Health Canada's Science and Technology Strategy

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TABLE OF CONTENTS

FOREWORD

Health Canada has a strategically important role within the Government of Canada as the federal department responsible for helping the people of Canada maintain and improve their health.

Whether we are regulating products, providing essential health services to First Nations and Inuit, promoting improved health or supporting the health care system, we need to access, perform and use science. We pride ourselves on making decisions based on the best available evidence; sound science is a critical part of that evidence.

Health Canada's *Science and Technology (S&T) Strategy* lays out our strategic direction for science within Health Canada. For the department, the *Strategy* provides a policy framework for science planning, priority setting and management. As we collaborate with our science partners – in the Health Portfolio, federal science-based departments and agencies, governments in Canada and other countries, international organizations and with stakeholders – the *Strategy* will help us to position ourselves more strategically and work more effectively.

On behalf of Health Canada, we want to express our sincere appreciation to our staff and to all of those who participated in developing the *Strategy*. We invite you to think about the directions the *Strategy* sets out. Developing the *Strategy* is only the beginning – we will continue to seek your collaboration and ideas as we move forward to implementation.

Morris Rosenberg   Suzanne Vinet
Deputy Minister   Associate Deputy Minister

EXECUTIVE SUMMARY

As a science-based department, Health Canada depends on a strong foundation of science to fulfill its legislated mandate and contribute to the health and safety of Canadians. Given the importance of science-related activities in the department, it is critical that we use sound science effectively in policy and regulatory decision-making and that we ensure that science activities are aligned with departmental and federal policies and objectives.

Health Canada's *Science and Technology Strategy* will strengthen the contribution that science can make to fulfilling the department's mandate. Within the department, the *Strategy* will provide a policy framework for science planning, priority setting and management at the departmental level, and will guide science planning in Health Canada branches. The *Strategy* will also help the department to position itself more strategically and work more effectively with science partners in the Health Portfolio[1], federal science-based departments and agencies, governments in Canada and other countries, international organizations and with stakeholders.

There were a number of considerations that made the development of an *S&T Strategy* a priority for the department:

- public and governmental expectations of excellent science in Health Canada;
- the need to ensure that the right investments are made in science and that science resources are used well in support of departmental and government priorities;
- the need to better integrate science and policy; and
- the need for enhanced partnerships inside and outside government.

The release on May 17, 2007 of the *Federal Science and Technology Strategy,* which includes a focus on health, gave impetus to departmental work.

A wide-ranging series of consultations with Health Canada staff and stakeholders led to three key *objectives* for this strategy, as well as four "*enablers*", areas that require attention if the objectives are to be achieved.

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[1] The Health Portfolio consists of Health Canada, the Public Health Agency of Canada, the Canadian Institutes of Health Research, the Hazardous Materials Information Review Commission, the Patented Medicine Prices Review Board and the newly-formed Assisted Human Reproduction Canada. Key portfolio science partners for Health Canada are the Public Health Agency of Canada and the Canadian Institutes of Health Research.

Objectives

1. To strengthen the contribution of science to delivering on key departmental priorities, and the links between science and policy.

2. To enable an effective, forward-looking and responsive policy, regulatory and program (or service) environment that:

   › protects the health and safety of Canadians and the environment while supporting Canadian excellence in research and innovation;

   › supports the delivery of health services to First Nations and Inuit;

   › supports the health care system;

   › promotes improved health; and

   › contributes to global health.

3. To improve Health Canada's ability:

   › to perform, access and integrate science;

   › to access and apply science human resources in support of its mandate; and

   › to advance evidence-based policy and regulatory decision-making.

Enablers

1. Maximizing national and international linkages and partnering opportunities to provide access to, and exchange ideas concerning scientific information, emerging trends, and technologies.

2. Clearly communicating the department's science and science needs.

3. Promoting excellence in science by fostering scientific learning within the department and showcasing our results.

4. Increasing accountability with an effective means to measure and report on S&T expenditures.

The department is committed to moving in the directions set out by these objectives and enablers, and has identified a number of specific actions that will be taken in the short term. Progress on the *Strategy* will be assessed regularly to identify further required action, and to determine whether adjustments to the directions set out in this document should be made as a result of new knowledge and priorities.

The Departmental Executive Committee's Subcommittee on Science (*SMB-Science*) is responsible for oversight of the *Strategy.* In addition, a strategic science policy and management organization being developed within the Health Policy Branch of Health Canada will guide and facilitate action on the *Strategy.* Any modifications of direction and the identification of further required actions will be based on regular reviews of progress.

The *Strategy* will be reviewed and adjusted as necessary within five years of its publication.

INTRODUCTION

Health Canada was established to help the people of Canada maintain and improve their health. The department is committed to improving the lives of all Canadians and making Canada's population among the healthiest in the world – as measured by longevity, lifestyle, and effective use of the public health care system.

In fulfilling the health and safety dimension of its mandate, the department is responsible for the regulation of a wide variety of products including therapeutic products and medical devices, pesticides, consumer chemicals and products, nuclear and radiological safety, illicit drugs and food.

Health Canada also provides essential health services to First Nations and Inuit, and supports the health care system by working with provincial and territorial partners and stakeholders on important reform initiatives, and setting and administering national principles for the health care system through the *Canada Health Act.*

The department promotes improved health as a public champion for individual decision-making that will enable individuals and families to be as healthy as possible. Health Canada must also be responsive to global factors bearing on the health of Canadians ranging from new forms of infectious disease to environmental threats. It therefore leads the Canadian contribution to a global health agenda. In the most general expression of its scientific vocation, Health Canada generates and shares knowledge and information to support personal decision-making, the development of regulations and standards, and new policy and innovation in the health system.

Science in Health Canada includes both natural and social sciences and ethics. Science expenditures represent about 30% of the department's budget[2] (after funds for direct services to First Nations are removed). One-third of Health Canada's personnel are involved with science, divided between research (15%) and applied scientific knowledge (85%).

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[2]   Statistics Canada, April 2007, *Federal Scientific Activities 2006/2007,* catalogue no. 88-204-XIE ***www.statcan.ca/bsolc/english/ bsolc?catno=88-204-X***

Consultations

The *S&T Strategy* reflects extensive consultations on Health Canada's science needs and how the department can best build the scientific capacities required for the future. Stakeholders from academia, non-governmental organizations, industry associations and research organizations, as well as federal science-based departments and agencies have been consulted, and departmental staff has been engaged throughout the strategy development process[3].

Some clear themes emerged from these consultations:

- the importance of strong connections between science and policy;
- the need, in enabling an effective regulatory environment, to ensure an appropriate balance between protecting Canadians from risks, and enabling and facilitating commercialization;
- recognition that innovation can lead to opportunities for products that can be commercialized, as highlighted in the *Federal S&T Strategy,* or to findings that can improve health, health services and health programs;
- the importance of effective linkages with sources of external research and innovation both in Canada and internationally, since much of science innovation occurs outside government;
- the requirement for a dynamic science environment to attract and maintain highly qualified scientific personnel, who need opportunities to develop their skills and maintain relevant expertise;
- the need to work in productive partnership with industry, academia, international organizations and with counterpart organizations in other countries;
- recognition that, if Health Canada is to demonstrate leadership in science, it must work with partners in creating visionary goals; coordinating science priorities, resources, and activities across funders and performers; and raising public awareness of benefits of research and innovation;
- the requirement for excellence in all areas of Health Canada science; and
- the importance, in assessing scientific work, to focus on *outcomes* (including how science findings will impact on health care providers and patients), and not only on investments and outputs.

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[3] Appendix 1 provides a more complete description of the consultation initiatives and findings and Appendix 2 contains a summary of the response to questions regarding emerging scientific and technological trends that will require different or new scientific work or outputs from Health Canada during the next ten years.

A) PURPOSE OF THE *S&T STRATEGY*

Sound science is essential in formulating the priorities of the Minister of Health and for almost every aspect of Health Canada's activities.

The *Health Canada Science and Technology (S&T) Strategy* is intended to strengthen the role of science to help improve the department's capacity to:

- meet its mandated responsibilities;
- be responsive to the current and future needs of Canadians; and
- be more strategically positioned relative to government-wide S&T activities.

The *Strategy* provides a policy framework and associated governance structure that will enable the department to develop a consistent set of science priorities over the next 5 – 10 years in pursuing the objectives set out below. It will also help the department to improve the management and planning of science, better access the science and science human resources required to deliver on its mandate, and strengthen its policy decision-making.

Work is underway in Health Canada branches to set out science commitments in support of their responsibilities. The *S&T Strategy,* in providing departmental direction for the full range of the department's mandate, will guide this work.

B) WHY A STRATEGY?

A number of factors – some arising within Health Canada and others from developments outside the department – have prompted the department to develop this *S&T Strategy*.

If Health Canada is to maintain credibility with both the government and the public, its decisions must be based on sound science. The department must also have the knowledge and skills to "tell the science story" to policy and decision makers. This *S&T Strategy* responds to both needs, under the general theme of relevance and excellence in science and its focus on a limited number of specific objectives and enablers.

Health Canada has an obligation to Canadians to ensure that the right investments are made in science and innovation, and that research focuses on the right priorities at the right time. Limited science resources must be used in the most effective and efficient way to better implement the departmental mandate. The guidance that the *S&T Strategy* provides will help the department to meet these challenges.

To respond fully to government science priorities, Health Canada must be more strategically positioned in relation to government-wide S&T initiatives. In particular, the Federal Science and Technology Strategy *Mobilizing Science and Technology to Canada's Advantage*[4], which includes a focus on health, highlights government science, recognizes the importance of regulatory science and supports enhanced linkages. Health Canada's *S&T Strategy* responds to the priority for health, and recognizes in its key objectives and enablers, the importance of regulatory science and enhanced linkages, both inside government and with external partners.

While Health Canada has worked for some time to improve integration of science and policy making, there is an opportunity for even greater integration that will better support departmental, government and national priorities. This need is reflected in one of the key objectives of the *Strategy*.

Science is an increasingly collaborative effort that involves scientists across the country and internationally. Health Canada needs better partnerships and linkages to gain improved access to modern and excellent science, to be aware of emerging trends, and to build science capacity. The objectives of the *Strategy* respond to this need.

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[4] Industry Canada, May 2007, Mobilizing Science and Technology to Canada's Advantage. Available from ***http://www.ic.gc.ca/epic/site/ic1.nsf/en/h_00231e.html***

II CONTEXT – WHERE ARE WE NOW?

A) HEALTH CANADA'S MISSION / MANDATE

Health Canada is mandated to help the people of Canada maintain and improve their health. To do so, it must have access to the highest possible quality of scientific and technological advice to promote health by:

- setting policy in emerging technology and public health areas;
- regulating increasingly sophisticated products; and
- providing the services, information and management essential to affordable and world-class health care for Canadians.

Strategic, evidence-based decisions require an adaptable capacity to perform science and research and to facilitate and interpret the research conducted by its partners in the research community.

A sampling of the depth and breadth of legislative acts, regulations and agreements that the Minister of Health is fully or partially responsible for, demonstrate the complexity of the department's mandate. The department meets its mandate through partnerships with other federal departments, and other national and international organizations.

The *Department of Health Act* formally establishes Health Canada's mandate. The Minister of Health is also responsible for the direct administration of another 18 laws where science is critical. They include the:

- *Food and Drugs Act*;
- *Hazardous Material Information Review Act*;
- *Hazardous Products Act*;
- *Controlled Drugs and Substances Act*;
- *Canadian Environmental Protection Act*;
- *Radiation Emitting Devices Act*;
- *Tobacco Act*; and
- *Pest Control Products Act.*

Health Canada is also responsible for the administration of the *Canada Health Act,* including the analysis and resolution of compliance issues with the Provinces and Territories and for addressing the health inequalities between First Nations and Inuit and other Canadians. Research to strengthen the knowledge base to address health and health care priorities supports the inclusion of broader social and health system impacts of emerging technologies for policy development and senior management decision-making.

B) HEALTH CANADA'S S&T EFFORTS IN SUPPORT OF THE MISSION

In order to meet its legislative mandate, the department is involved in:

- scientific research, evaluation, standard setting, development of regulations, policy development, data collection, surveillance, testing for safety and efficacy, and education and outreach;

- product evaluation for such items as food, food additives, packaging materials, drugs, vaccines, blood, natural health products, veterinary medicines, cosmetics, toxic substances and pesticides;

- health information analysis and evaluation, to enhance Canada's ability to prevent and respond to health crises;

- social and natural scientific research and development of new laboratory methods and techniques supports policy research and analysis to enable decision-making;

- investigation, inspection and enforcement related to Health Canada regulatory functions governing Health Canada regulated products. Enforcement and investigation is delivered with, and supported by, partners such as the Solicitor General, RCMP, Department of Justice, Canada Customs, Canadian Food Inspection Agency, Revenue Agency and the Canadian Center on Substance Abuse;

- health surveillance, monitoring and exposure assessment to identify emerging and monitor existing issues. Measurement of our regulatory effectiveness and post-market monitoring of health products and pesticides;

- strengthening capacity through internal and external research and research-related activities to accurately define health risks, trends, and emerging issues; support effective design and delivery of health programs and services; and support increased control by First Nations and Inuit people;

- outreach, education and training to promote healthy living for Canadians; and

- enabling science through effective support and direction mechanisms including the Science Advisory Board; Research Ethics Board; Science Policy Directorate; peer review; quality management; and science debate mechanisms.

III WHAT DO WE WANT TO ACHIEVE?

A) MISSION FOR HEALTH CANADA SCIENCE

Health Canada's scientific mission can be expressed in relatively few words:

> *To perform research and related scientific activities, and to access scientific knowledge, in order to apply a high standard of scientific evidence to Health Canada's policy, regulatory and health promotion activities, and health programs.*

Translating this statement of purpose into effective and relevant scientific activity requires a proper understanding of what science is needed by the department and what science must be done in the department. These requirements must be expressed in terms of clear, measurable objectives against which departmental performance can be assessed over time.

This departmental strategy for science must also be closely linked to larger departmental priorities and to the broader goals for S&T that are set out in the *Federal Science and Technology Strategy*.

B) OBJECTIVES AND ENABLERS OF THIS STRATEGY

Health Canada's S&T Strategy is centred on the pursuit of three key objectives, as well as four "enablers" that support the science work of the department.

The **objectives** are:

1. To strengthen the contribution of science to delivering on key departmental priorities, and the links between science and policy.

2. To enable an effective, forward-looking and responsive policy, regulatory and/or program (or service) environment that:
   › protects the health and safety of Canadians and the environment while supporting Canadian excellence in research and innovation;
   › supports the delivery of health services to First Nations and Inuit;
   › supports the health care system;
   › promotes improved health; and
   › contributes to global health.

3. To improve Health Canada's ability:

   › to perform, access and integrate science;

   › to access and apply science human resources in support of its mandate; and

   › to advance evidence-based policy and regulatory decision-making within Health Canada.

Enablers are areas which require attention if the objectives are to be realized. The ***enablers*** are:

1. Maximizing national and international linkages and partnering opportunities to provide access to, and exchange ideas concerning scientific developments, emerging trends, and technologies.

2. Clearly communicating the department's science and science needs.

3. Promoting excellence in science by fostering scientific learning within the department and showcasing our results.

4. Increasing accountability with an effective means to measure and report on S&T expenditures.

These objectives and enablers reflect all dimensions of departmental activity – policy, programs and regulation.

C) LINK WITH HEALTH CANADA'S DIRECTIONS

As a science-based department, Health Canada depends on a strong foundation of science and research to fulfill its legislated mandate and contribute to the health and safety of Canadians. In order to ensure that the department is working to achieve tangible results for Canadians, in the *Report on Plans and Priorities 2008-2009*[5] Health Canada has identified ***four strategic outcomes***[6] to guide the work of the department. High quality science contributes to each.

1. Accessible and sustainable health system responsive to the health needs of Canadians

Work on this strategic outcome draws on expertise and knowledge in the health and social sciences and the natural sciences. Health Canada works with many partner organizations in health research and health data collection in Canada and internationally.

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[5] The Report can be found on the Treasury Board of Canada website, at ***http://www.tbs-sct.gc.ca/rpp/2008-2009/inst/shc/shc00-eng.asp***

[6] A strategic outcome is a long-term and enduring benefit to Canadians that stems from a department or agency's mandate, vision and efforts. It represents the difference a department or agency wants to make for Canadians and should be a clear measurable outcome that is within the department or agency's sphere of influence. The source of this definition can be found at ***http://www.tbs-sct.gc.ca/est-pre/20052006/Lex_e.asp*** More details regarding the contributions of science to each strategic outcome can be found in Appendix 3.

2. Access to safe and effective health products and food and information for healthy choices

Science informs regulatory, policy and research activities pertaining to food and nutrition, drugs, medical devices and natural health products. This requires expertise of many different sorts – from laboratory researchers to scientists reviewing new health product submissions, and from inspectors in the regions to researchers generating the evidence base to create appropriate policies.

3. Reduced health and environmental risks from products and substances, and sustainable living and working environments

Health Canada continues to advance science and use strong evidence-based research to formulate health promotion and harm prevention programs, policies and regulations affecting products and substances, the workplace and the environment.

4. Better health outcomes and reduction of health inequalities between First Nations and Inuit and other Canadians

Science and research supports, either directly or indirectly, strengthening Health Canada's capacity to accurately define health risks, trends, and emerging issues; support effective design and delivery of health programs and services; and support increased control by First Nations and Inuit people.

D) LINK WITH *FEDERAL SCIENCE AND TECHNOLOGY STRATEGY*

The *Federal S&T Strategy,* released by the Prime Minister in May 2007, set out three advantages for Canadians that are supported by federal investments in science and technology: an *entrepreneurial advantage,* a *knowledge advantage* and a *people advantage.*

A regulatory environment that protects the health and safety of Canadians and the environment while also supporting research and innovation in the economy will contribute to the entrepreneurial advantage.

By placing priority on S&T activities best delivered by Health Canada, and maximizing linkages and partnering opportunities, the department will contribute to fostering a knowledge advantage. Clearly communicating the department's science needs will support both existing partnerships and the creation of new links.

Improving the department's ability to access science and science human resources will make better use of the talents of existing scientific personnel and those of new graduates. Finally, the objectives of this *Strategy* also contribute to the *Federal Strategy*'s core principles of enhanced accountability, a focus on priorities, and the promotion of world class research.

IV HOW WILL WE ACHIEVE OUR OBJECTIVES?

A) ACTIONS TO ACHIEVE OUR *OBJECTIVES* FOR S&T

1. To strengthen the contribution of science to delivering on key departmental priorities, and the links between science and policy.

A more collaborative and effective interface between science and policy is essential to fulfilling the broader mission of Health Canada, and to ensuring that the department's science work supports the mandate and priorities.

Science and Priorities

This means the department must look ahead to consider emerging science and policy priorities and how they will influence science needs. To this end, Health Canada will increasingly introduce perspectives from science and research into the policy decision process, and policy considerations in science decision-making (as is provided for by Health Canada's Decision-Making Framework[7]).

Actions

- Work to bring new scientific knowledge to bear, both on setting priorities and delivering on them.

- Launch a process of assessing the relevance of departmental science to the department's mandate.

- Develop criteria for and launch a science priority-setting exercise.

Foresight

Foresight is key to Health Canada's ability to access and perform the science that the department requires.

Identifying scientific developments early in their genesis is important if Health Canada is to recognize and respond to innovations. Since much of science innovation occurs outside of government, effective linkage with innovators in Canada and internationally is essential. Awareness of key trends in science will enable Health Canada to re-order its priorities and to focus on accessing knowledge and expertise in those areas.

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[7]   Health Canada, August 1, 2000. *Health Canada Decision-Making Framework for Identifying, Assessing, and Managing Health Risks.* Available at ***www.hc-sc.gc.ca/ahc-asc/pubs/hpfb-dgpsa/risk-risques_tc-tm_e.html***

Health Canada will maintain awareness of key science trends, as part of departmental planning. Foresight processes at different levels across the department will be encouraged, so that internal and external expertise is leveraged. Information from these processes will be part of a system that makes information available and usable by Health Canada. While departmental priorities may change over time, the processes to ensure adequate foresight should be generic enough to address both current and future priorities.

Actions

- Develop a strategy to link and nurture relationships with innovators at an early stage in their work. Young scientists and knowledge workers can contribute important perspectives on encouraging and supporting innovation.

- Work with portfolio partners to exchange information about new scientific developments and their potential impact on Health Canada.

- Consider an organizational mechanism that will serve as a focal point for science foresight in Health Canada. Options include assigning a mandate to identify science policy research requirements to an existing organization, or creating a centre of expertise for new and emerging issues based on the experience of the Healthy Environments and Consumer Safety Branch.

- Facilitate the exchange of scientists within Health Canada and between countries and institutions. Consider posting health science advisors in key countries of priority to Canada and to the department.

Science / Policy Collaboration

Skills and competencies required for staff involved in the science / policy interface will be identified by science and policy managers, in a manner similar to the public service competencies for executive positions. Policy training for scientists and science training for policy staff will be supported. Communication between policy and science workers will be improved and better formal and informal links between organizational units working at the science / policy interface will be created.

Actions

- Work towards improved policy / science collaboration, through such measures as:
  - ensuring improved Portfolio science contributions to Health Canada's policy, regulatory, and program decision-making;
  - ensuring that research carried out within Health Canada has a departmental sponsor;
  - improving the communication of science to facilitate policy-making;
  - fostering mentorship, learning and training that links science and policy for staff at Health Canada; and
  - supporting exchanges across government portfolios, with international health agencies such as the World Health Organization, and between countries.

- In cooperation with academic partners and other federal departments, seek additional emphasis in university curricula on science policy and the links between science and policy.

2. To enable an effective, forward-looking and responsive policy, regulatory and program environment that protects the health and safety of Canadians and the environment while supporting Canadian excellence in research and innovation.

To be proactive and effective, it is important that the S&T community within the department:

- conduct high quality scientific work to support decision-making;

- ensure that science activities within the department adhere to recognized standards of ethics and integrity;

- produce clear, concise regulations and supporting guidelines;

- communicate effectively with stakeholders;

- increase collaboration with international colleagues;

- work more closely with all stakeholders; and

- increase efficiencies by improving internal processes.

Health Canada will put in place a more open and transparent regulatory system that will take into account the full range of science, including social sciences and ethics. Several initiatives are underway that will contribute to improved regulation:

- the *Blueprint for Renewal: Transforming Canada's Approach to Regulating Health Products and Food*[8];

- as announced by the Prime Minister and the Minister of Health on April 8, 2008, tabling of the new *Canada Consumer Product Safety Act* and amendments to the *Food and Drugs Act*[9]; and

- consistent with the *Federal S&T Strategy* commitment to ensure Canada has "an effective, forward-looking and responsive regulatory environment that promotes a competitive marketplace and protects the health and safety of Canadians", Health Canada is leading interdepartmental work to develop a plan to ensure that biotechnology and nanotechnology products, services and technologies are regulated responsibly and in a timely manner.

Actions

- Create an environment in Health Canada that anticipates and responds to innovations in health and life sciences and technologies.

- Promote efficiencies by using departmental committees to identify scientific issues with a horizontal nature, to identify harmonized approaches and best practices, and to work with Branches to achieve this standardization.

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[8] Health Canada 2007, *Blueprint for Renewal: Modernizing Canada's Regulatory System for Health Products and Food.* Available at ***www.healthcanada.gc.ca/hpfb-blueprint***

[9] Prime Minister's Office 2008, *PM announces tougher food and product safety legislation to protect Canadian consumers.* Available at ***http://www.pm.gc.ca/eng/media.asp?category=1&id=2059***

- Work across the department to share experiences and to bring new scientific knowledge and findings to bear on:

  › risk and benefit assessment methodologies and other areas; and

  › policy, program and regulatory decisions.

- Support work to clarify product categorization, recognizing that technologies may cross legislative lines (for example, functional foods and whether they should be regulated as foods or drugs).

Innovation

First and foremost, Health Canada is a regulatory department that acts in the public good to protect human health, and is mandated to regulate the results of innovation. Often, this requires a careful and conservative approach to regulation. Those same regulatory activities can be enablers of innovation by ensuring clarity and timeliness of regulatory decision-making.

Given our public good role, the department supports a broad definition of innovation, as laid out by the Canadian Institutes of Health Research (CIHR). Their definition focuses on a knowledge translation context in which innovation is seen as a process in which research is translated through knowledge, expertise and skilled people *between* the science base and its use communities and contributes to economic competitiveness, effectiveness of public services and policy, and quality of life of Canadians[10].

The *Federal S&T Strategy* highlights the importance for federal departments to balance their role as protectors of the Canadian public while at the same time supporting and enabling innovation. There are many ways that Health Canada's S&T community can support innovation, including:

- better advice to decision-makers;

- advice to innovators early in the innovation cycle;

- development of innovative processes which support that cycle; and

- adoption of relevant risk and benefit assessment methodologies based on the most current science.

While some activities of the department may generate knowledge that can be pursued for commercial benefit, our priorities have to be focused on public good.

Innovation leads to developments of importance to the commercial sector and to findings that can improve health, health services and health programs. Health Canada will focus on all these areas, and will develop a shared understanding of innovation that serves both as a Health Canada planning tool and to inform Health Canada's governmental and external partners and stakeholders as to the department's policy and innovation enabling initiatives.

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[10] CIHR Innovation and Action: Knowledge Translation Strategy, July 2004.

Actions

- Encourage and reward innovative approaches to accessing, using and performing science in Health Canada.

- Work with partners to develop a shared understanding of the innovation continuum from the Health Canada perspective. In developing this understanding, the department will:

  › describe and assess the role, functions and activities of the department which contribute to innovation;

  › describe the capacity, capability, partners and stakeholders, and contributions to the innovation continuum for each activity; and

  › apply this approach using several examples of science and technology innovation.

Knowledge Management

During the consultations, new approaches to knowledge management were highlighted. Knowledge management is, at one level, the application of information technology tools such as databases to share knowledge across given communities, both internally and externally. However, such databases are difficult to keep current and can quickly become obsolete if members are not scrupulous about continually updating information.

Building "communities of practice" involves the development and operation of networks composed of members with common interests, who grow and share their knowledge through ongoing interaction. Health Canada has had some experience – and success – with communities of practice in the areas of policy, regulation and biotechnology, and is now applying this experience in the area of nanotechnology.

Actions

- Selectively establish additional communities of practice, based on agreed scientific and policy drivers, that enable and promote the creation, sharing, and use of knowledge. Communities could be composed of both scientific and policy staff; they could be limited to Health Canada, expanded to the Federal Health Portfolio, or encompass a much larger cross-jurisdictional landscape.

- Identify "knowledge brokers" with content and process expertise within Health Canada, who would play key roles in the development and support for communities.

3. To improve Health Canada's ability to perform, access and integrate science; to access and apply science human resources in support of its mandate; and to advance evidence-based policy and regulatory decision-making within Health Canada.

Planning

A focus on foresight, described under Objective 1, will support the early identification of developments in science. The departmental process underway of identifying gaps in science and science objectives, involving internal and external stakeholders, will also contribute to this identification, and to responding to these findings.

Planning for science will be part of the broader departmental planning process. Senior managers and scientists will work together to integrate science priorities from different stakeholders. Health Canada will develop an integrated harmonized framework for working, planning and talking together about science, so that branch science plans are consistent with the department's *Science and Technology Strategy,* and have the necessary links with each other.

Actions

- Participate in international processes to identify emerging science issues and trends, and collaborate to address those which are consistent with the department's mandate.
- Develop a framework and process for planning science in Health Canada. The process and framework must be linked with Health Canada's overall planning, and with science foresight activities. The relationship with branch science activities will be addressed as part of this framework. An annual internal gathering for planning for science may be part of such a process.

Nurturing a Science Culture

A dynamic science environment within the department is needed to attract and maintain highly qualified science staff. To nurture such a culture, and to plan for the future, Health Canada's S&T community will review and communicate current science capacity. Among the capacities of special need today are science translators – i.e., scientists who understand policy and policy staff who are receptive to science advice.

Building capacity for science must be done within the context of a supportive environment or "science culture". Enabling a science culture is essential to attract, build and retain the science personnel needed to conduct and manage the high quality science that Health Canada needs for the 21st century. The resulting systems, tools, facilities, partnerships and other capacities will reflect the degree to which a science culture is achieved in Health Canada.

Fostering a positive science culture means paying appropriate attention to the full range of scientific activity in Health Canada, including natural sciences, health sciences, and social sciences. It means valuing both research and related scientific activities such as evaluation, assessment and data collection. It also includes:

- transparent approaches to science activity which encourage participation by interested scientists;
- extensive use of, and opportunities for, partnership and collaboration;
- continual processes to address foresight, innovation, and capacity;

- an "open space" approach to science, in which there are no barriers between Health Canada science and global science; and

- a collaborative science / policy interface.

Managing our Scientific Resources

Proper attention to human resource management is essential to building a science culture. These issues include pay, classification, choice of work projects, staff development, and capturing knowledge before people retire. Health Canada has developed an integrated departmental business and human resources plan for 2008-2009 that was communicated to employees in March 2008 and posted on the department's intranet site. The science dimension of Health Canada's mandate is an integral part.

Creative human resource practices that build and maintain capacity will help to recruit and retain scientists and scientific personnel. Priority is being given to recruitment – an Assistant Deputy Minister has been designated as the departmental champion for all recruitment, with the initial focus being on external recruitment initiatives.

Health Canada will work to influence educators (universities and colleges) to better meet the needs of the department in the future. The department will also improve communication with students to raise awareness of science careers in Health Canada. For example, the Health Canada Science Forum is an excellent opportunity to attract students. Over the last year senior departmental officials have focused on establishing relationships and visiting university campuses that have programs related to recruitment objectives. Novel human resources strategies to transfer and utilize knowledge and skills available in universities and private industry through exchange programs will be developed.

If scientists are to be retained, they must be valued. They want to make a difference and want to understand the contribution that they can make to Canada's interest. The department will strive to reduce barriers to, and support, partnerships and collaborations to better meet departmental and government mandates.

Actions

- Develop an inventory of science capacities that includes scientific evaluation and research, and communicate it as a stimulus to link similar or complementary expertise and the opportunity to connect related projects.

- Expand the use of collective staffing processes for science staff through a major recruitment campaign in 2008, building on experience with current collective recruitment processes and the cooperative recruitment efforts with Environment Canada. Build on experience with the current joint pilot initiative in Health Canada that focuses on improving, simplifying and expediting staffing processes.

- Identify suitable skill sets and competencies for such positions as science managers, scientists, and science policy staff.

- Provide additional opportunities for growth in a science career, in both managerial and scientific paths. This will include continuing to support the Health Canada Science Management Development Program, completion of learning plans for all personnel and making language and other training available.

- Offer opportunities for networking and collaboration, linked to the concept of science as an "open space" activity, in which there are no barriers between Health Canada science and global science, and recognize and reward those who demonstrate such practices.
- Develop a Visiting Scientist Exchange program which would encourage reciprocal visits involving collaborative research projects.

Information Systems and Laboratories

Other business processes make an important contribution to a science culture. Excellent laboratory facilities and effective libraries and information systems that provide access to e-journals are key. Processes (including accommodation and information technology services) need to be responsive to scientific requirements.

Health Canada is responsible for nine laboratory buildings – six in the National Capital Region and others in Winnipeg, Montreal and Toronto. The average age of the facilities is over 40 years; only two of the labs are considered in good condition. The department is facing the real possibility of closure of some of these laboratories due to their physical deficiencies. Work is underway to address facility problems; this work will be influenced by the report of the Government's Independent Expert Panel on Federal Laboratories[11].

Actions

- Give priority to addressing critical problems of outdated and inadequate laboratory facilities across the country.
- Explore alternative arrangements to meet the critical requirements for laboratory accommodation in Health Canada.
- Develop common goals between scientists and departmental administration so that there is an understanding of mutual requirements and a sharing of the benefits of meeting those goals.

B) ACTIONS TO SUPPORT OUR FOUR KEY "ENABLERS" FOR S&T

1. Maximizing national and international linkages and partnering opportunities to provide access to, and exchange ideas concerning scientific developments, emerging trends, and technologies.

Partnerships

Health Canada is committed to pursuing its science objectives in partnership with Canadian and international collaborators. To this end, the department will focus on science and technology activities that it can best deliver and will maximize partnering opportunities to provide access to ideas and technology and to enhance capacity. Linkages (internally, nationally, internationally, between social and physical sciences, and with stakeholders) will facilitate responses to horizontal science issues such as risk assessment and communication.

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[11] Treasury Board of Canada Secretariat. 2007. *Independent Panel of Experts on Transferring Federal Non-Regulatory Laboratories.* Available at ***http://www.tbs-sct.gc.ca/fedlab-labfed/index-eng.asp***

Planning and foresight will assist in identifying new circumstances and new opportunities so that Health Canada can determine strategically whether a particular activity should be carried out within the department, and whether there are targeted opportunities for collaboration and partnerships.

Health Canada will seek connections to the innovators, especially those in academia. The department will collaborate at an early stage – this will increase capacity for informed direction setting at Health Canada.

In its partnerships, Health Canada will share capacities – human, financial, infrastructure – for science. Health Canada will also recognize, in setting up structures and procedures, that there are varying levels and types of collaborations and partnerships. The department will be more active in science issues that are cross-departmental and interdisciplinary.

Finally, there are opportunities for Health Canada to work more closely with federal granting agencies to gain recognition and understanding of each other's imperatives, and to identify opportunities to support research needs that are consistent with the department's mandate and priorities.

Actions

- Develop a policy framework and processes to facilitate scientific collaboration. This will include:

  › consideration of whether the activity should be a collaborative effort and criteria to determine strategically whether scientific activities should be done in-house or sought externally, including through external collaboration;

  › how best to collaborate;

  › whether the collaboration should focus on current issues or long-term issues; and

  › how to reduce barriers to collaboration.

- Work with key international jurisdictions to share best practices and ensure that regulatory requirements reflect new science.

- Pursue partnerships with other federal and external organizations, both in the conduct of science and in areas such as trend monitoring, human resources exchange, and knowledge transfer.

- Assess work done in partnerships in performance evaluations.

- Identify mechanisms to develop and access science and technology networks and partnerships.

The "Make or Buy" Issue

The purchase of required scientific expertise through contracting is one form of collaboration. "Make or Buy" decisions (i.e., decisions on whether to develop particular capability within Health Canada or to buy the expertise) are complex and often situation-specific. Sometimes there is an option to buy or borrow knowledge, facilities, or people. There are also occasions when the department needs to develop capacity such as the transition from a scientist to a manager.

Health Canada requires the capacity to obtain, assess and assimilate "bought" science and to interact with the external science community.

In all these matters, it should be remembered that decision-making responsibility, including responsibility for regulatory decisions, rests with Health Canada, regardless of the source of the science on which the decisions are based [12].

Actions

- Develop a better understanding of future needs for contracting out, through links to planning and foresight, and through creating multi-disciplinary teams to provide scientific direction for "make or buy".

- Seek ways to remove barriers to contracting out, and to build on successful examples of standing offers and other mechanisms.

2. Clearly communicating the department's science and science needs.

Communicating science is an essential capacity in the information age. This means communicating both Health Canada's scientific findings and the department's needs for science.

Consultations pointed to a clear need to communicate science more effectively, in order to dispel misunderstandings and misinformation. Health Canada will seek to better explain departmental actions, why they are being taken, and what the results are, especially in relation to Health Canada's regulatory role. And Health Canada's S&T community will work to clearly communicate science and make it understandable – to decision makers and to the public.

Communicating with the Public

Health Canada will implement and maintain an effective and timely knowledge translation strategy for Canadians and will seek to better understand what Canadians want them to do.

The department has committed to an increasingly open and transparent regulatory system (Objective 2), and will build on initiatives that are underway to make more and better information available to Canadians to assist them to make healthy choices. Research into risk communication will be monitored and these findings, along with the results of public opinion research, will be used to improve departmental communications with the public.

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[12] Stakeholders hold differing views regarding the source of scientific expertise, as do departmental staff. During the consultations, some were cautious about contracting out science activities because of concerns about objectivity and control. Others noted that specific components of risk assessment can be contracted out, for example, and the external scientific input would be assessed by Health Canada staff from a regulatory perspective.

Communicating with Stakeholders

Attention will be given to timely communication and effective knowledge translation activities for all external stakeholders. Informal consultation on science priorities will take place regularly, and priority will be given to follow-through on previous consultations.

Actions

- Within Health Canada, share experiences with stakeholder communication and build on successful early consultation.

- Continue a dialogue with external science advisory bodies and in addition, bring together external stakeholders for formal consultations regarding Health Canada science on a periodic, possibly five-year, basis.

- As part of science priority setting exercises, include consultation on a regular basis; key planning milestones will be used as link points.

- Assess contributors to communications as part of performance reviews.

Communicating with Health Canada Staff

Attention will be given to recognizing the challenge of communicating more information in a workplace that is already overloaded with information that is difficult to keep current. Accessibility to information is a significant problem for regional staff, with long delays.

Actions

- As part of the capacity-related inventory, make better use of the Health Canada intranet as a source of basic information.

- Develop a science-based directory of personnel with their skills and expertise.

- At all levels, continue work to ensure that significant scientific decisions are shared with Health Canada staff in a timely way.

3. Promoting excellence in science by fostering scientific learning within the department and showcasing our results.

Fostering sound science was a strong underlying message that emerged during the consultations – science that is objective, reliable and replicable. This requires:

- an organizational and management culture within the department that values science;

- business processes and a departmental infrastructure that are supportive of scientific work, both research and regulatory science;

- carefully chosen partnerships and linkages; and,

- a clear link with Health Canada's priorities.

This commitment to excellence underpins everything that will be done in achieving the specific objectives set out above.

Actions

- Seek to make scientific learning opportunities broadly available to Health Canada staff.

4. Increasing accountability with an effective means to measure and report on S&T expenditures.

Health Canada is accountable for the science that it carries out, and for the decisions taken on the science that it uses.

In assessing accomplishments, the focus will be placed on *outcomes* (including, where appropriate, how science findings will impact on regulatory decision, regulated industries, health-care providers and patients), not only on investments and outputs. Scientific capacity to evaluate scientific performance as part of overall evaluations will be developed within Health Canada, or obtained externally.

Actions

• Work with Health Canada colleagues in evaluation and audit to:

  › identify links to Health Canada's accountability framework;

  › measure progress and determine the frequency of progress measurement; and

  › develop indicators of success.

• Science-based performance indicators (among others) will be established upon which to evaluate performance; international examples may provide a foundation for these indicators.

C) IMPLEMENTATION AND OVERSIGHT OF THE STRATEGY

Governance for *Health Canada's S&T Strategy* will be exercised through the Departmental Executive Committee's Subcommittee on Science (*SMB-Science*). This is the senior management committee charged with enabling and advancing Health Canada's science and research activities, including regulatory science, by providing leadership for science-related matters requiring collective and coordinated departmental action.

Health Canada is currently developing a strategic science policy and management organization in the Health Policy Branch to improve the link between science and policy within the department, and to improve the planning and management of science. This organization will be responsible to oversee work on the *Health Canada S&T Strategy,* and to maintain links with the *Federal S&T Strategy.*

Progress on *Health Canada's S&T Strategy* will be assessed regularly to identify further required actions, and to determine whether adjustments to the directions should be made as a result of new knowledge and priorities. The *Strategy* will be reviewed and revised within five years of its publication.

V CONCLUSIONS

On the basis of three key objectives and four enablers set out in Section III, this *Strategy* aims to provide guidance to science managers and staff, and policy, regulatory, and program staff, and interested stakeholders and partners outside the department. The *Strategy* also sets out actions which Health Canada will be taking over the next five years to achieve those objectives.

In putting forward the *Strategy,* we recognize that goals and actions will evolve over time, as circumstances and government priorities change. But this document will serve as the foundation for the responsible conduct of the essential scientific mission of Health Canada in support of the department's broader mandate.

1 DEVELOPMENT OF THE STRATEGY

Health Canada's S&T Strategy has been developed with the participation of a number of Health Canada staff. The Departmental Executive Committee's Subcommittee on Science (*DEC-Science*) has exercised management oversight, while a Steering Committee with representatives from departmental science organizations has guided the *Strategy*. A number of departmental staff participated in working groups on capacity, foresight, and policy and innovation.

The department has undertaken extensive consultations with stakeholders and with Health Canada staff.

The Science Advisory Board offered their advice during their September 27, 2007 and March 26, 2008 meetings.

On October 3, 2007, 28 representatives from a cross-section of external stakeholders (academia, Non-Governmental Organizations, research organizations, and industry associations) attended a stakeholder round table.

The Minister's Roundtable on Health Research on October 9, 2007, gave the Minister an opportunity to hear high-level views on where Canada needs to focus its investments in health research and how the Health Portfolio can have the best impact in steering these investments. Some 13 individuals from academia, health charities and the private sector attended.

An interdepartmental consultation with Science-Based Departments and Agencies was held on October 16, 2007, with representatives from 11 departments and agencies. Finally, electronic consultations to seek external input were undertaken.

To consult Health Canada staff, a presentation on the development of the *Health Canada S&T Strategy* was made at the Science Forum November 9, 2007, and a Town Hall meeting with Health Canada staff took place November 20, 2007. Interviews with 30 departmental staff at all levels have been completed, and electronic consultations to seek Health Canada input were undertaken.

Some clear themes emerged from these consultations.

Strengthening Science and Policy Links

Respondents stressed the importance of strong connections between science and policy. Foresight can assist in identifying new policy requirements as well as science challenges, and in influencing priorities. More collaboration between policy and science staff should be encouraged through, for example, organizational options, staff exchanges and co-location.

Enabling an Effective Regulatory Environment

A common concern was the appropriate balance for Health Canada between protecting Canadians from risks, and enabling and facilitating commercialization. There is recognition that effective product regulation can provide a competitive advantage in international markets, and steps such as discussion of requirements with industry at very early stages of bringing new products to market, and increased openness and transparency in the regulatory system would be beneficial.

The full range of science (including social sciences and ethics) should be taken into account. Regulatory silos within Health Canada need to be broken down, so that issues such as uncertainty regarding product classification, and products resulting from the convergence of technologies and their regulation can be addressed and that risk assessment methodologies can be shared.

Innovation can lead to opportunities for products that can be commercialized, as highlighted in the *Federal S&T Strategy,* or to research findings that can improve health, health services and health programs. In the life-cycle of innovation, a focus on both products and research findings, and on the application of research or innovations, is important. Knowledge can be applied in many ways that benefit both the economy and society, without pushing the department into "commercialization".

Accessing Science and Science Human Resources

Foresight is essential if Health Canada is to recognize and respond to discovery and innovation. Since much of science innovation occurs outside government, effective linkage with sources of external research and innovation, both in Canada and internationally, is essential. Awareness of key trends in science will enable Health Canada to adjust its priorities as required, and to focus on accessing knowledge and expertise in those areas. To be effective in accessing external science, Health Canada needs to cooperate internally as well as with external partners.

A dynamic science environment is needed to attract and maintain highly qualified scientific personnel, who need opportunities to develop their skills and maintain relevant expertise. A variety of human resource issues were raised during our consultations, including:

- the need for a competitive pay structure;
- a classification system that provides for more diversity of background;
- development of existing staff; and
- capturing knowledge before people retire.

Health Canada scientists and science managers need to articulate common goals so that there is an understanding of mutual requirements and a sharing of the benefits of success in meeting those goals. Effective information services and responsive business processes (accommodation, hiring, information technology services) will contribute to a dynamic science environment. Addressing laboratory accommodation issues is critical.

Maximizing Linkages and Partnering

Health Canada will pursue its science work in productive partnership with industry, academia, international organizations, and with counterpart organizations in other countries.

International links are critical to access the best practices in regulation and to support the responsible harmonization of regulations and regulatory processes. Collaboration is important, but should only be encouraged if (a) it contributes to results and (b) all partners are equally committed. Partnering requires a degree of flexibility and informality so that informal networks can function.

Communicating the Department's Science Needs

If Health Canada is to demonstrate leadership in science, it must work with partners in:

- creating visionary goals;
- coordinating science priorities, resources, and activities across funders and performers; and
- raising public awareness of benefits of research and innovation.

An emphasis on knowledge transfer and translation will contribute to action on the results of science research, and to building bridges between scientists and the public, and between health sciences and business.

The department must clearly communicate its priorities, processes and functions so that the science community can respond appropriately. To this end, there were a number of suggestions regarding the tracking and communication of information about scientific work underway in government and other sectors across Canada.

Promoting Excellence in Science

The requirement for excellence in all areas of Health Canada science pervaded the discussions. Several examples were mentioned:

- the need for excellence at the level of the individual scientist (to be successful in publishing and to be part of collaborations in key areas of science); and
- the need for excellence at the system level as a regulator (exchanging best practices).

Strengthening Accountability

Our consultations showed that in assessing scientific work, the focus should be on *outcomes* (including how science findings will impact on health care providers and patients), and not only on investments and outputs. This will require appropriate ways of assessing and managing risk. There is a perception among those we consulted that currently there is too much focus on simply avoiding error.

2 TRENDS THAT REQUIRE A SCIENCE RESPONSE FROM HEALTH CANADA

When staff and stakeholders were asked about emerging scientific and technological trends that will require different or new scientific work or outputs from Health Canada during the next ten years, a series of developments were identified.

One trend concerned broadening the perspective of what should be taken into account in decision-making: social and behavioural science findings, legal and ethical considerations, traditional and complementary medicine should be part. Changes in Canada's social fabric, norms and values, population demographics, economy, global relations and trade, and the relationship with the environment could impact the type of science conducted or the methodologies employed.

Public policy issues that will require Health Canada's scientific attention include climate change, water quality and quantity, pandemics and infectious disease, the intersection of health and environment issues, and the impact of globalization.

From a population health perspective, special populations, aboriginal health, vulnerable populations, children and the age/class demographic will be important. The understanding of health behaviour needs improvement, as does the complexity of interactions between individual behaviour, environmental factors, and private and public sector activities. With the ability to identify genetic bases for health conditions comes a variety of issues such as whether to screen and treat large segments of the population for such potential health conditions.

Public values are changing, and expectations that consumer input will be taken into account alongside science-based evidence in risk assessment and management, challenges traditional concepts and practices. Science literacy may become an increasing issue due to the trend of education away from science after grade 9. Issues such as the detection of chemicals in the environment that may have a presumed health effect require a scientific and timely response from Health Canada.

Within government, the federal community is expected to be coordinated and to work and act as one. Pressures for the timeliness of science delivery are increasing, while the required scientific knowledge is increasingly found outside government. There are major changes in federal government workforce demographics and dynamics, requiring strategic approaches to hiring, training and managing staff. Internationally, there are signs of increasing collaboration, harmonization and understanding among governments, but new challenges such as electronic governance and innovation in the global health delivery system are arising.

Trends affecting diagnosis of health conditions include new methods such as cellular level tests and genetic testing, new applications of technology such as remote sensing for home care, developments in imaging technologies, non-invasive diagnostic tools, and more rapid assays.

Treatments will increasingly be developed for small population groups – or individuals. New types of products: stem cell therapies, drug delivery targeted to specific tumours or pathogens, products derived from nanotechnology, bioinformatics, proteomics and genomics are reaching the market. The number of combination – and increasingly complex – products is climbing. Natural health products continue to grow in popularity. High-tech health care products, techniques and services including the Electronic Health Record and web-based programs to convey information to health professionals and patients / consumers are becoming more available.

Health Canada's decision-making can – and should – take advantage of advances in modelling for decision-making and policy development. The changing nature of problems, their increasing complexity, and the increasing time pressure for solutions present growing challenges. Trends to increasing interdisciplinary work continue. The vastly expanding medical informatics field offers both opportunities and challenges.

With respect to risk assessment, predictive hazard methods based on structure, scenarios and "omics" is a rapidly developing area. Upcoming toxicity assessment and testing methodologies such as toxicogenomics, and the increasing reliance on health effects modelling may alter risk assessment approaches. Coordinated life-cycle analysis (both human and environmental) offers an alternative to a point-in-time assessment of a single substance. New techniques and approaches for identifying and measuring human exposure and potential health effects from chemicals are being developed. Interpretation of biomonitoring data for environmental chemicals and data on mixtures of chemicals is an increasing challenge.

Effective regulation will provide a competitive advantage for producers, but Health Canada will need to be nimble and timely with science-based advice to meet regulatory needs. Processing and evaluating the large numbers of products, along with product convergence resulting from new developments will pose increasing regulatory challenges. Setting data requirements for nanotechnology regarding toxicity and environmental fate will be necessary.

3

LINK WITH HEALTH CANADA'S STRATEGIC OUTCOMES 2008-2009

Health Canada's Strategic Outcomes are the long-term benefits that the department seeks to bring to Canadians. The realization of each of these outcomes is supported by science.

STRATEGIC OUTCOME 1:

Accessible and sustainable health system responsive to the health needs of Canadians

Our objective is to promote the national coordination and development of a strong, shared knowledge base to address health and health care priorities for all Canadians. We also aim to facilitate health system adaptation to changes in technology, society, industry, and the environment, so that Canadians will continue to be protected from heath risks, have access to quality health care, and gain positive health benefits from information and innovation.

Health Canada works with many partner organizations in health research and health data collection in Canada and internationally. It does this to promote collaboration and knowledge-sharing in health care research; address knowledge gaps in what the federal Health Portfolio has identified as priority issues; and ensure that research addresses the health needs of all Canadians. As well as drawing on the work of partners and partner organizations, the department also relies on internal expertise (for example, to conduct economic analyses of what affects supply and demand in health care).

Health Canada uses science in working toward the following results:

- improved health care system planning and performance;

- enhanced capacity of governments and stakeholders to support health system planning;

- awareness and understanding among health sector decision makers and the public of the factors affecting accessibility, quality and sustainability of Canada's health-care system and the health of Canadians;

- increased input of Canadian stakeholders on Assisted Human Reproduction (AHR) technologies;

- increased knowledge of the application of AHR procedures in Canada;

- increased number of AHR regulations to protect the health and safety, dignity, and rights of Canadians using AHR technologies;

- health and safety risks related to AHR technologies addressed;
- enhanced knowledge base and intersectoral collaboration on global health issues;
- influencing the global health agenda for the benefit of Canadians; and
- global health policies for the benefit of Canadians.

STRATEGIC OUTCOME 2:

Access to safe and effective health products and food and information for healthy choices

Scientific and technical expertise is of critical importance to the activities of this strategic outcome. Such expertise is used on a daily basis for policy development, the evaluation of health products and foods, risk assessments, compliance testing, and nutrition and contaminant surveillance to research on food pathogens and pharmacogenomics. Research is undertaken in support of regulatory activities and related activities that contribute to evidence-based decision-making to protect the health and safety of Canadians.

Under this strategic outcome, Health Canada will work to achieve the following results:

- increased regulatory system response to health product-related health risks;
- increased awareness and/or knowledge of health products issues;
- reduction of the exposure to disease-causing foodborne micro-organisms and environmental agrochemical contaminants, food allergens; and
- an increased level of informed choices/healthy decisions related to food quality and food safety.

STRATEGIC OUTCOME 3:

Reduced health and environmental risks from products and substances, and sustainable living and working environments

Health Canada will continue to advance science and use strong evidence-based research to formulate healthy and safe living promotion and harm prevention programs, policies and regulations.

Departmental experts work closely with colleagues in the federal government and beyond (e.g. academia) in the areas of both research and development and related scientific activities. Anticipatory, applied and novel research provide the evidence of emerging health issues through investigations along the continuum from exposure and hazard assessment, to mechanism of action and population studies, to contribute to the design and implementation of policies, regulations and legislation, as well as to decision-making, aiming at protecting the health and safety of Canadians.

In our role as a regulator, we extend our scientific research by contributing to the generation, dissemination and application of scientific and technological knowledge, including the assessment of products and processes for the purpose of regulation, as well as surveillance, testing and collection of information. In addition to our internal activities related to scientific research, health surveillance and foresight in the safe use of emerging and merging technologies (such as biotechnology and nanotechnology), we will also use the science conducted by external organizations to help identify risks to human health, and assess and manage these risks.

Under this strategic outcome, Health Canada will seek to achieve the following results:

- timely regulatory system response to health risks related to toxic chemicals and environmental risks to health;
- new and emerging health risks related to toxic chemical substances are identified, assessed and managed;
- Canadians are knowledgeable and aware of environmental health issues;
- declining trends in levels of risk, adverse reactions, illnesses, and injuries from hazardous products, substances, cosmetic products, and radiation emitting devices;
- Canadians are knowledgeable / aware of the health risks of exposure to hazardous products, substances, cosmetic products, and radiation emitting devices;
- timely system response to public service employees with psycho-social problems;
- Internationally Protected Persons and Canadian Public Servants are protected during visits and events from work-related and other risks to their health and safety;
- adherence to Acts, Regulations, and Guidelines;
- reduced tobacco consumption;
- reduced abuse of drugs, alcohol, and other controlled substances;
- declining trends in levels of risk from regulated pest control products; and
- increased stakeholder awareness of risks and confidence in regulatory activities.

STRATEGIC OUTCOME 4:

Better health outcomes and reduction of health inequalities between First Nations and Inuit and other Canadians

Science and research supports, either directly or indirectly, strengthening Health Canada's capacity to accurately define health risks, trends, and emerging issues; support effective design and delivery of health programs and services; and support increased control by First Nations and Inuit people. The activities are driven by specific information requirements for First Nations and Inuit program and policy development and are both quantitative and qualitative in design.

Under this strategic outcome, Health Canada is responsible for achieving the following results:

- strengthened community programs;
- better health protection;
- improved primary health care; and
- access to non-insured health benefits to contribute to improved health status of First Nations and Inuit individuals, families and communities.