interests or business objectives and not necessarily by organization, who create, share and use knowledge to achieve a common goal. Knowledge management theory addresses ways to identify and support communities of practice.

4.2 Facilitate sharing proactively.

Encourage the sharing of information with colleagues. Pass along the context, and why it is that the information is thought to be useful or beneficial. This is especially important for health workers who have taken on new jobs or assignments.

Develop guidelines and procedures for passing along knowledge and information as a matter of course in one's work, and as an employee moves on to a new job, resigns or retires (including how to pass along or archive e-mail, what the manager's responsibilities are vs. the employee's, etc.). Mandatory exit procedures would be one example of a knowledge sharing procedure. Less formal, tacit procedures, such as the process used to gain approval for a file, should be identified and documented where necessary in order to communicate them to new employees and to make them more consistent and coherent.

Excerpt from "The Therapeutic Products Program Knowledge Management Strategy":

[We] need to understand the sources of knowledge, based on user-centric work activities :

- What is it that you do?
- How do you do it?
- When do you do it?
- Where in the organisation does it fit?

Information on the importance of sound knowledge sharing practices should be incorporated into the orientation process for new employees and the continuous learning process for all employees. The mentoring program could be adjusted to suit this purpose, for example, and modules could be added to existing learning initiatives. The department could use seminars to further promote knowledge sharing. The department should furthermore make important results, findings, publications known.

Promote and encourage the use of electronic systems where information can be readily accessed, shared and re-used.

4.3 Communicate health knowledge effectively and efficiently.

As much as is possible, logical and reasonable, provide single-window access to health information in the consumer's choice of medium. Make health information available electronically via such media as the Canadian Health Network and the new Health Canada electronic magazine REAL Health (<http://www.hc-sc.gc.ca/real>). Review communications policies and guidelines to ensure that roles and responsibilities for good communication are clear.

IV.5 Manage health knowledge well.

5.1 Establish knowledge business specialists.

5.2 Manage records through their life cycle.

5.1 Establish knowledge business specialists.

The table on the following page outlines, from the knowledge management perspective, the traditional roles in Health Canada. It shows how the introduction of knowledge management would cause those roles to be augmented, refocused or changed.

<i>Role</i>	<i>Goal(s)</i>	<i>KM Focus</i>	<i>Who Does This Now?</i>
Knowledge Domain Experts: <i>these execute the primary business functions of the department</i>	deliver on a business line	leveraging the knowledge inherent in staff, colleagues, partners, information and data to fulfil their operational goals	program managers; all Health Canada employee
Technical Experts: <i>these are responsible for technical advice</i>	ensure organisational effectiveness and efficiency	provide expertise on key aspects of knowledge infrastructure, such as IT, records, learning and others	computing specialists; communications specialists; records managers; others
Knowledge Business Specialists: <i>these provide integrate business, knowledge and information needs and IT technical advice to support the Domain Expert</i>	ensure knowledge is used to help Canadians maintain and improve their health	providing expert advice to domain experts on ways they can use knowledge to fulfil their goals; acting as a catalyst to make KM initiatives happen; improving department's overall KM capacity	no one

Primary responsibility for managing knowledge to support the business of the department belongs to, and should continue to belong to, the domain experts. They know better than anyone else what the business is, and, by extension, what knowledge is required to deliver on it.

The role of infrastructure experts is to help the domain experts execute certain specialised functions. In the case of a knowledge management initiative, for example, the domain expert would rely on a computing specialist to help identify and put in place the required technology tools and a human resources specialist to help train staff and redefine positions, among others. These infrastructure experts are valuable not only because of their specialised knowledge, but also because they maintain an overview of their particular area of expertise. For example, a computer specialist knows what technology is in place in the department, what its functionality is, who is responsible for it, and what the larger technology trends in the world are.

The concept for a knowledge business specialist is a person who would fulfil an equivalent role for knowledge. This specialist would :

- provide expert advice to domain business managers on whether to, when to, and how to, implement a knowledge management initiative
- coordinate between different domain managers and infrastructure experts to execute knowledge management initiatives

- put in place a framework for knowledge management in the department, helping to identify knowledge gaps and barriers to knowledge sharing.

In creating a specialised knowledge management function, the department runs the risk of creating something that domain managers rely on as a crutch to protect them from having to take this role over themselves. However, given that knowledge management constitutes a wholly new way of conceptualising and conducting the business of the department, and given the time and cultural constraints on domain managers, the knowledge business specialist is required to 'plant the seed' of knowledge management and build capacity.

"The Coming of the New Organization", by Peter F. Drucker, in Harvard Business Review

"Because the 'players' in an information based organisation are specialists, they cannot be told how to do their work. There are probably few orchestra conductors who could coax even one note out of a French horn, let alone show the horn player how to do it. But the conductor can focus the horn player's skill and knowledge on the musicians' joint performance. And this focus is what the leaders of an information-based business must be able to achieve".

Some believe that once knowledge management becomes a habit, and a knowledge management framework (consisting of maps, methodologies, architectures etc.) is in place, the specialised function will 'wither away' and become subsumed within the ordinary work of the department. The success of the knowledge business specialist would consequently be measured in his or her own ability to put him/herself out of business, to leave the experts as a collaborative team requiring little or no facilitation. Others, however, believe that the knowledge business manager will become as valuable a source of support as one's human resources or financial advisor. The department should determine what is required to create this function and what its operational goals should be, and it should monitor the continued utility of maintaining this specialised function.

5.2 Manage records through their life cycle.

The Health Canada project to develop a records management system is a critical element of any good knowledge management strategy. Sound records management will ensure that corporate memory information is captured, retained, and made accessible, and that convenience information is deleted before the volume becomes burdensome. Authentic and reliable records, once they are routinely captured and structured, will help us to meet our decision-making, program delivery and accountability requirements.

Definition of a Record

- means information, regardless of physical form, created, collected or received in the initiation, conduct and completion of an activity, including any correspondence, memorandum, book, plan, map, drawing, diagram, pictorial or graphic work, photograph, film, microform, sound recording, videotape, machine readable record, and any other documentary material, regardless of physical form or characteristics and any copy thereof. (National Archives of Canada definition)
- is that which is created and kept as evidence of agency or individual functions, activities and transactions. To be considered evidence a record must possess content, structure and context and be part of a record keeping system. (National Archives of Canada Australia)

V. Strategic Priorities: Framework for Setting Knowledge Investment Priorities for the Next Three to Five Years

Three strategic domains have been identified for positioning Knowledge Management and IM/IT investments, they are: Creation, Research and Analysis; Tools, and Information Management; and Dissemination and Communications. An additional grouping, Multi-faceted Initiatives, reflects initiatives covering all three of these strategic domains. All groupings are considered equally important and the initiatives listed underneath are in no particular order. This framework does not address the scope of the initiative nor does it assess the cost, benefits or impact on people.

V.1 Creation, Research and Analysis

1.1 Creating the Right Data and Information and Conducting Good Analysis.

- create a discipline of applied health analysis within Health Canada

- use analysis to establish what data and information exist, are needed, the gaps, and focus on filling gaps in priority areas
- work with CIHI and Statistics Canada on "The Roadmap"
- support the Canadian Population Health Initiative

1.2 Targeting Research to Fill Knowledge Gaps.

- through the establishment of an entity to develop the departmental position on, and to influence, the health research agenda in which there are many partners: MRC, CIHR, NHRDP, CHSRF, SSHRC

1.3 Leading the Cultural Change.

- leverage the experiences, expertise, information and knowledge of individuals
- for greater collective organizational success by fostering sharing in a continuous learning environment
- to improve analytical capacity and develop analytical discipline
- courseware, communities of practice, champion sharing (townhalls, presentation, focus groups, expert speakers, practitioner panels, reward program, etc.)

V.2 Tools and Information Management

2.1 Making Information Available Internally.

- intranet, e-mail, groupware, Secure Electronic Service Delivery (SESD)/ Public Key Infrastructure (PKI), standards

2.2 Building Health Canada's Capacity to Manage KM, IM and IT.

- establish a CKO and Knowledge Business Specialists
- develop a Knowledge Management Architecture to provide a framework for decision-making on Governance & Planning, Knowledge & Information, Applications & Technology
- establish policies, standards, plans, committees, where required

2.3 Building and Maintaining IM Infrastructure and Tools to Support Knowledge Management.

- data/information models, knowledge maps, records management application, standards

2.4 Building and Maintaining IT Infrastructure and Tools.

- make investments to build Y2K-compliant, evergreen infrastructure, to support departmental business lines and the CHI initiatives
- common administrative (financial, human resources, assets and information management) systems
- SESD/PKI

V.3 Dissemination and Communications

3.1 Establishing NEW Canadian Health Infostructure initiatives.

- through initiatives supported by the OHIH such as the Minister's Advisory Committee and their Interim Report
- through the development of the proposed Knowledge Innovation and Investment Office (consider such things as the National Health Library of Canada concept, the concept of a national health PKI)

3.2 Interacting Securely with Trusted Partners.

- building extranet capacity, SESD/PKI, standards, Internet

3.3 Making Health Information Available Externally.

- Canadian Health Network, Health Canada's WWW site, seminars, conferences, press releases and other communications methods
- Internet and WWW services, SESD/PKI, standards

V.4 Multi-faceted Initiatives

The following two projects are multi-faceted initiatives which cover all three strategic domains.

4.1 Building the National Health Surveillance Infrastructure.

- Secure Electronic Service Delivery (SESD)/PKI

4.2 Building the First Nations Health Information System.

- SESD/PKI

VI. Implementation Plan

Last November 9, 1998, the Deputy Minister and Associate Deputy Minister announced the creation of a new branch, Information, Analysis and Connectivity (IACB) with Denis Gauthier as ADM. The directorates of this new branch, as reported in the announcement are :

- Applied Research and Analysis (new) (ARA)
 - to include the Research and Knowledge Development area of the Health Promotion and Program Branch
- Office of the Health Information Highway (OHII)
- Information Management Services Directorate (IMSD)

The vision, strategy and recommendations stemming from this document may serve as a blueprint for future action in the newly created branch. At this time, some recommendations still need further discussion to determine who should be accountable, some require shared responsibilities and the creation of horizontal partnerships. In general, recommendations are addressed by the creation of the new branch and its directorates.

A recommendation requiring further attention includes the requirement for a KM strategic capacity: to develop overarching KM strategy, to develop and implement cultural initiatives and including a cadre of knowledge business specialists. The next important step will be discussions and plans for how the new branch should lead the implementation of the Strategic Initiatives.

Appendix A - Governance for the Vision and Strategy Initiative

Comité visionnaire -- Liste des membres

Brewer, Alexa / MSB
Butterfield, Andy / Chair, Information Technology Advisory Committee (ITAC)
Bull, Fruji / CSB, DG-IMSD
Carman, Mary / DMO (DEX) Connolly, Carmen / HPPB
Fortier, Marie / PCB Acting ADM
Franklin, Claire / PMRA
Gauthier, Denis (Chair, Visionary Committee)
Gorman, Diane / RDG (West)
Hunter, Greg (Secretary)
Jock, Richard / Chair, Committee for Information, Technology and Holdings (CINTH)
Mintz, Jim / Chair, Advisory Committee on Information Holdings (ACIH)
Rallis, Gina / Learning and Development, CSB
Reissman, Christine, PCB
Ross, William / HPB

HIS Internal Steering Committee -- List of Members

Bull, Fruji, DG-IMSD
Cochrane, Paul / MSB
David Dodge (Co-chair)
Fortier, Marie / PCB
Gauthier, Denis / IACB
Lafleur, R.S. / CSB
Lee, Jerry / Bellefeuille, Peter (Secretary)
Losos, Joe / HPB
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Appendix B - Policy and Legislative Environment

Health Canada receives its mandate from, and is responsible for adhering to, a variety of pieces of legislation and policies that both define its role in Canada and govern the manner in which it executes that role. Any knowledge management strategy will consequently need to enhance the department's ability to fulfill its legislated role without compromising its ability to comply with the requirements and constraints that legislation imposes.

The legislation upon which Health Canada is founded is the Department of Health Act. This Act defines a number of roles and responsibilities for the department, ranging from promoting the well-being of Canadians to protecting Canadians against diseases to establishing safety standards for consumer products. It also assigns responsibility to Health Canada for administering other Acts. The most notable of these is the Canada Health Act, which establishes the criteria and conditions upon which transfer payments to the provinces for health services are predicated. In addition, the department is responsible for about twenty other pieces of legislation on such subjects as food and water quality, drugs, tobacco, pest control, and quarantine measures. The tasks associated with fulfilling these roles - reviewing drugs, for example - are very knowledge and information intensive and will consequently tend to shape the knowledge management strategy accordingly.

In its day to day activities, the department is also responsible for adhering to various cross-governmental policies and pieces of legislation which govern the accessibility, use, and management of government information. Access is governed by the Access to Information Act and the Privacy Act: the latter provides a right of access to information in records under the control of Health Canada, while the former protects the privacy of individuals with respect to personal information about themselves. Use and management of information issues are governed by the National Archives Act, the "Management of Government Information Holdings" policy, and a variety of internal departmental policies, such as the "Records Management" policy. These establish departmental requirements for managing information through its life cycle, preserving corporate memory and Canadian heritage, and utilising information as a corporate resource. In addition to being mandatory, they aim to serve many of the same principles as knowledge management; a knowledge management strategy can consequently both reflect them and use them as a foundation.

In addition to the major Acts and policies, there are a myriad of pieces of legislation and policies, federal, provincial, and international that govern specific jurisdictions and aspects of health service provision, information management and information technology. Provinces, for example, have their own legislation and policies on issues ranging from health service provision to privacy, all of which have an impact on the way they produce and share knowledge. Similarly, the United States and other countries have policies and legislation to govern things like disease control and drug approvals, to name two, that pertain to the knowledge work Health Canada does. Within the federal government, the Communications Policy, Federal Identity Program, and Official Languages Act contain many requirements that govern the provision of information and knowledge to employees and the public. Furthermore, the "Management of Information Technology" policy, the "Enhanced Framework for the Management of Information Technology Projects", and the "Blueprint for Renewing Government Services Using Information Technology", all from Treasury Board, establish criteria for enhancing information technology infrastructure, and the Government Security Policy contains provisions that can apply to virtually all activities undertaken by the department.

The department's knowledge management strategy must reflect the overall purposes that have been assigned to Health Canada in legislation, and ensure compliance with the cross-governmental legislation and policies that govern its use of information and other resources. The task is made easier by the fact that many of these pieces of legislation and policies, having been crafted to ensure the capture and preservation of government information in a consistent fashion, are founded on the same principles as knowledge management. A knowledge management strategy can be presented as a further enhancement to and rationalisation of existing government legislation and policies; it can serve as a bridge between the legislation governing Health Canada's role and the legislation governing the management of Health Canada's information.

Appendix C -

An Example of Knowledge Being Used to Protect the Health of Canadians

STEP & Primary Participant	Example	Knowledge Applied	Knowledge Produced
1. A company prepares a submission for a new pesticide	Acme Pesticides, develops a pesticide, called Aphidex, that kills aphids without harming delicate plants. It prepares a submission in hopes of marketing Aphidex in Canada.	<ul style="list-style-type: none"> • knowledge of chemicals and pest biology • knowledge of market demand • knowledge of the regulatory environment • expertise of researchers 	<ul style="list-style-type: none"> • a recipe for a pesticide and a large quantity of supporting data relating to what is in it and how it works
2. PMRA reviews and evaluates the submission	PMRA reviews the data on Aphidex that was provided in the submission and determines that small children could develop rashes if the pesticide were to come in contact with skin, that its effect on the environment is negligible, that it works, and that it would be good for the Canadian horticultural industry, especially orchid growers.	<ul style="list-style-type: none"> • knowledge of pest biology and chemicals • knowledge of risk factors relating to human health • knowledge of risk factors relating to the environment and plant and animal biology • knowledge of the economy • knowledge of similar pesticides in use in other countries • researchers' expertise 	<ul style="list-style-type: none"> • information on how the pesticide would affect human health and the environment and under what conditions • objective information on whether the pesticide works • objective information on what value, economic or otherwise, the pesticide would add to Canada
3. PMRA makes a regulatory decision	PMRA registers the drug on the condition that the label and instructions indicate that children should avoid contact with sprayed areas for 2 hours after spraying.	<ul style="list-style-type: none"> • knowledge of government regulations • knowledge of the public's concerns regarding pests and pesticides 	<ul style="list-style-type: none"> • information on why the product should or should not be released on the market and under what conditions
4. Information on the decision is disseminated	A citizen in Edmonton sees her neighbour spraying Aphidex on a flowerbed near her children's swing set. She calls the PMRA hotline and asks whether she should be concerned. The operator tells her to keep her children away from that spot for a couple of hours as a precaution.	<ul style="list-style-type: none"> • knowledge of public, industry, provincial, and activist interests • knowledge of techniques and vehicles for disseminating information • knowledge of regulatory requirements for disclosing information 	<ul style="list-style-type: none"> • labels and instructions for safe use • general product information which producers, consumers, and third parties groups can use to make decisions to protect their health and the environment

Appendix D -

Proposal for the Knowledge Management Architecture for Health Canada

The Knowledge Management Architecture containing three elements:

- | | |
|--------------------------------|-----------------------|
| 1. Governance and Planning | - Managing |
| 2. Knowledge and Information | - Informing |
| 3. Applications and Technology | - Applying Technology |
-

1. Managing :

Governance (how does the department wish to invest in and manage knowledge assets)

- policies (must do)
- standards (commonly preferred tool or procedure)
- guidelines (how best to do)
- committees (consensus-seeking forum)

Planning (who does what, when)

- strategic (3- to 5-year vision, principles, strategy, plans)
- investment (annual IM/IT plan, emerging technologies)
- project (enhanced management framework, risk management methodologies)
- operational (workplans, communications, learning and development)

2. Informing and

3. Applying Technology:

These two elements of the Knowledge Management Architecture would address Services and Assets in a Governance and Planning context.

Services (what services are provided by whom, who pays)

- knowledge (knowledge business specialist (KBS), learning)
- information (library, records, knowledge maps, directory)
- applications (corporate mainframe and network-based)
- technology (network, e-mail, Internet)

Assets (what are our valued knowledge-related resources)

- people and knowledge (experience, expertise, tacit knowledge)
- information (records, books, WWW information, documents)
- software (operating and business systems, enterprise software tools)
- hardware (mainframe, network, LANs, PCS)

Appendix E -

Integration of Health Canada's Contribution within the Canadian Health Infostructure

The following table has been developed as an architectural tool for integrating Health Canada's contribution within the Canadian Health Infostructure. One could define each layer to be a type of architecture or the full spectrum, across the layers, could be defined to be an overarching architecture. These architectures are interrelated; an application architecture, for example, will place certain demands on management that will have to be incorporated into the Management architecture, and all architectures will ultimately have to produce measurable outcomes that serve the business.

Layer	Principaux aspects de l'intégration			Spécimen
Outcome	Benefits? Value add? Why are we doing this	Stakeholder buy-in Managing expectations	Measurable Outcomes	• National action plan on vaccination program response to information analysis
Output	What services/products? How delivered	Setting standards Measuring performance	Managing Expectations	• Single window access to HC's CHI contributions
Management	Management office Governance structure Communications	Project management Risk management Business case	Marketing Legislations	• Business case reflecting business and information integration realities with F/P/T
Business	Business models Business processes	Methodologies Access rules	Business Standards	• Departmental process on access to external information collection • standard data dissemination approach from multiple HC environments
Data and Information	Meta data Data model Data dictionary	Repository/Warehouse Privacy Nomenclature	Data Standards	Meta data standards and intelligence access environment • Common privacy model • Common information architecture
Applications	Database standards Common functions	Look and Feel Interface (APIs)	Application Standards	• Open and standard based operating environment • Same look and feel
IT infrastructure	Architectural concept IT services Physical Network Inter-operability	Help/Support Reliability/Manageability Protocols	Performance Standards Scalability Security	• Secure departmental PKI • Reliable Internet Services • Appropriate HC Bandwidth • Extranet facilities

Appendix F - Building a Policy/Research Capacity in Health Canada

Within Health Canada and in the larger health community, there is increasing recognition that health is determined by a range of factors, from biological-makeup and personal health practices, to interventions in the health system and the influences of the physical and socio-economic environment. It has therefore become increasingly important for the department to base its policy decisions on an understanding of these factors, including the impact of its own policies. The department needs to know how it can best make investments in research and knowledge development to improve the health of Canadians and to be accountable for its policy decisions.

In building a policy/research capacity, the department needs to address a generic set of activities known as the policy development life cycle. Each of these activities has certain research requirements associated with it. A policy process often begins with the identification of an emerging issue. Ideally, the issue is then investigated and a range of possible policy responses are identified and explored through consultation. Eventually, a preferred option is selected and a policy adopted. It is subsequently communicated and translated into action through programs, infrastructures, or funding mechanisms. Following implementation, the policy is evaluated and revised as appropriate. In general, the department follows these steps, but often the process is not informed by research.

To enhance the department's capacity to incorporate research into its policy making process, five key objectives must be addressed :

- determine the types of research that are relevant to policy-making in Health Canada and describe how these research types inform the various phases in the policy-making cycle;
- identify the key organizations/networks currently conducting policy-relevant research and indicate how they relate to Health Canada;
- identify the major information gaps in the policy cycle, to determine the types of research required to address these gaps, and to

identify possible Health Canada roles (eg. are there phases in the policy cycle where there are research deficits?)

- determine the conditions which support policy-relevant health research; describe how these conditions vary throughout the policy cycle; and determine how Health Canada could contribute to the creation of these conditions;
- study the nature of effective policy/research links throughout the policy cycle and develop mechanisms for strengthening these links.

The outcome will be a department in which researchers and policy makers are better able to work together to ensure that policies are based on the best possible information and that policy actions are evaluated by the most appropriate and effective mechanisms. In addition to improving its capacity to make effective decisions, the department will be better able to show whether its decisions were effective in improving the health of Canadians.

Appendix G - Glossary of Acronyms

ACIH	Advisory Committee on Information Holdings
CANARIE	Canadian Network for the Advancement of Research, Industry and Education
CDC	Centres for Disease Control (U.S.)
CHI	Canadian Health Infostructure
CHSRF	Canadian Health Services Research Foundation
CIHI	Canadian Institute for Health Information
CIHR	Canadian Institutes of Health Research
CINTH	Committee on Information Technology and Holdings
CISTI	Canadian Institute for Scientific and Technical Information
CKO	Chief Knowledge Officer
CPHI	Canadian Population Health Initiative
CSB	Corporate Services Branch
DMO	Deputy Minister's Office
FDA	Food and Drug Administration (U.S.)
HIS	Health Information Strategy Internal Steering Committee
HPB	Health Protection Branch
HPPB	Health Promotion and Programs Branch
IM	Information Management
IT	Information Technology
KIIO	Knowledge Innovation and Investment Office
KM	Knowledge Management
KMA	Knowledge Management Architecture
KMLC	Knowledge Management Life Cycle
LAN	Local Area Network
MRC	Medical Research Council
MSB	Medical Services Branch
NHRDP	National Health Research Development Program
OHIH	Office of Health and the Information Highway
PC	Personal computer
PCB	Policy and Consultation Branch
PMRA	Pest Management Regulatory Agency
PRI	Policy Research Initiative
RDG	Regional Director General
SGML	Standard Generalized Markup Language
SSHRC	Social Sciences and Humanities Research Council
TPP	Therapeutic Products Program
WHO	World Health Organisation
XML	Extensible Markup Language