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Your health and safety... our priority. *Votre santé et votre sécurité... notre priorité.*

Science and Research Serving Canadians

Healthy Environments and Consumer Safety Branch

Canada

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Healthy Environments and Consumer Safety Branch

"Health Canada is the federal department responsible for helping Canadians maintain and improve their health. We assess the safety of drugs and many consumer products, help improve the safety of food, and provide information to Canadians to help them make healthy decisions. We provide health services to First Nations people and to Inuit communities. We work with the provinces to ensure our health care system serves the needs of Canadians."

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Foreword from the Assistant Deputy Minister

I am pleased to present the first Healthy Environments and Consumer Safety Branch (HECSB) report on science. *Science and Research Serving Canadians* provides an opportunity to share some of our successes, to highlight the importance of our scientific work to the health and safety of Canadians, and to demonstrate that we are committed to the tradition of excellence in science.

Health Canada's mission is to help Canadians maintain and improve their health. At HECSB, we strive to do this by promoting healthy and safe living, working and recreational environments and by reducing the harm caused by tobacco, alcohol, controlled substances, environmental contaminants, and unsafe consumer and industrial products. To fulfill its mission, HECSB undertakes scientific research, conducts health surveillance, provides foresight in safe use of emerging and merging technologies, identifies risks to human health, and assesses and manages those risks.

With evolving technologies and changing environments, it is important to be prepared for future challenges. To respond effectively to emerging health and safety concerns, HECSB must remain at the forefront of scientific developments. Past scientific achievements at HECSB have been marked by the removal of unsafe products from market (such as baby walkers), key research that helps us to understand the effects of environmental contaminants (such as smog) on children, and the establishment of new standards in the analysis of controlled substances.

This report is the result of a collaborative effort between HECSB programme areas, regions, and policy and planning staff at all levels of the Branch and reflects activities until 2005-2006. It has been developed to ensure that we have the right expertise, tools and resources to meet the challenges and opportunities of the future.

Susan Fletcher
Assistant Deputy Minister
Healthy Environments and Consumer Safety
Health Canada

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Introduction

Overview

The mandate of the Healthy Environments and Consumer Safety Branch (HECSB) is to promote healthy and safe environments for living, working and recreation and to reduce the harm caused by tobacco, alcohol, controlled substances, environmental contaminants and unsafe products. The Branch relies on science as one tool to execute this mandate.

Scientists and researchers in HECSB work at the leading edge of their fields to make sure that decisions affecting the health of Canadians are made with the best science available. Their work ensures a strong evidence base that supports policies, programs, regulations and legislation. Our science is critical to our ability to identify emerging health issues, capitalize on opportunities, and minimize the risks to Canadians posed by consumer products and our environments.

The ways in which science is performed are evolving. Increasingly, complex issues require innovative management and scientific solutions. As existing sciences and technologies converge, new fields have emerged in areas such as biotechnology, nanotechnology, genomics and proteomics. We need to understand the impact of these highly novel fields and to find ways to benefit from them. Responding to these changes requires integration with other federal and provincial departments and agencies, academia, industry and international organizations to draw upon multidisciplinary expertise and resources. In so doing, we will more effectively identify, address and resolve a wide range of issues that affect health.

The purpose of this document is to provide a comprehensive overview of the science carried out in the Branch to improve understanding of the nature, calibre and reasons science is performed and used in HECSB. In addition to providing a description of science programmes within the Branch, this report demonstrates how HECSB programmes are working to address current and emerging health priorities. Similarly, each of HECSB's programmes, outlines the strategic scientific directions and plans core science requirements for the coming years and the manner in which this science will be used to fulfill programme needs and commitments that benefit Canadians. The report allows programme leaders to articulate how they intend to pursue continuous improvement, demonstrate leadership, and ensure that the appropriate resources and tools are in place to identify risks and respond to issues in a timely manner.[1]

> "It is important that the Government remain current with the latest scientific developments. Governments and other organizations need access to timely, unbiased and scientifically sound analysis of the state of knowledge in such complex areas as biotechnology and climate change…"
>
> Federal Budget, February 2005
> Government of Canada

All science performed, used and funded by HECSB is driven by the principles of effective science. The principles, as established by Health Canada's *Framework for Science*, are consistent with the advice of the Federal Council of Science and Technology Advisors (CSTA):

- *Alignment* – perform, harness and use science that is aligned with the department's mandate, priorities and programs;
- *Excellence* – plan, conduct and evaluate science on the basis of high quality of knowledge, ethics, relevance, openness and transparency;
- *Innovation* – use creative, innovative, leading-edge approaches to science and its use in policy development and decision making;
- *Stewardship* – respect the ethical and appropriate treatment of humans, animals and the environment, the protection of personal information and the need for effective risk management throughout the conduct and use of science; and
- *Linkages* – plan and conduct science in collaboration with other government departments and with other organizations to focus in-house efforts where they are most needed to fulfill Health Canada's mandate and to capitalize on the best available science.

1. The structure of the programme plans is based on HECS' main activity areas, as defined in the Branch's Programme Activity Architecture.

HECSB's activities are divided into five programme areas:

- Safe Environments
- Product Safety
- Drug Strategy and Controlled Substances
- Tobacco Control
- Workplace Health and Public Safety

HECSB's activities are divided into five programme areas. Each of these programme areas focuses on a different aspect of health affected by the environment and/or consumer products:

- The Safe Environments Programme (SEP) promotes healthy living, working and recreational environments by identifying and assessing health risks to Canadians posed by environmental factors.
- The Product Safety Programme (PSP) assesses and helps manage the health and safety hazards associated with consumer products, cosmetics, workplace chemicals, environmental noise and solar UV radiation.
- The Drug Strategy and Controlled Substances Programme (DSCSP) manages the *Controlled Drugs and Substances Act* and its Regulations and plays the lead federal role in coordinating and implementing Canada's Drug Strategy.
- The Tobacco Control Programme (TCP) regulates tobacco and develops and implements initiatives to reduce or prevent the harm associated with tobacco use.
- The Workplace Health and Public Safety Programme (WHPSP) enhances productivity and quality of life by contributing to the health and safety of federal and other Canadian workers, visiting dignitaries and the traveling public in Canada.

This report addresses some common issues at both the Branch and programme levels, such as pursuing partnerships, strengthening our capacity in key areas and quality management. Along the way, this report will draw attention to many of the current scientific activities, innovative collaborations and remarkable individuals that represent scientific excellence within the Branch.

Alignment

Health Canada has identified four medium-term strategic priorities:

- maintaining confidence in the publicly funded health care system;
- improving the quality of life of Canadians;
- reducing the risks to the health of Canadians; and
- improving accountability for results.

HECSB's two broad priorities are:

- reducing risks to health and safety, and improving protection against harm associated with workplace and environmental hazards, consumer products (including cosmetics), radiation-emitting devices, new chemical substances and products of biotechnology; and
- reducing health and safety risks associated with tobacco consumption and the use of alcohol, drugs and other controlled substances.

Health Canada has implemented the *Cigarette Ignition Propensity Regulations* which require all cigarettes manufactured in or imported for sale into Canada on or after October 1, 2005 to meet an ignition propensity standard. In support of these regulations, research was conducted to determine smokers' behaviour regarding fire risks. Establishing the baseline on behaviour and monitoring any changes following the implementation of a new regulation is critical.

Scientific evidence shows that environmental degradation, climate change and the introduction of new substances and technologies all have an impact on health. HECSB is increasingly looking at the linkages between health and the environment. Some of the activities HECSB intends to undertake include:

- addressing the health risks associated with air pollutants in indoor and outdoor environments – with an emphasis on vulnerable populations, such as children, the elderly and people with lung and heart conditions;
- finalizing a prioritized list of substances (based on potential risks to human health) that will require subsequent screening assessment as part of the *Canadian Environmental Protection Act* (CEPA);
- working toward the legislative and regulatory changes necessary to implement the Globally Harmonized System of Classification and Labeling of Chemicals to enhance protection of human health and the environment;
- completing the Climate Change and Health Vulnerability Assessment that will contribute to the Government of Canada's commitment to action on climate change and its international obligations to report on impacts and adaptation efforts;
- providing public health inspections on air, rail and marine conveyances related to food, water and general sanitation to protect the millions of people who travel in Canada every year, and Canadians who come into contact with travelers; and
- supporting research related to the impacts of the workplace on human health to develop a better understanding of indirectly and directly associated human health risks such as substance abuse, anxiety, depression, infections, conflicts and injuries.

HECSB also undertakes a wide range of activities related to tobacco consumption, alcohol and controlled substances. Some of our objectives include:

- developing a national framework for action on substance abuse; and
- enhancing Canadian research in the area of alcohol and drug abuse through the coordination of the development of a National Research Agenda on Substance Abuse.

Governance

At all levels and in all programmes, management, scientists and policy makers are committed to ensuring excellence in science. The HECSB Science Advisory Committee, which is comprised of representatives of each HECSB programme, advises the Assistant Deputy Minister and the HECSB Executive Committee on science issues, policies, capacity and other activities and initiatives. The Office of Science Policy (OSP) plays a central role in coordinating and developing branch science policies and strategies to ensure a robust science capacity and culture, and excellence and innovation in support of evidence-based policy and programs. OSP also liaises with other organizations both within Health Canada and interdepartmentally on horizontal science-based issues.

Good advice from scientists helps us make good decisions. Scientists contribute to decision making by collecting and analyzing credible and high-quality information related to health risks and identifying possible ways of dealing with those risks. Open communication between senior management, policy makers and scientists helps maintain the integrity of the science advice through the decision-making process. This practice extends across networks within the federal government science and technology (S&T) community. HECSB is integrating the principles and guidelines of the Government of Canada's *A Framework for Science and Technology Advice* in our actions to ensure that decisions are informed by the best available science advice.

HECSB also relies on external, expert advisory boards to provide science advice. Health Canada's Science Advisory Board provides independent advice to the Minister of Health on the ways the Department can best meet its mandate through the use of science, including social sciences. The board makes recommendations on Health Canada's priorities and advises on the relevance and effectiveness of its science. In addition, individual programmes also rely on their own expert advisory boards that consider specific issues within their respective mandates.

Types and Roles of Science in HECSB

HECSB will develop a plan to identify, implement and support appropriate quality management systems as part of its efforts to continually enhance the quality and credibility of its science.

The breadth of HECSB's mandate requires the Branch to count on the work of scientists in a range of fields, including the natural sciences, life sciences and social sciences. These scientists work in areas of research and development and related scientific activities (RSA). Anticipatory, applied and novel research provide the evidence of emerging health issues and form the basis for actions that protect the health and safety of Canadians. The knowledge and evidence that are derived from research contribute to the design and implementation of policies, programs, regulations, and legislation as well as to decision making.

As a result of our role as a regulator, the largest proportion of science performed by HECSB is RSA, which complements and extends research by contributing to the generation, dissemination and application of scientific and technological knowledge. Within HECSB, some of the most prevalent types of RSA performed include the assessment of products and processes for the purpose of regulation – surveillance, testing and collection of information is central to fulfilling this mission. Much of this work directly supports risk assessment, management and communication in each of the programme areas.

Excellence

"The S&T performed, funded and used by the federal government must be of the highest quality. It must be demonstrated to meet or exceed international standards for scientific and technological excellence, and deliver social or industrial relevance. This should be achieved through openness, transparency, and regular and appropriate expert review."

Council of Science and Technology Advisors, *Building Excellence in Science and Technology* (1999)

HECSB defines excellence based on the quality of the science performed and used, its relevance to the roles and priorities of the Branch and the Department, and transparency and openness. Excellence is also closely related to addressing ethical considerations and supporting the federal government's stewardship roles.

To ensure that our science meets the highest standards, we work to provide the necessary conditions for excellence to flourish. In particular, we focus on maintaining high-quality science by submitting our science, our programs and our facilities to external expert review.

External review

External review (including peer review) is used to evaluate the scientific merit and quality of publications, funding proposals, and even scientific programs and facilities. HECSB scientists regularly submit their work for review and intend to implement a systematic and programmatic peer review, particularly for laboratory activities, as a way to scrutinize RSA.

HECSB Scientists Win Poster Awards

Caroline Healy and her colleagues Mike Wade, Avril McMahon, Craig Parfett and Douglas Johnson were the Environmental Health poster contest winners at the Health Canada Science Forum in 2004. Healy and her team worked on the flow cytometric detection of chemically induced tandem repeat mutations in two murine cell lines. They have developed a quick and inexpensive way of detecting whether certain environmental agents cause DNA damage.

Andrew Williams received one of five best poster awards at Health Canada's Science Forum in 2005 for his poster, which presented methods for identifying and controlling nuisance parameters in microarray studies. Data visualization techniques, clustering and methods for detecting differentially expressed genes were applied to data from multiple Health Canada investigators. The poster presented technical and biological variation in various sources and the impact on identifying differentially expressed genes.

Dr. Hongyan Dong received a best poster award at the Health Canada Science Forum in 2005 for a study on the developmental effects of exposure to thyroid hormone disruptors. Dr. Dong and her co-workers derived an extensive list of genes from developing mouse liver that were affected by neonatal and postnatal disruption of thyroid homeostasis. From the list, Dr. Dong identified one candidate gene that possesses a DNA element that potentially mediates the regulation of the gene through interaction with the thyroid hormone receptor. This gene may be used as a biomarker to screen potential thyroid hormone disruptors.

Laboratory quality management systems

Ensuring that HECSB laboratories and facilities foster and maintain high-quality standards is key to scientific excellence. Since HECSB performs many different scientific activities ranging from research to testing, it employs a range of quality management systems. Good laboratory practices, peer reviews and internationally recognized quality systems involving external reviews and certification, such as those developed by the International Organization for Standardization (ISO), help to ensure the quality of our science and the safety of products and processes we assess.

In March 2003, an external Expert Advisory Panel assessed the progress of each branch within Health Canada in implementing appropriate laboratory quality systems and accreditation. The findings evolved into three general themes for Health Canada's approach to quality:

- strong support by senior-level management for laboratory accreditation;
- alignment of laboratory registration, accreditation and/or recognition with the needs and expectations of the clients, the mandate and the product/service produced; and
- staff training to implement quality management systems.

In April 2005, HECSB completed a comprehensive review addressing the Branch priority of quality systems for laboratories. In general, the review found that branch laboratories participated in a wide range of activities and were faring well in their approach to quality systems. Specific recommendations stated that (a) certain laboratories need to make a decision regarding quality management systems; (b) branch laboratories focused on research should implement a systemic and ongoing approach to quality management; and (c) branch external laboratories require quality standards approved for internal laboratories. The Branch is working toward implementing these recommendations.

The Product Safety Laboratory is one of the few laboratories in Health Canada to be accredited (since 1999) to ISO/IEC 17025, which stipulates the "General Requirements for the Competence of Testing and Calibration Laboratories".

Excellence in Science
Award Winners from HECSB

Dr. Vern Seligy — Dr. Seligy was co-recipient of the first Excellence in Science Award (1999) for his research on molecular biological methods to monitor exposure and effects of microbe-based biotechnology products covered by CEPA, using biopesticides as models.

Dr. Hari M.Vijay — Dr. Vijay, one of the top world experts on mould allergens, received an Excellence in Science Award 2000 for her work on mould spore allergenicity and human health. She worked on the standardization of allergens extracts to improve diagnosis and treatment of allergic patients.

Dr. George R. Douglas — Dr. Douglas was an award recipient in 2001 for improving and advancing international standards in genotoxicity methodology and criteria using transgenic and multi-gene models.

Dr. Ih Chu — Dr. Chu is recognized around the globe as a top-notch toxicologist. His work earned him the honour of an Excellence in Science Award in 2002.

Dr. Renaud Vincent — Dr. Vincent, a world leader in evaluating the risks of particulate air pollutants, received the award in 2003 for his contributions to the understanding of health effects of air pollution.

Dr. Rick Burnett — Dr. Burnett received the Excellence in Science Award in 2005 for his expertise in statistical modelling on the impact of exposure to air pollutants on human health.

Dr. Paul A. White — Dr. White received the 2005 Excellence in Science Award for Most Promising Scientist for his work on developing an understanding of the risks from complex environmental mixtures.

Dr. Pierre Band — Dr. Band is an internationally respected medical epidemiologist who has made outstanding contributions to the understanding of the association between environmental and occupational exposures to chemicals and health. He received the Excellence in Science Award in 2006.

Dr. Carole L. Yauk — Dr. Yauk received the 2006 Excellence in Science Award for Most Promising Scientist for her work in toxicogenomics and heritable tandem repeat mutations.

A strong science culture

Every day, scientists and researchers at HECSB apply skill, creativity and enthusiasm to their work. The result is that HECSB is home to dedicated scientists, many of whom are nationally and internationally recognized for being at the leading edge of their fields.

Many HECSB scientists hold positions on scientific advisory boards, professional associations and scientific societies. The Branch supports building linkages with other scientific institutions, particularly in areas of common interest. In 2004, 25 scientists held cross appointments with universities across Canada.

Recognition is also given internally to outstanding scientists for their contribution to knowledge in the sciences relevant to the protection and promotion of health. Among other public service awards, eight HECSB scientists have been the recipients of the Health Canada Excellence in Science Awards since 1998.

Bibliometrics

Publications are an important way of sharing and evaluating new ideas and advancing science. Whether research findings appear in peer-reviewed journals, books or whether they are presented at conferences, they attest to their authors' productivity, knowledge of science in their fields, and the excellence of their work. HECSB scientists have produced an exceptional and large body of knowledge. HECSB will work with the Office of the Chief Scientist and other branches in Health Canada to ensure that the knowledge these scientists have generated and records of their achievements are retained and easily accessible to other scientists and decision makers within Health Canada.

Bright Lights

The sun was shining on Dr. Pascale Reinhardt and the team from Consumer and Clinical Radiation Protection Bureau, Product Safety Programme as she accepted the United States Environmental Protection Agency's 2004 Stratospheric Ozone Protection Award for the Government of Canada's Sun Awareness Program.

The Sun Awareness Program, conducted in collaboration with Environment Canada, has been in place since 1998. It targets elementary and secondary school-aged children, making them aware of changes in their environment and how to minimize the risk of over-exposure to the sun. Materials produced by the program include posters, brochures, activity kits and a copy of the UV Index. Every spring, 14,000 of these kits are sent to schools across Canada, with about 200,000 children reached every year. The program will be broadened to include after-school and day-care programs, as well as summer camps.

As part of the program, the Sun Savvy School Club encourages teachers and students to learn about UV radiation and sun protection by measuring and recording UV levels near their schools. Over 1,600 teachers have registered for the program, which started in 2000.

This is the second award to Pascale and Yvon Deslauriers. They have also been recognized by the Canadian Dermatology Association for their work.

Innovation

While innovation for commercialization is not the Branch's central goal, we are constantly looking for new, creative and novel ways in which science can help us identify and decrease health risks or support healthy living. For example:

- The Product Safety Laboratory designed and developed new crib and cradle impact and vibration testing equipment that was not previously available. The laboratory received commendations from the Standards Council of Canada for its work.
- The Tobacco Control Programme created national and regional evidence-based tools to assist Canadians in their efforts to quit smoking and used both traditional and non-traditional networks for dissemination.
- The Safe Environments Programme developed and validated genomic and proteomic tools and cell system methods to conduct risk screens of environmental contaminants (including chemicals and biotechnology substances).
- The Drug Strategy and Controlled Substances Programme led an international initiative to develop methodologies for estimating avoidable costs of substance abuse. Although methodologies to address cost estimation have been used since the end of the 1990s, no scientific consensus has existed on how to estimate avoidable costs. An international working group of experts was tasked with the identification of the best scientific avenues for addressing the issue. The International Guidelines for the Estimation of Avoidable Costs of Substance Abuse were completed in December 2005. Canada is preparing a national study to estimate avoidable costs related to alcohol use and abuse.

The pursuit of scientific discovery and technological advances are drivers of Canada's productivity and prosperity. Science at HECSB serves a vital role in sparking innovation in other sectors in ways that benefit the health of Canadians:

- The Forensic Fourier Transform Infrared (FTIR) Spectra Library database contains intellectual property developed by the Drug Analysis Service of the Drug Strategy and Controlled Substances Programme, licensed by Health Canada and marketed worldwide. The database allows for quick identification of drugs, including analysis of illicit substances, for law enforcement and educational purposes.

Canadians rely on HECSB to assess and regulate product safety and efficacy using the best available science, and inform them of known and potential health risks. In doing so, HECSB enhances the climate for investment and trust in Canadian markets and manufacturers and reduces the administrative burden on business.

- The Product Safety Laboratory is committed to technology transfer to private industry by making laboratory test methods available on Health Canada's Web site. Technical assistance is also available to private laboratories or organizations interested in setting up commercial testing services.

To effectively assess the risks and benefits to Canadians and develop appropriate regulations, HECSB scientists need to be on the cutting edge of their fields. In particular, the natural and life science fields of biotechnology, nanotechnology, genomics and proteomics are expanding rapidly.

- The Mutagenesis Section of the Safe Environments Programme is collaborating with the Tobacco Control Programme on a research project to identify genomic markers of toxicity for tobacco smoke. This will generate supporting data to develop methods to assess the effects of tobacco products modifications.
- The Mutagenesis Section is also collaborating with the Product Safety Programme (Biotechnology Section) to develop and validate genomic and immunoproteomic tools and cell system methods to conduct risk screens of biotechnology-related micro-organisms.

Stewardship

HECSB is committed to upholding the highest standards of research ethics. Any research performed or funded by HECSB that involves human subjects must be reviewed by Health Canada's Research Ethics Board (REB) to ensure the greatest protection is provided to participants. HECSB recognizes the ongoing importance of ethics review and works closely with the REB to provide training and tools for researchers on the review process and to further systemize the procedure for submitting applications for review. Similarly, HECSB is committed to maintaining high standards of care in science activities involving animals. All projects adhere to the Canada Council on Animal Care guidelines.

> "Scientific research and technology development are essential for higher productivity and a rising standard of living"
>
> Federal Budget, May 2006
> Government of Canada

Similarly, HECSB is committed to helping create healthy social and physical environments, integrating sustainable development into departmental decision making and management processes, and minimizing the environmental and health effects of its physical operations and activities. Many health problems are exacerbated by conditions in the natural and built environments, including the quantity and quality of water, air quality, global environmental threats to health such as climate change, and exposure to toxins in certain foods. Science can increase our understanding of these issues and is particularly important given the inherent variability and uncertainty of many natural phenomena that the Branch addresses. Research can provide the baseline data and knowledge to better understand and address sustainable development issues and make predictions about changes in the future.

Linkages: Working Together

As public policy issues grow increasingly complex, the federal government's capacity to develop coordinated and integrated responses to priority issues becomes ever more urgent. The increasing complexity and costs of performing science and the frequent need to bring multidisciplinary approaches and expertise to bear on these issues mean that joint identification of Science and Technology (S&T) priorities, the sharing of information, resources and expertise – and where appropriate – integrated program management are essential.

Collaborations are essential to our success, and we will continue to expand our networks to capture the benefits of working collaboratively with organizations in Canada and around the world to reduce risks, find innovative solutions to complex health issues, and improve the health of Canadians.

Integrating our science with other federal departments and agencies

Within the federal government, several science-based departments and agencies, including Health Canada, work together on national priorities. HECSB works closely with these other federal departments and agencies, as well as through the Assistant Deputy Minister Science and Technology Integration Board, as an active participant in a variety of initiatives. For example:

- Water

  Health Canada and Environment Canada are leading the development of a federal Freshwater Research Agenda. This research agenda will provide a sound basis for future investments in science. It will also support the objectives of the Health and Environment Agenda and the Competitiveness and Environmental Sustainability Framework.

- Climate Change

  Climate and climate variability pose numerous challenges to individuals and communities in Canada. These include the increased frequency and severity of extreme weather events, changing air quality, water and food-borne contamination, and changing patterns of disease. HECSB will work with its collaborators to move forward with effective adaptation measures, and where necessary, to minimize health impacts.

- Northern Science

  Northern science is a horizontal issue with unique political, geographical, environmental, cultural and economic opportunities and challenges. Along with other Health Canada branches, HECSB will participate in scientific activities that support initiatives such as International Polar Year (2007–08) and the Federal Northern Strategy.

- Public Security

  The ***C****hemical Biological Radiological Nuclear* (CBRN) **R**esearch and **T**echnology **I**nitiative – also known as CRTI – represents the federal science community's response and commitment to providing science solutions related to potential chemical, biological, radiological and nuclear threats to public security. HECSB is an active participant in this initiative.

- Substance Use and Abuse

  Under the renewed Canada's Drug Strategy, the Drug Strategy and Controlled Substances Programme is coordinating research initiatives and activities with key federal partners and agencies. The collaborators include the Canadian Centre on Substance Abuse, Justice Canada, the Royal Canadian Mounted Police, Foreign Affairs and International Trade Canada, Public Safety and Emergency Preparedness Canada, the Canadian Border Services Agency, and several other federal departments and agencies. Provincial, territorial and municipal governments' and other stakeholders' ongoing support and collaboration are also essential to success. This coordination provides for synergy and better integration of resources.

Domestic Collaborations

Within Canada, HECSB works with provincial and territorial governments, academic institutions, industry, the voluntary sector and health organizations. Each programme has a network of linkages with organizations to address specific issues related to their mandates and activities. In many areas, HECSB works directly with its partners to perform or fund science, which is then used by other organizations to inform activities, policies and outreach programs intended to improve the health of Canadians.

Here are a few examples from the hundreds of scientific collaborations where HECSB is a participant or leader:

- HECSB supports Health Canada's role in nuclear and chemical threat assessment by providing technical and scientific advice to the Solicitor General for Public Safety and Emergency Preparedness Canada (PSEPC) in accordance with the National Counter Terrorism Plan through the Special Threat Assessment Group.
- The Radiation Protection Bureau in the Safe Environments Programme works with national standards bodies to develop standards for measuring and monitoring human radiation exposure. Their objective is to improve measurement accuracy of radioactivity and ensure that radiation protection programs are effective in protecting occupationally exposed workers.
- The Tobacco Control Programme pilots various training projects with regional and provincial professional associations, provides support for a national network of quit lines and carries out national and regional cessation projects with various partners.
- The Mutagenesis Section in the Safe Environments Programme participates in various research and training projects with other branches, departments and universities, providing support for national and international networks in toxicogenomics and bioproduct regulation.
- The Drug Strategy and Controlled Substances Programme funds regional and national initiatives aimed at reducing substance use and assisting those at risk from the effects of drugs. Best Practice documents have been developed to support professional education, training and practice that involves evaluations with various partners in collaboration with provinces, territories, experts and user groups.

First-Ever Global Public Health Treaty

In December 2004, Canada ratified the Framework Convention on Tobacco Control (FCTC), which is the first-ever global public health treaty. It is designed to protect present and future generations from the health and economic consequences of tobacco consumption and exposure to second-hand smoke by strengthening tobacco control initiatives around the world. As part of the FCTC, Health Canada supports and promotes international activities in the area of tobacco control, and has been a leading supporter of global tobacco control initiatives and contributed in key areas by:

- facilitating the major role that non-governmental organizations (NGOs) played in the development of the FCTC by leading the development of a consensus that invited NGOs to participate as observers during negotiating sessions;
- co-chairing negotiating groups throughout the negotiations and chairing one of the two final negotiating groups at the last negotiating session; and
- providing support to the World Health Organization, regional multilateral organizations and bilaterally to build capacity in tobacco control.

International Collaborations

Electronic and professional networks that span the globe allow scientists and researchers to share information and strengthens our capacity and technical expertise. It also gives us an opportunity to share our knowledge with other countries to jointly achieve common policy and scientific goals.

HECSB works with international organizations and foreign governments to address common health risks and to support Canada's international obligations and commitments. Some examples include:

- The Drug Analysis Service in the Drug Strategy and Controlled Substances Programme works with an international standing committee, the Scientific Working Group for Forensic Drug Analysis, to make recommendations to the forensic community on minimum analysis standards.
- The Water Quality Bureau in the Safe Environments Programme is involved at the international level with the World Health Organization and the Pan-American Health Organization to develop and implement guidelines for drinking water.
- The Policy and Planning Directorate of HECSB supports the Minister of Health's participation in the Health and Environment Ministers of the Americas. Through this forum, Canada works with other countries on three common priority areas for hemispheric action: integrated management of waters resource and solid waste; sound management of chemicals; and integrated environment and health assessment including indicators for child health.

Capacity

The Branch's ability to carry out its duties depends on having the right people with the right skills, as well as the right facilities and equipment for the tasks at hand. Increasing scientific specialization and the emergence of new fields such as genomics often necessitates equally specialized tools and highly skilled individuals. In other areas, the complex, multidisciplinary nature of issues, such as children's health,

requires a more horizontal and integrated approach that links a range of expertise and resources – often from different organizations.

Our People

HECSB delivers its services through an organization of more than 1,200 employees across Canada. It is a highly skilled knowledge-based workforce, over half of whom work directly in natural, life and socio-scientific–related activities. These individuals are employed in many diverse occupations, including research; applied science and engineering; health services; technical; economics and social sciences; and education and library science.

Many of our scientists are eligible to retire within the next few years, taking with them tremendous scientific expertise and corporate memory. We need to recruit and retain the right individuals with the right mix of skills to ensure we continue our tradition of scientific excellence. One of the Branch's goals is to develop and implement a human resources strategy that addresses issues such as succession planning, recruitment, learning and retention – specifically for our scientists and researchers. Initiatives, such as Health Canada's Postdoctoral Fellowships Program, and welcoming scientists emeritus back into the Branch as mentors will be important for our success.

First Scientist Emeritus

Dr. Tony Myres was named Health Canada's first Scientist Emeritus in recognition of his life-long commitment to environmental health. For over 20 years, Dr. Myres has offered continuous support to young scientists and junior colleges and has been actively involved in the cooperative education program and student mentoring.

The emeritus program gives Dr. Myres the opportunity to share what he has learned throughout his career. He hopes to help the Department meet the challenge of attracting, recruiting and retaining young scientists. Dr. Myres, who is volunteering his services as Scientist Emeritus, knows first hand how "nothing can quite match the breath, diversity, complexity challenge… and yes, the excitement of a career in science in Health Canada."

HECSB's National Presence

Regional work is driven by Health Canada's vision of improving the health of Canadians. From coast to coast, the regions work directly with Canadians to deliver programmes and services. There are seven regions[2]:

- British Columbia
- Alberta
- Manitoba
- Saskatchewan
- Ontario
- Quebec
- Atlantic

Although the bulk of HECSB's science is carried out in the National Capital Region, facilities across the country perform scientific activities. Seven regions deliver HECSB programmes and services through an organization of more than 400 employees, a quarter of whom perform scientific duties.

HECSB operates a network of facilities that house the Branch's research, testing and surveillance capabilities. Activities range from sampling and testing of environmental and food-borne contaminants, analyzing suspected illegal drugs seized by law enforcement, researching and implementing actions aimed at reducing and preventing tobacco and illegal drug use, and collaborating with academic institutions on research. These important regional scientific activities help to shape future policy objectives.

Some notable examples of HECSB regional initiatives:

- In the Safe Environments Programme, a key project has been the assessment of potential health impacts of 100 years of steel making on the residents of Sydney, Nova Scotia. The results of this study and others concluded that potential adverse health risks due to soil exposure in Sydney are no different from living in other similar communities in Nova Scotia or Canada.
- During two recent Avian Influenza outbreaks in British Columbia, the Workplace Health and Public Safety Programme (WHPSP) BC Region offices used their extensive science capacities to provide advice and guidance to employees of the Canadian Food Inspection Agency (CFIA) as they carried out vital culling procedures. In response to these outbreaks, the WHPSP BC Region, in conjunction with the Public Health Agency of Canada regional office, created a *Joint Lessons Learned Report*, which was issued early in 2006, and prepared a key science-based *WHPSP Avian Influenza Policy and Procedure* document.
- Working from laboratories located in four regions, the Drug Analysis Service of the Drug Strategy and Controlled Substances Programme provides expert advice and analysis of suspected illegal drugs seized by Canadian law enforcement agencies. The results of these analyses confirm the identity of the controlled substances.
- The Tobacco Control Programme supports prevention, cessation and education activities in each of the regions through a variety of social research projects with external collaborators. This includes projects that seek to understand the factors that contribute to tobacco use and addiction, and the findings often lead to policy toolkits or outreach initiatives.
- The regional role in implementing Canada's Drug Strategy includes enhancing health promotion and prevention initiatives. For instance, Alberta Region worked with Alberta Justice, the Alberta Alcohol and Drug Abuse Commission, the Royal Canadian Mounted Police and other stakeholders in organizing "The Alberta Workshop on Methamphetamine: an Environmental Scan."
- Nationally, the Product Safety Programme largely focuses on consumer product safety and cosmetics regulated under the *Hazardous Products Act* and the *Food and Drugs Act*. The focus of regional initiatives includes information and education programs, compliance and enforcement of legislation and regulations, and collaboration with stakeholders to encourage voluntary compliance to protect consumers from product-related hazards.

The Avian Flu Outbreak Response Team, which included employees from the Workplace Health and Public Safety Programme BC/Yukon Region, received a 2005 Deputy Ministers Award in the Teamwork category.

2. Public Affairs, Consultation and Regions Branch is responsible for programs and initiatives undertaken in Yukon, Nunavut and the Northwest Territories.

Improving Internal Science Coordination and Surveillance

Within HECSB, programmes pool their scientific resources to maximize efficiencies and opportunities for synergy. There are countless scientific linkages at the working level, including issue-specific working groups, information exchange, joint publications, and sharing of equipment and ideas. One of these initiatives is described below.

Enhancing Surveillance Capacity: Developing a Branch-Wide Approach

Environmental health and consumer product safety surveillance and monitoring are an essential strategic area for the Branch. Within HECSB, there is strong interest in creating a stronger, cohesive, relevant and accessible surveillance capacity. Knowledge of the relationship between risk factors and health outcomes can contribute to the Branch's and Health Canada's health protection efforts and provide a credible and useful source of knowledge for outside organizations.

> Surveillance is the ongoing and sustained collection, integration, analysis, interpretation and dissemination of information for knowledge development, decision making, reporting and raising awareness.

The former HECSB Surveillance Working Group (SWG) was established in August 2002 to lead the Branch's efforts to enhance surveillance capacity and coordination. SWG coordinated information collection and surveillance development activities in HECSB, assessed capacities and priorities, provided advice, and worked with other organizations (e.g. Public Health Agency of Canada) to improve linkages and share information. Related outputs included a strategic plan and framework for surveillance (see below), a surveillance needs assessment, and an inventory of federal, provincial and territorial environmental and occupational data sources.

The *Strategic Plan for Environmental Health and Consumer Product Safety Surveillance* developed by SWG aimed at strengthening branch-wide surveillance coordination so that the five HECSB programmes could more effectively undertake their risk management and health protection activities. The plan was based on a review of existing systems and related initiatives, a conceptual framework for surveillance, a set of guiding principles, a needs assessment, and identification of surveillance commonalities in the programmes.

Upon completion of the *Strategic Plan*, the Branch began developing programme-specific surveillance implementation plans. Detailed outlines of these plans were created at a workshop held in February 2005, and include each programme's current and anticipated surveillance needs, identification of gaps and solutions to fill them, establishment of appropriate mechanisms to obtain data, opportunities for synergies, mechanisms to address constraints and obstacles, and resource requirements. Some programmes have officially adopted the outlines while recognizing that they may be revised to reflect conditions within each programme. Subsequently, HECSB programmes will aim to more fully develop and finalize the surveillance implementation plans tailored to their specific needs over the next three to five years.

In the coming years, the Branch will enhance surveillance capacity and coordination to better meet programme needs and to inform risk assessment and risk management decision making. Future areas to explore include developing environmental health indicators and product safety indicators, as well as indicators on the environmental burden of disease and on the economic burden of environmentally related disease (e.g. costs of health care services and other interventions). Such indicators will help to build a stronger evidence base for health and environment linkages and will better inform decision making and policy development.

HECSB programmes will also continue to:

- develop further linkages to broader surveillance initiatives;
- provide input to relevant surveys (e.g. the Canadian Community Health Survey and the Canadian Health Measures Survey);
- monitor developments on legislative renewal as they relate to surveillance; and
- address relevant ethics and privacy issues relating to access to surveillance data.

Programmes are working together with partners within Health Canada and other government departments and agencies to improve access to and analysis of health effects data, and to ensure the secure transfer of information.

Examples of Surveillance, Monitoring Systems and Data Sources Led by HECSB

- The National Dose Registry monitors occupational radiation exposure in more than 550,000 workers in 80 job categories. The registry contains records from 1951 to the present, and is a valuable source of information for health studies on occupational exposure to ionizing radiation.
- The National Environmental Monitoring of Radionuclides Database tracks national data from 1991 to the present on radionuclides in outdoor air, precipitation, drinking water, and in food – with the aim of minimizing radiation exposure in Canadians.
- The federal and provincial National Air Pollution Surveillance Network, coordinated by Environment Canada, collects air quality data for specific air pollutants at 155 stations in 55 cities in all provinces and territories. It is used extensively by Health Canada for air pollution epidemiological research.
- The Arctic Contaminants Database has captured data since 1994 on levels of environmental contaminants (e.g. organochlorine pesticides, PCBs, lead, mercury, cadmium) in tissues (blood, breast milk) of residents in the Canadian Arctic. The data are collected and analyzed under the Northern Contaminants Programme of Indian and Northern Affairs Canada.
- In partnership with other Health Canada branches, HECSB is collaborating with Statistics Canada's 2006–08 Canadian Health Measures Survey to undertake the first-ever national survey of body levels of environmental chemicals in Canadians.
- Since 1997, the Product Safety Information System has captured data on over 4,000 complaints and injuries related to consumer products, and contains over 40,000 records of inspections and enforcement actions such as seizures, recalls and warning notices.
- The Safe Environments Programme is providing leadership and secretariat support to the Federal, Provincial and Territorial Committee on Health and the Environment's Tracking/Surveillance Task Group, whose purpose is to oversee collaborative action to strengthen health and environment tracking and surveillance across Canada.
- The Tobacco Control Programme uses a number of tools to collect tobacco use data, including the Canadian Tobacco Use Monitoring Survey and the Youth Smoking Survey. The Programme's monitoring activities include collecting, analyzing and interpreting retailer compliance data, public opinion research data, retail market research data, consumer market research data, and industry reports (chemistry, sales, research and marketing data).
- The Drug Strategy and Controlled Substances Programme develops, leads, participates in and supports the collection of information on prevalence, attitudes, harms, consequences and opinions about alcohol and other drug use through various initiatives such as the Canadian Alcohol and Drugs Monitoring Survey and surveys of Canadian Street Youth and Injection Drug Users, in collaboration with the Public Health Agency of Canada, the Canadian Centre on Substance Abuse, and provincial and territorial departments and agencies.

- The Controlled Drugs and Substances Database records information on seizures of controlled drugs and substances, and related charge and disposition information from law enforcement agencies. This Drug Strategy and Controlled Substances Programme (DSCSP) database also tracks the loss and theft of controlled substances and the forgery of prescriptions.
- HECSB has worked with the Public Health Agency of Canada's Centre for Surveillance Coordination to create an inventory of federal, provincial and territorial environmental and occupational health data sources. A searchable web-based version of this inventory is available at: **http://www2.itssti.hc-sc.gc.ca/clf/clfinventory.nsf**

Conclusion

This report, as well as the programme highlights that follow, shows the ways that HECSB is using and will use the natural, life and social sciences to contribute to better health for Canadians. Similarly, it discusses a number of issues common at both the Branch and programme levels, such as pursuing collaborations, strengthening our capacity in key areas and quality management. The following programme highlights demonstrate the way in which each of the five programme areas of HECSB adhere to the principles of effective science: alignment, excellence, innovation, stewardship and linkages. In addition, they describe the types and purpose of science within HECSB programmes.

Programme Highlights

Safe Environments Programme

The Safe Environments Programme (SEP) promotes healthy living, working and recreational environments by identifying and assessing health risks to Canadians posed by environmental factors. SEP develops national risk management strategies that help reduce risks to human health from the environment, are supported by scientific research and directly align with Health Canada's Sustainable Development Strategy.

- Environmental Contaminants Bureau
- Environmental Health Science Bureau
- Radiation Protection Bureau
- Water Quality and Health Bureau
- Health Impacts Bureau

Environmental Contaminants Bureau

The primary concern of the Environmental Contaminants Bureau (ECB) is to protect Canadians from the adverse health effects of chemicals and contaminants under the *Canadian Environmental Protection Act* (CEPA 1999). CEPA is the bureau's primary authority for assessing and managing environmental contaminants in Canada.

ECB identifies and assesses the health risks from toxic substances and environmental pollution, manages these risks through regulation, collaborations and international cooperation, and communicates with stakeholders and the Canadian public. The bureau is responsible for the identification, prioritization and health risk assessment of existing commercial substances. It also develops risk management strategies for the control of CEPA toxics and conducts research on acute and chronic health effects of ambient and indoor air pollution.

Science Strategies, Requirements and Activities

ECB gathers information on human exposure and health effects associated with existing environmental contaminants. It evaluates these data to assess risks to human health, conducts risk assessments on airborne contaminants, and updates Canada Wide Standards. The risk assessment work and standards are an important step toward the long-term goal of minimizing the risk that particulate matter and ozone pose to human health and the environment. ECB provides advice to health professionals and the public on health effects of air pollution, engages in health promotional activities, conducts literature reviews, and develops health science evidence and research for assessments, standards and guidelines. It also generates exposure and source data where such data are lacking.

The bureau engages in health promotion activities, such as the Air Quality Index (AQI) and Air Quality Benefits Assessment Tool. It makes presentations to professionals and has a youth outreach strategy. To develop health science evidence and research for assessments, standards and guidelines, ECB does epidemiological and clinical studies on the relationship between acute and chronic exposure to indoor and outdoor exposure to air pollution and adverse population health effects. The bureau also develops methods, including GIS (Geographic Information System), for

assessments of population exposure to air pollutants, and monitors spatial pollution distribution, personal, indoor and outdoor exposure level. ECB's risk management duties require verification of the relevance of emission sources to human exposure, the validity of reported sources, their impact on Canadians, and the ability to meaningfully control such exposures.

To carry out its research strategy, the ECB collaborates with various organizations, including:

- Environment Canada;
- Indian and Northern Affairs Canada;
- Commission for Environmental Cooperation;
- Arctic Monitoring and Assessment Program;
- US Environmental Protection Agency;
- International Program on Chemical Safety, World Health Organization;
- Organisation for Economic Co-operation and Development; and
- European Union Commissions.

Excellence

ECB scientists regularly present their work at international conferences and publish in peer-reviewed journals. ECB has also developed strong links with other national and international organizations having similar mandates, to ensure that the most up-to-date scientific and technical information and methodologies can be rapidly assessed and adopted. The bureau has also brought together key experts from around the world to provide input into or comment on specific technical components.

Challenges, Opportunities and Emerging Issues

The science of human health risk assessment continues to evolve rapidly. New test methods, the emergence of the new "omics" technologies, and the development of *in silico* technologies will impact on how the bureau identifies and prioritizes for assessment and actually conducts the health risk assessment of existing substances. The newly developed AQI is a health science-based, multi-pollutant tool on air quality being developed to help the public better manage the risks of exposure to air pollution. Increasing attention has been given to evaluating the evidence of health benefits due to regulatory policies and advanced fuel and engine technologies. New test methods for the continued development of monitoring programs need to be implemented to gauge progress in management effectiveness.

Environmental Health Science Bureau

The priority of the Environmental Health Science Bureau (EHSB) is to help reduce the burden of disease caused by harmful environmental contaminants through enhanced hazard identification, risk assessment, risk management and risk communications.

EHSB conducts research that contributes to the knowledge and science-based decision-making process of key areas, such as exposure assessment, vulnerable populations, health impacts and health/exposure indicators. The research provides knowledge on the identity, levels of exposure and routes and mechanisms of human exposure to harmful environmental contaminants in water, air and soil. EHSB research applies methods of toxicology (*in vivo* and *in vitro*) and epidemiology to increase knowledge of adverse health effects of exposure and indicators of health status and exposure. Research is used by policy analysts and communications staff – internally, nationally and internationally – to develop and share risk management strategies.

Science Strategies, Requirements and Activities

The three strategic directions for scientific research in EHSB are to characterize human exposure to environmental contaminants, human health effects associated with environmental contaminants, and the association between human health effects and exposure to environmental contaminants. These science strategies are aimed at identifying the human health hazards from environmental contaminants. Activities include conducting research studies to develop new and improved methods and techniques by applying existing methodologies in the science of chemistry, biotechnology, genomics, biomonitoring, toxicology, nanotechnology, protemics, pharmacokinetics, epidemiology, statistics and mathematical modelling.

To carry out its research strategy, EHSB collaborates with various organizations, including:

- Centers for Disease Control in the United States;
- Centers for Disease Control in Salud, Mexico; and
- academic institutions.

Excellence

For science excellence, quality assurance, quality control and inter-laboratory comparison exercises are applied to ensure standard good laboratory practices. The scientific staff of EHSB regularly publish their work in peer-reviewed scientific literature. The excellence of EHSB's work is internationally recognized and has resulted in EHSB scientists participating on expert panels, working groups, national and international grant peer-review committees and granting agency review boards. EHSB staff have received the Deputy Minister's Award for Excellence in Science on five occasions and have been honoured with several international awards.

Challenges, Opportunities and Emerging Issues

The rapid development of emerging transformative technologies, such as biotechnology and nanotechnology, has the potential to put the health of Canadians at risk. New chemical, toxicological and epidemiological methodologies are needed to better understand the health effects of the exposure of chemical mixtures on human populations. Work is required to understand the pharmacokinetics of specific chemicals in humans and to develop appropriate methods for measuring chemicals in human tissues or fluids, as well as leading-edge approaches and techniques in biotechnology, genomics and proteomics.

Communication and Outreach

The results of our research are regularly published in peer-reviewed scientific literature and are presented at scientific conferences and to international committees, such as the Organisation for Economic Co-operation and Development.

- Our findings are discussed with evaluators from the *Canadian Environmental Protection Act* water and air programs.
- Staff deliver expert training courses in statistics and genotoxicity to others within the Department.
- EHSB engages policy makers, non-governmental agencies and communities in designing and conducting epidemiology research from concept through to completion.

Radiation Protection Bureau

All Canadians are exposed to ionizing radiation from natural sources in the environment, including radon gas in the home. This exposure can be intensified as a result of medical and industrial applications of radiation. To ensure that radiation exposures in Canada are minimized, work is accomplished by three divisions within the bureau – Radiation Surveillance and Health Assessment, Occupational Radiation Hazards, and Nuclear Emergency Preparedness and Response. The priority of the Safe Environments Programme, Radiation Protection Bureau is to investigate and manage risks to Canadians resulting from exposure to natural and human-made sources of radiation.

Science Strategies, Requirements and Activities

Strategies include environmental radiation surveillance, human monitoring for radiation exposure, research into the health effects of radiation, radiological risk assessment and emergency planning.

Environmental radiation surveillance involves the operation of the Canadian Radiological Monitoring Network, which consists of 26 national sites that measure radioactivity in air and environmental gamma radiation dose rates. The bureau operates four air particulate stations and two noble gas stations in support of the Comprehensive Nuclear Test Ban Treaty (CTBT). It maintains a network of real-time gamma radiation monitors around nuclear reactors in large population centres, and at border crossing points, to give an early warning of a major nuclear accident or a terrorist attack using radioactive materials. The surveillance strategy is supported by a full laboratory capability to measure radioactivity on air filters, water and food.

For human monitoring, the bureau provides dosimetry services to 95,000 nuclear workers in Canada and maintains dose records for 130,000 nuclear workers in the National Dose Registry. Research into the health effects of radiation involves epidemiological studies using the National Dose Registry. Research is also done on the risk of lung cancer from radon gas in

homes. The bureau conducts radiobiology studies on alpha radiation effects in cultured cells and investigates the uptake of radionuclides from traditional foods.

To carry out its research strategy, the bureau collaborates with various organizations, including:

- Environment Canada;
- Department of National Defence;
- Canadian Nuclear Safety Commission;
- Atomic Energy of Canada Limited;
- United Nations Scientific Committee on the Effects of Atomic Radiation;
- Comprehensive Nuclear Test Ban Treaty (CTBT) organization;
- International Atomic Energy Agency;
- Nuclear Energy Agency, Organisation for Economic Co-operation and Development;
- International Commission on Radiological Protection;
- World Health Organization;
- US Department of Homeland Security;
- US Environmental Protection Agency;
- US Federal Emergency Management Agency; and
- academic institutions.

Excellence

All projects are assessed semi-annually under the bureau project management system. The National Calibration and Reference Centre for *in vivo* and bioassay measurements is ISO 9001:2000 certified. The centre conducts regular inter-comparison programs for laboratories across Canada in industry, hospitals and universities. The CTBT monitoring program is certified by the international CTBT organization. The Federal Nuclear Emergency Plan is tested regularly in national and international exercises.

Challenges, Opportunities and Emerging Issues

Recent studies have confirmed that radon levels constitute a measurable risk of lung cancer. A national radon program is being developed to address this issue. The identification of sites of high-level and low-level radioactive waste repositories will concern many Canadian communities. The development of space-age technologies will also provide many opportunities for studying the health effects of long-range contaminant transport and climate change.

Communication and Outreach

- Scientific findings are published regularly in peer-reviewed journals and government reports.
- All researchers in the bureau are encouraged to attend one or more scientific conferences each year to present the results of their research.
- Many staff members contribute expertise to national and international working groups and are often called upon to give media interviews.
- The Health Canada Web site is regularly updated with monitoring data and with information on current topics in radiation protection.

Water Quality and Health Bureau

The Water Quality and Health Bureau (WQHB) is primarily concerned with developing health risk assessments that support the development of guidelines for drinking water quality and for recreational water quality. Its goal is to develop national and federal policies, strategies and frameworks to ensure the safety of drinking water and to better protect human health.

WQHB conducts health risk assessments of microbiological and chemical contaminants to support the development of Guidelines for Canadian Drinking Water Quality, Guidelines for Canadian Recreational Water Quality, Drinking Water Guidance Values, and Emergency Health Advisories for site-specific drinking water contaminants. The bureau also contributes to the development of guidelines for grey-water re-use, develops indicators for source water quality and Soil Quality Guidelines. WQHB contributes to targeted research in support of the drinking water guidelines, including monitoring of water contaminants, and collaborates to develop international health-based standards for drinking water materials. The health risk assessments and guidelines for drinking water are used by all jurisdictions in Canada as a basis for establishing their own enforceable requirements for drinking water quality. This science helps to promote an integrated approach to water and human health through horizontal federal initiatives, such as the

development of a Federal Freshwater Research Agenda, the multi-barrier approach to safe drinking water and the development of a national protocol to address waterborne contamination and waterborne illness.

Science Strategies, Requirements and Activities

WQHB participates in, requests or develops surveillance, monitoring and indicators to determine the presence and concentrations of contaminants in drinking water and recreational water. WQHB also develops health risk assessments for microbiological and chemical contaminants of drinking water, microbiological contaminants of recreational water, and develops risk management strategies based on science incorporating feasibility, treatment considerations and population-based approaches. The bureau supports laboratory research to address knowledge gaps related to drinking water contaminants, including the occurrence and formation of chemical contaminants in Canadian drinking water supplies and the exposure of Canadians to specific drinking water contaminants. WQHB works with its collaborators to develop a more coordinated and integrated approach to water management, including new approaches that incorporate population-based and burden-of-illness considerations.

To carry out its research strategy, the WQHB collaborates with various organizations, including:

- Federal-Provincial-Territorial (FPT) Committee on Drinking Water;
- FPT Committee on Health and the Environment;
- Interdepartmental Working Group on Drinking Water;
- Pest Management Regulatory Agency; and
- Canadian Water Network.

Excellence

WQHB risk assessment documents are developed using study templates and standard operating procedures. They are subject to input from experts in the area; internal review by a WQHB management team; external peer review by subject, matter or issue experts; public scrutiny consultation through the Health Canada Web site; and approval through the FPT process. To further demonstrate excellence, WQHB is recognized as a PAHO/WHO Collaborating Centre on Water Quality.

Challenges, Opportunities and Emerging Issues

Increasing numbers of new and emerging contaminants (e.g. pharmaceuticals, pathogens and endocrine disrupting substances) are being detected in drinking water at very low concentrations. For new contaminants, there are insufficient data, including toxicological or epidemiological studies, on which to base health risk assessments. WQHB is working with its partners, through the Federal Freshwater Research Agenda and the Canadian Water Network, to ensure that these issues are identified to the research community.

Communication and Outreach

- All key documents posted on the Web site and new guideline documents now include an executive summary, which explains the scientific content of the document in vocabulary designed for a non-technical audience.
- Backgrounders entitled *Water Talks* are developed and posted to the Web site. The Web site also contains information on the Federal-Provincial-Territorial Committee on Drinking Water and the guideline process.

Health Impacts Bureau

The priority of the Health Impacts Bureau (HIB) is to assess the impacts of environmental contaminants on human health.

Four program areas in the HIB involve science:

- Environmental Health Assessment Services provides direction to Health Canada on all activities carried out under the *Canadian Environmental Assessment Act* (CEAA). By carrying out an environmental assessment before a project or action commences, irrevocable damage to the environment and to the health of Canadians can be prevented. About 120 environmental assessments were reviewed for health impacts in 2005–06.

- The Contaminated Sites Office, under both the federal Contaminated Sites Accelerated Action Plan and its successor the federal Contaminated Sites Action Plan, provides expert support and advice to federal departments on federal contaminated sites that pose the greatest potential risk to human health and the environment. In addition, the office provides guidance and training on contaminated site risk assessment and public outreach and involvement. Fifty-six projects were defined for 2005–06, including work on chemical mixtures, radiological risk assessment, microbial risk assessment, contaminant bioavailability from soil, etc.
- The Climate Change and Health Office (CCHO) advances the understanding of the health impacts of climate change in collaboration with researchers across Canada and raises awareness of these effects to provide advice on best practice for adapting to our changing climate. CCHO conducts activities within four program elements: building knowledge, increasing awareness, capacity building, and policy development and implementation.
- Environmental Health (EH) surveillance in Canada lags behind other health and safety domains. To address these issues, SEP, through HIB, has been developing two aspects of a conceptual framework and proposal for a health and environment surveillance and indicators initiative: the establishment of an integrated EH information (i.e. tracking) system, and support for EH surveillance research and monitoring to understand linkages between health and environment in Canadian populations. EH surveillance and information is a cornerstone of the Health and Environment Strategy being developed by Health Canada, which is the health component of the federal environment and sustainability framework.

Science Strategies, Requirements and Activities

The strategies that HIB employees use to ensure that potential risks to human health and the environment are minimized include evaluation by research scientists and policy analysts of scientific studies carried out for proponents; federal-provincial-territorial networking across the country; developing conceptual frameworks and health research agendas; and promoting required research.

CEAA: Typical projects subject to CEAA involve close association with other groups in Health Canada and include evaluation of drinking water quality, air quality, noise, electromagnetic frequencies, nuclear radiation, chemicals, contaminants, Aboriginal health, population health, and occupational health and safety. A list of major projects is available.

Contaminated Sites: Risk assessment methods are used for contaminated sites, public involvement, toxicology and toxicokinetics, remedial technologies, developing soil quality guidelines, researching the bioavailability of soil-borne contaminants, and surveying indoor dust in Canadian homes.

Climate Change: CCHO develops requests for scientific and policy research and conducts regular national assessments to gauge the capacity of Canadians to adapt to risk associated with climate change and climate variability. It is developing a framework for assessing the health implications of new technologies like ethanol, biodiesel, domestic emissions trading and hybrid cars, to reduce greenhouse gas emissions.

Surveillance: HIB works with federal, provincial and territorial partners to identify and support collaborative actions to strengthen health and environment tracking and surveillance in Canada. HIB, in collaboration with Statistics Canada, is also leading the development of the first-ever national biomonitoring survey and is implementing strategies to improve biomonitoring data on Canadians.

To carry out its research strategy, the HIB collaborates with various organizations, including:

- Federal-Provincial-Territorial Committee on Health and the Environment;
- health care institutions;
- academia and international organizations; and
- business and industry.

Excellence

The goal of all four programs in HIB is to provide expert health information and knowledge to ensure that any impacts to human health are minimized. This is done by publishing the results of our projects in scientific literature, ensuring the routine peer review of all reports, including contractor and MOU reports, and accepting guidance and direction from expert committees and other organizations of international repute. Quality assurance measures include monthly conference calls with regional staff, daily e-mail

exchanges and bilateral phone conversations, maintaining a national database for sharing information, training sessions and face-to-face meetings. For the surveillance and human biomonitoring work, new national steering committees will need to be established to maintain our high standard of excellence.

Challenges, Opportunities and Emerging Issues

The number and nature of projects that trigger CEAA and require health advice can come at any time and involve diverse and often new technology. In addition to learning the details of each project that requires review, staff need to learn about new technologies and challenges.

In the Contaminated Sites program, the increased application of probabilistic methods for risk assessment is desirable and inevitable. Contaminated Sites works on a national level toward standardization of human health risk assessments at federal contaminated sites and also participates in provincial workgroups.

Recent reports indicate that, in many areas, the risks from climate change are more serious than previously thought and that such risks (e.g. reduced capacity of oceans to absorb carbon dioxide, destabilization of Antarctic ice sheets, melting of the Greenland ice cap, shutdown of the Atlantic thermohaline circulation) could potentially signify greater risks to human health and well-being. Prospects of future "climate surprises" or much more rapid climate change and our subsequent responses are also being discussed.

Ongoing challenges include: needed data are often incomplete or not collected; there is a diversity of unconnected data sources; health and environmental data are poorly integrated; the capacity of the workforce and associated resources is limited; and ongoing leadership and management is needed to coordinate and address these issues. Although environmental health surveillance lags behind other health and safety domains, many pieces of key elements of a network or system exist and provide a foundation on which to build. Jurisdictions and players are also interested in strengthening the environmental health dimensions of current surveillance systems. For biomonitoring, the hundreds of substances that can be measured, the relatively high cost of biomonitoring, and the ethical and operational requirements needed for collecting and measuring human biological specimens pose important challenges and will require careful setting of priorities.

Communication and Outreach

- HIB is represented on provincial, regional and federal committees, and participates at scientific conferences, workshops and on international committees.
- HIB staff deliver training on risk assessment and public involvement to provincial and municipal agencies, which increases openness, cooperation and transparency with provincial and municipal regulators.
- A lecture series is organized within the Department to inform interested employees of climate change and health research initiatives.
- A newsletter, *Your Health and a Changing Climate*, describes ongoing and completed research as well as adaptation policy initiatives; it is electronically distributed twice a year to a wide audience of researchers and policy makers.

Product Safety Programme

The Product Safety Programme (PSP) assists in the protection of Canadians by researching, assessing and collaborating in the management of the health and safety hazards associated with consumer products; cosmetics; workplace chemicals; new chemical substances; products of biotechnology; radiation emitting devices; environmental noise; and solar UV radiation.

- Consumer and Clinical Radiation Protection Bureau
- Consumer Product Safety, Workplace Hazardous Materials Information System, and Cosmetics Program
- Product Safety Laboratory
- New Substances Assessment and Control Bureau

Consumer and Clinical Radiation Protection Bureau

Through risk assessment and management of radiation emitting devices (REDs) as legislated and regulated under the *Radiation Emitting Devices Act*, the Consumer and Clinical Radiation Protection Bureau (CCRPB) works to assure the safety of workers who use x-ray and non-ionizing radiation devices regulated under the Canada Labour Code and Treasury Board Hazardous Substances Directive.

CCRPB's mandate is to effectively manage and implement the regulations defined by the *Radiation Emitting Devices Act*. These regulations address the safety of such devices at point of sale, importation, leasing or resale and are based on risk assessments of the various devices covered by this *Act*. Broad categories of devices are non-medical and medical (including mammographic and dental) x-ray equipment; lasers and electro-optical devices; electric and magnetic field (EMF) producing devices; and ultrasound and noise-producing equipment. All devices should produce the minimum amount of radiation required to achieve the desired outcome, with a minimum of risk to either the operator of the device or the recipient of the exposure. The Canadian public will be able to benefit from the

technological advances offered by these devices with a minimum of risk to their immediate or future health status. The bureau is also concerned with exposures of the public to ultraviolet radiation from the sun and EMFs arising in the environment.

Science Strategies, Requirements and Activities

CCRPB performs research to better understand the underlying biological mechanisms and impacts of exposure to both ionizing and non-ionizing radiation. The knowledge gained is applied to developing risk assessments of devices that produce these radiation types. The bureau evaluates the physical risk from the immediate or prolonged exposure to ionizing and non-ionizing radiation while using radiation emitting devices. The effectiveness of the regulations and risk assessments is in part confirmed by monitoring our ongoing results compliance and evaluation inspection activities.

CCRPB undertakes a wide number and variety of risk assessments each year. In part driven by the emergence of new technologies (e.g. digital radiography) and further by external events (e.g. heightened interest in security devices after 9-11), these reviews are prioritized by the potential of severe risk to the user. As many of the emerging technologies have required new or modified analysis techniques, a large part of bureau research agenda focuses on methodology development. New techniques for use in radiobiological experiments and engineering advances in EMF production and detection are two areas of recent focus. Development of new assay techniques to detect radiation, induced damage, and variations

in biological sensitivity are also being studied. The bureau has recently initiated studies into the non-auditory effects of noise exposure.

To carry out its research strategy, the CCPRB collaborates with various organizations, including:

- provincial and territorial government departments;
- standards-writing bodies;
- private sector research bodies; and
- academic institutions.

Excellence

CCRPB staff participate in national and international meetings, conferences and workshops to share the results of their ongoing studies and learn of advances made by other laboratories and regulatory agencies. Bureau scientists and researchers are increasingly invited to participate in high-profile fora. In the area of standards development, staff have been invited to participate in or chair committees of the ISO and IEC. The selection of several staff to various boards of professional associations is further recognition of the quality of work being done in the bureau.

Challenges, Opportunities and Emerging Issues

The daily emergence of new technologies and the introduction of innovative novel applications of existing devices present a significant challenge to the bureau. Staff must find or develop new means of assessing these devices or applications to apply sound risk assessments. Bureau staff are cognizant of the benefit of continuing and expanding their participation in international standards development to ensure that they remain close to leading-edge international scientific expertise. Maintaining a close network of regulatory colleagues from other nations ensures that the Canadian perspective is clearly understood and influences industry changes.

Communication and Outreach

- Staff work with regulatory colleagues at the provincial and territorial level to develop guidelines and safety codes that serve federal, provincial and territorial government needs. The resulting documents are an effective means of communicating best practices to the scientific and technical communities.
- Documents specifically intended for a general audience are prepared as a component of *It's Your Health* series of departmental publications.
- Web-based communication products will continue to be developed over the next few years.

Consumer Product Safety, Workplace Hazardous Materials Information System, and Cosmetics Program

These programs work to reduce risks to public health and safety by preventing or reducing consumer product-related unintentional injuries and deaths and promoting consumer product safety; reducing the incidence and severity of workplace injuries, diseases and deaths from exposure to chemicals; and reducing the risks to health and safety associated with cosmetic products, while improving protection against harm from using cosmetic products.

Consumer Product Safety (CPS) gets its authority to develop risk management options and enforcement options from the *Hazardous Products Act* (HPA). Products under the Act's jurisdiction include the chemical hazards of consumer chemical products, glazed ceramics, kettles, liquid coating materials and science education kits; flammability hazards of textiles, upholstered furniture, carpets and mattresses; mechanical hazards of children's products; and the combined mechanical and fire hazards associated with other consumer products. The characterization of the hazard and risk is essential for identifying the appropriate type and level of response.

The Workplace Hazardous Materials Information System (WHMIS) is implemented through coordinated federal, provincial and territorial legislation. Supplier labelling and material safety data sheet requirements are set out under the HPA and associated Controlled Products Regulations (CPRs). WHMIS works to develop, maintain and coordinate the enforcement of the WHMIS provisions of the HPA, which protects workers from the dangers posed by exposure to chemicals in the workplace. The CPRs establish a national standard for the classification of hazardous workplace materials.

The goal of the Cosmetics Program is to protect the health of Canadians by minimizing the risk associated with the use of cosmetics marketed in Canada. The program defines and communicates requirements for the manufacture, labelling, distribution and sale of

cosmetics, and evaluates compliance. The basis for the regulatory authority for the Cosmetics Program comes from the *Food and Drugs Act*. Characterization of the hazard and risk is essential for identifying the appropriate type and level of response. Other issues include the environmental impact of cosmetics, the use of biotechnology in cosmetics products and the use of materials of bovine origin resulting in the threat of Bovine Spongiform Encephalopathy (BSE) in cosmetics.

Science Strategies, Requirements and Activities

Each of CPS, WHMIS and the Cosmetics Program engages in risk assessment, risk reduction, classification and surveillance.

- CPS

  CPS carries out risk assessments on consumer products to identify the best measure for addressing the issue. In 2005, particular attention was paid to lead risk in consumer products to which children are exposed, asbestos in consumer products, and a globally harmonized system for chemicals, blind cords and bath seats. There is also ongoing activity to collect, collate and analyze data on product-related incidents, injuries, illness and death to identify emerging issues. CPS is involved as well in the HECSB Surveillance Working Group to enhance surveillance capacity and coordination across the Branch.

- WHMIS

  Activities are undertaken to resolve classification disputes and provide scientific advice and direction to regulated parties and inspectors. Additional activities involve evaluating the efficiency and effectiveness of existing surveillance tools and data, gathering primary scientific data on sectors and occupations most at risk, and identifying substances causing harm to Canadian workers.

- Cosmetics Program

  There is ongoing activity to identify chemicals that present an unacceptable risk to users (if so, they are added to the "Hotlist"—a List of Restricted and Prohibited Cosmetic Ingredients in Canada). The Cosmetics Program provides assistance and guidance to the Environmental Assessment Unit for risk assessment of cosmetic ingredients under the New Substances Notification Regulations of the *Canadian Environmental Protection Act*; assists the Natural Health Products Directorate in compiling information on non-medicinal ingredients; and monitors the available science and addresses emerging issues related to BSE/Transmissible Spongiform Encephalopathy (TSE) risk with cosmetic products.

To carry out its research strategy, these programs collaborate with various organizations, including:

- Labour Canada;
- provincial and territorial Ministries of Labour and other labour organizations;
- Environment Canada;
- Department of Foreign Affairs and International Trade;
- US Food and Drug Administration; and
- US Consumer Products Safety Commission.

Excellence

Risk assessments are generally peer reviewed internally and/or reviewed by management. Regulatory Impact Analysis Statements used for regulations are reviewed during the regulatory process. Enforcement policies and procedures are developed by internal policy groups before being vetted through management for approval.

Challenges, Opportunities and Emerging Issues

New products and new technologies are constantly appearing on the market. Collaborating with other governments helps to identify and clarify emerging issues associated with new products and to harmonize approaches in dealing with the concern. Ongoing review of literature and attendance at trade shows and conferences contributes to up-to-date awareness of market trends.

Communication and Outreach

- Consultation with stakeholders is conducted before and during the regulatory process, and ongoing meetings with federal-provincial-territorial partners are held.
- Regional staff interact regularly with public health officials and other injury prevention organizations in their region.

Product Safety Laboratory

The Product Safety Laboratory (PSL) operates under the mandate of the *Hazardous Products Act* (HPA) and its regulations. PSL's main priority is to minimize product-related hazards and reduce risks to the health and safety of Canadian consumers. It is organized as a multidisciplinary laboratory with expertise in analytical chemistry, flammability and mechanical engineering.

PSL's work aims to protect consumers from unsafe consumer products, such as textiles, children's products, play products, consumer chemicals, and ignition sources covered under the HPA and its regulations. PSL performs compliance testing and evaluation on consumer products and laboratory scientific investigations on hazardous products because of product-related death or injury, safety-related issues, and consumer or industry complaints. PSL's work often contributes to the issuance of advisories, warnings, recalls or product bans by Health Canada.

PSL performs pre-market assessment of products on a cost-recovery basis at the request of private industries to eliminate or reduce unsafe or substandard products being imported into the Canadian market. Hazardous cosmetic products are assessed, analyzed and evaluated under the *Food and Drugs Act* and Cosmetic Regulations.

Science Strategies, Requirements and Activities

PSL tests and evaluates products for compliance and enforcement purposes under the HPA; develops performance criteria to address hazards posed by new products; and develops and adapts test methods and instrumentation to measure, analyze and assess product hazards in support of current and new regulations or to provide scientific advice when the need for new regulations has been determined.

PSL also conducts safety-related investigations and surveys to evaluate the state of the Canadian market; transfers scientific and technical knowledge and expertise to inspectors, medical professionals, consumer interest groups, fire marshals, industry and other government agencies; provides advice and expertise essential to the application or development of test procedures to private laboratories; and generates, gathers and disseminates scientific and technical data to the rest of the program.

To carry out its research strategy, these programs collaborate with various organizations, including:

- Canadian Food Inspection Agency;
- Royal Canadian Mounted Police;
- Office of the Fire Marshal;
- US Consumer Product Safety Commission (CPSC);
- non-governmental organizations; and
- private laboratories.

Excellence

PSL was one of the first laboratories in Health Canada to receive ISO/IEC 17025:1999 accreditation from the Standards Council of Canada. All aspects of PSL's Quality System are internal-audited annually because of the stringent quality assurance criteria. PSL staff have represented Health Canada in many voluntary standards-writing organizations. The analytical method for Total Lead Analysis has been adopted by the US CPSC.

Challenges, Opportunities and Emerging Issues

New consumer products are flooding the Canadian market at an ever-increasing pace, and PSL is constantly being challenged to develop new methods and methodologies that are highly resource-intensive to test and evaluate new products.

Communication and Outreach

- To promote technology transfer and operational transparency, our test methods are available on PSL's Web site.
- A training course on lighter testing is available on a cost-recovery basis for industries, including importers, manufacturers and retailers.
- Technical assistance is available to commercial laboratories to help them acquire the necessary competencies to evaluate consumer products under HPA standards.

New Substances Assessment and Control Bureau

The New Substances Assessment and Control Bureau (NSACB) focuses on the risk assessment and management of CEPA New Substances and Products of Biotechnology, and Environmental Assessment of *Food and Drugs Act* Substances. NSACB's CEPA includes assessment of risks to human health from substances new to Canada, and assessment of risks to human health and the environment that arise from environmental release of substances in products regulated under the *Food and Drugs Act* (FDA). NSACB is also responsible for conducting screening-level risk assessments of products of biotechnology that are on the Domestic Substances List (DSL). Where risks are identified, NSACB works with Environment Canada to implement appropriate risk management measures under CEPA. Reducing the exposure to substances, which the NSACB assesses as being toxic, results in decreased morbidity and mortality among Canadians. Reducing environmental release of substances in FDA products results in decreased harm to the Canadian public and environment.

Science Strategies, Requirements and Activities

NSACB evaluates toxicological, physical and chemical information on new substances. Where risk assessment has identified a suspicion of toxicity, NSACB, in collaboration with Environment Canada, develops and takes appropriate risk management actions to protect human health (e.g. limiting the quantity or type of use of the substance). NSACB also conducts risk assessments of new chemicals, polymers, products of biotechnology and substances in FDA products and, where necessary, implements risk management actions to control identified risks. It also participates in international research programs to enhance decision making in the risk assessment of biotechnology products, and in the development and, where appropriate, revision of regulations and guidelines for its risk assessments.

Each year, NSACB conducts risks assessments of about 750 new chemicals, polymers and substances in FDA products and about 20 products of biotechnology (e.g. micro-organisms used in reclaiming land after an oil spill). NSACB is beginning to identify potential environmental risks associated with substances in FDA products in use between 1987 and 2001. NSACB is also leading an international collaborative study to develop protocols and generate data to permit accurate identification of the microbe *Pseudomonas* and related species. As well, the bureau is developing databases for accurate identification and determination of virulence factors in the *Bacillus* species, and is evaluating data substantiating identification of notified microorganisms and data on their potential for pathogenicity.

To carry out its research strategy, the NSACB collaborates with various organizations, including:

- Environment Canada;
- OECD Task Force on New Industrial Chemicals Notification and Assessment;
- OECD Working Group for the Harmonization of Regulatory Oversight in Biotechnology;
- US Environmental Protection Agency; and
- National Industrial Chemicals Notification and Assessment Scheme, Australia.

Excellence

NSACB is developing a process for the periodic review of its risk assessment reports for notified new substances by an independent panel. The bureau has developed a model framework to establish and operate an independent external review panel, and is actively involved in the development of Health Canada's CEPA Results-based Management Accountability Framework and the Product Safety Programme's Performance Measurement Framework. Members of NSACB regularly take part in conferences, workshops and other national and international fora that develop new protocols, guidelines, methodologies and classification systems.

Challenges, Opportunities and Emerging Issues

Two areas of development in science and technology will have significant impacts on the work of NSACB: nanotechnology and new areas of biotechnology. Another challenge to NSACB is the political and commercial push for international harmonization in the area of new chemical risk assessment.

Communication and Outreach

- On an ongoing basis, NSACB and its colleagues in Environment Canada communicate with companies before and after they submit information packages for assessment, often via formal Pre-notification Consultations.
- To communicate information to the public about identified hazards, NSACB is preparing for publication summaries for certain notified substances and for full reports on substances controlled at NSACB's recommendation.
- NSACB is also undertaking a process to share hazard information received in notifications with federal, provincial and territorial occupational health authorities.

Drug Strategy and Controlled Substances Programme

The Drug Strategy and Controlled Substances Programme regulates controlled substances and promotes initiatives that reduce or prevent the harm associated with these substances and alcohol. The programme also provides expert advice and drug analysis services to law enforcement agencies across the country.

- Office of Research and Surveillance
- Office of Demand Reduction
- Office of Controlled Substances
- Drug Analysis Service

Office of Research and Surveillance

The main priority of the Office of Research and Surveillance (ORS) is to provide Canadians with sound information to help them make knowledgeable health and lifestyle decisions about alcohol and drug consumption.

ORS provides scientific leadership and coordination in the development of new knowledge on alcohol and other drug use in Canada. We contribute to knowledge generation that strengthens the collective capacity of Canada's Drug Strategy (CDS) partners and stake-holders in other levels of government and sectors to improve evidence-based policy, programming and decision making on alcohol and drug use.

Science Strategies, Requirements and Activities

ORS funds and conducts research on the risks associated with the use and abuse of alcohol and other drugs and their potential impact on the health of Canadians. It conducts surveillance activities to monitor and identify trends and patterns of alcohol and illicit drug use in Canada and reviews policies, issues and emerging trends on drug use nationally and internationally. It develops and obtains literature reviews and scientific analysis to support regulatory, policy and legal aspects; prevention programs; strategic directions; and decision making.

One of ORS's main activities is the coordination of the development of a National Research Agenda (NRA). The purpose of the NRA is to provide a framework for action, synergy and partnership and to identify issues of common concern, research needs and priorities of national interest in the field. The key objectives of the Agenda are:

- to help ensure effective coordination of research initiatives and an optimum sharing of information;
- to enhance partnerships and to leverage resources and expertise; and,
- to enable a better overall connection between research, monitoring, treatment and services.

As part of the NRA, a surveillance strategy is being developed to monitor trends and patterns of illicit drug use in Canada. Health Canada is leading an ongoing survey of alcohol and drug use by Canadians and the development of an early warning system on emerging drug trends.

To carry out its research strategy, the ORS collaborates with various organizations, including:

- provincial and territorial governments;
- academic institutions;
- research institutions;
- non-governmental organizations; and
- treatment centres.

Excellence

The ORS was created to support research capacity, knowledge development, evidence-based decision making and credibility. All research and surveillance development activities are conducted in collaboration with stakeholders and partners and are conducted to support Canada's Drug Strategy, the Programme's mandate and the National Framework for Action on Substances Abuse. The research initiatives and reports are peer reviewed and expert advisory committees are established to ensure sound and transparent processes. Workshops are held routinely with researchers to establish protocols, methodologies and indicators, and to develop research strategies.

Challenges, Opportunities and Emerging Issues

Alcohol and drug consumption is increasing internationally, and it is the responsibility of ORS to identify relevant emerging trends and factors in Canada. Canadians must have reliable information to make informed decisions about their use of alcohol or other drugs that may impact their health and well-being.

Timely and reliable data are essential to implement appropriate policy and program services. Efforts to address issues pertaining to substance use and abuse have been hampered by intermittent reporting and lack of coordination among partners. The NRA and the surveillance strategy of ORS try to address this challenge. The creation of a National Surveillance Advisory Committee is intended to enhance coordination. In concrete terms, the development of an early warning system will help to systematically and consistently identify prevalence, harms and emerging trends in the general and at-risk populations across the country.

Communication and Outreach

- Results of surveys and research are made public through widely disseminated reports—in print and electronically—and the data are made available through public use data files.
- ORS regularly produces and distributes a Science Update to DSCSP staff, which involves the contribution of most offices under the DSCSP.
- ORS also hosts many seminars in which key note speakers are brought in to present on various topics related to the Programme's mandate.
- ORS encourages staff to actively participate in major and relevant scientific conferences to enhance networking and increase their knowledge of pertinent information in the field.

Office of Demand Reduction

The Office of Demand Reduction (ODR) works to increase understanding of substance use issues and related harms among Canadians to facilitate knowledgeable health decisions; to increase effective prevention and harm reduction responses in Canadian communities; and to enhance access to treatment and rehabilitation services for women, youth and other vulnerable populations—in partnership with provinces and territories. This is accomplished by developing and disseminating public and professional information related to alcohol and other drugs and substances and providing funding to communities to support their efforts in addressing substance use and abuse.

ODR works with multisectoral partners to develop, disseminate and exchange leading-edge public and professional information in prevention, risk, and harm reduction and treatment, through information publications, a youth Web site, best practices syntheses, other tools and training. ODR also manages three contribution programs to provide funding to communities to support promotion, prevention, harm reduction and treatment initiatives based on established priorities and aimed at a sustained reduction in substance use and abuse.

Science Strategies, Requirements and Activities

ODR uses surveillance data, quantitative and qualitative data, and public opinion and market research related to public information; mass media, communications, dissemination and exchange strategies; knowledge, attitudes and behavioural change; treatment and rehabilitation practice; and community-based programs. The office also commissions literature reviews, environmental scans and syntheses of expert advice, and stakeholder and target group perspectives for development of best practices and other tools, and compiles knowledge based on experiences of youth. ODR evaluates program-level interventions and funding programs to guide quality assurance and program improvements, and assesses short, intermediate and long-term outcomes.

In the area of public information activities, the focus is on youth with parents/guardians as a secondary audience. To support these activities, ODR conducts public opinion research to assess the awareness, knowledge, attitudes and behaviours and their determinants related to priority and emerging issues such as alcohol and marihuana.

In the area of professional information, ODR creates best practices documents in treatment and rehabilitation focused on priority themes identified by a federal-provincial-territorial working group. Best practices are based on commissioned literature reviews, evaluations, expert advice and consultations/focus groups with stakeholders and target audiences. Uptake surveys by user groups are part of the evaluation plan.

Funding programs to support community-based initiatives encourage nationally significant knowledge-generating science activities, such as pilot projects, evaluations, and community capacity building and community impact studies. The Drug Treatment Court Funding Program, co-funded and jointly managed with the Department of Justice and with Justice as the lead, has as a major focus the evaluation of and, as appropriate, the model improvement of the drug treatment court in the Canadian context.

To carry out its activities, the ODR collaborates with various organizations, including:

- Public Health Agency of Canada;
- Royal Canadian Mounted Police;
- Human Resources and Social Development;
- Canadian Centre for Substance Abuse;
- National Crime Prevention Centre (Public Safety and Emergency Preparedness Canada);
- National Homelessness Secretariat;
- provincial and territorial governments;
- provincial addiction organizations; and
- academic institutions.

Challenges, Opportunities and Emerging Issues

Effective youth engagement is needed to guide successful health promotion, prevention and harm reduction associated with substance use. Opportunities will be explored to broaden and create new linkages with stakeholders with a youth focus, and to link with government departments that practise youth engagement.

Communication and Outreach

- ODR will continue to create and foster collaborations and exchange information on results of community-based projects, public and professional information, guidelines and best practices.
- ODR also promotes the involvement of target groups in planning, implementing and evaluating their programs.

Office of Controlled Substances

The Office of Controlled Substances (OCS) works with Canadian and international stakeholders in both the public and private sectors to ensure that controlled drugs and substances are handled effectively and remain in legal distribution channels, and that valid commercial, scientific and medical activities are not compromised.

OCS specialists and their managers are involved in departmental and interdepartmental initiatives on such issues as import and export procedures at Canada's border crossings, drug scheduling initiatives or changes, and investigations with the Royal Canadian Mounted Police. They provide information sessions on the administration of the *Controlled Drugs and Substances Act* (CDSA) and its regulations and presentations on emerging issues.

Science Strategies, Requirements and Activities

To decrease the availability of drugs and chemicals with mind-altering potential or chemicals that could be converted to such drugs, the OCS reviews the structure and activity of chemicals not specifically listed in the schedules appended to the CDSA and determines whether the chemical in question is included in the schedules attached to the CDSA. OCS also works with industry stakeholders to evaluate the possible risks of facilitating transactions involving controlled drugs and substances by permitting e-ordering and e-prescribing.

OCS works with provincial and territorial governments and other interested stakeholders to investigate possible trends in prescription drug misuse. OCS licenses all vendors (e.g. pharmacists, pharmaceutical representatives and regulatory specialists), who make commercial transactions involving controlled drugs and substances, to help prevent the diversion of these substances to illicit use. The OCS monitors information sources that may provide some early warning of emerging trends in drug use, which helps to ensure timely and responsive decisions about the use of controlled substances related to emerging health issues. OCS is involved in the Marihuana Medical Access Regulations, which allows controlled access to medical marihuana by people suffering from grave and debilitating illnesses.

To ensure that timely decisions on the status of chemicals and substances can be made, OCS employs an in-house chemist. The Compliance, Monitoring and Liaison Division monitors compliance with the CDSA and its regulations. The division includes pharmacists, inspectors, regulatory specialists and support staff to develop a national inspection and compliance strategy.

The Policy and Regulatory Affairs Division works to ensure that the regulations of the CDSA are effective and applicable.

Excellence

OCS is developing an extensive quality management system to ensure that procedures and policies are approved, tracked and regularly reviewed to remain current and relevant. Part of this quality management system will involve developing service standards and methods to monitor success in meeting these standards.

Challenges, Opportunities and Emerging Issues

Information widely available on the internet and the relative ease of illicit drug manufacturing has made the enforcement of CDSA more complicated for Health Canada and law enforcement. There is an increasing requirement for this activity to be monitored to enable Health Canada to make timely decisions on drug and chemical scheduling. Technological advances also have an impact on service delivery. Some pressure has already been experienced to develop a response to e-prescribing and e-ordering of controlled drugs and substances over the Internet.

Communication and Outreach

- OCS uses a variety of vehicles to inform stakeholders of regulatory and policy projects currently underway and to allow stakeholders to provide feedback:
  - publishes regulatory initiatives in *Canada Gazette;*
  - submits content to the Health Canada Web site;
  - participates in advisory working groups and expert advisory groups; and
  - conducts stakeholder consultations.

Drug Analysis Service

Drug Analysis Service (DAS) provides professional and objective scientific services for the control, analysis and destruction of substances of abuse under the *Controlled Drugs and Substances Act* (CDSA) and the *Food and Drugs Act* for the benefit of all Canadians. DAS laboratories analyze suspected controlled substances seized by various enforcement agencies as well as provide a safe and effective supply of marihuana to fulfill medical requests.

Science Strategies, Requirements and Activities

DAS laboratories analyze approximately 100,000 exhibits a year using modern scientific instrumentation such as Fourier Transform Infrared Spectrometer, gas chromatograph/mass spectrometer, gas chromatograph with a flame ionization detector, and a high performance liquid chromatograph. DAS also assists law enforcement in investigating clandestine laboratories and their safe dismantling, and provides unbiased scientific testimony pertaining to drug exhibits and their analysis.

To facilitate the accumulation of data around emerging trends in illicit drugs, Phase I of the Laboratory Information Management System (LIMS) has been implemented. LIMS provides an electronic record-keeping and tracking system. In the area of law enforcement, DAS authorizes drug destruction for police forces, while the DAS laboratory in Toronto provides reliable drugs for training drug detector dogs across Canada. DAS provides access to a licit source and supply of marihuana seeds to people who qualify under the CDSA and the Marihuana Medical Access Regulations for the Medical Marihuana Research Program.

To carry out its activities, the DAS collaborates with various organizations, including:

- Royal Canadian Mounted Police;
- Department of Justice;
- Canadian Border Services;
- Public Works and Government Services Canada;
- Department of Public Safety and Emergency Preparedness; and
- United Nations.

Excellence

The Toronto DAS laboratory is the pilot site for accreditation to ISO 17025. All DAS laboratories participate in international proficiency testing programs, and once the Toronto laboratory has been accredited, the other laboratories will follow suit.

Challenges, Opportunities and Emerging Issues

New drugs of abuse are constantly appearing in Canada. The challenge for DAS is to ensure that these substances can be identified and to provide data and advice to Health Canada for scheduling and reporting purposes.

Communication and Outreach

- Attendance at the annual Clandestine Laboratory Investigating Chemists meeting gives DAS staff an opportunity to connect with other experts in the field, to learn of new techniques and trends, and to present information garnered in our own laboratories.
- DAS staff teach several classes at police colleges on clandestine laboratory investigations.

Tobacco Control Programme

The Tobacco Control Programme (TCP) regulates tobacco products and develops and implements initiatives to reduce or prevent the harm associated with tobacco use. Canada's Federal Tobacco Control Strategy (FTCS) is championed by many parties working toward a common goal: reducing tobacco use. The primary mission of the FTCS is to reduce tobacco-related disease and death among Canadians. The FTCS aims to reduce the number of people who smoke; decrease the number of cigarettes sold; increase retailer compliance with laws on tobacco sales to youth; reduce the number of people involuntarily exposed to environmental tobacco smoke in enclosed public spaces; and explore how changes to tobacco products affect hazards to health.

- Tobacco Control Programme

Tobacco Control Programme

The Tobacco Control Programme (TCP) enforces the regulations of the *Tobacco Act* through the Federal Tobacco Control Strategy (FTCS), which establishes a framework for a comprehensive, fully integrated and multifaceted approach to tobacco control.

TCP focuses on four mutually reinforcing components: protection, prevention, cessation and harm reduction, supplemented by effective use of public education campaigns to reach all Canadians. It plays a central role in promoting the FTCS on national and international levels.

Through evidence-based policies and strategies, tobacco products are regulated and the effectiveness of tobacco control initiatives is tracked and reported. As a result, Canadians have improved access to comprehensive, accurate tobacco resources, including information on prevention, cessation, environmental tobacco smoke, toxic constituents in tobacco smoke, product sales volumes and health warning messages. The outcomes of these activities include reduced smoking prevalence and tobacco consumption, reduced exposure to environmental tobacco smoke, and reduced tobacco illness and premature death. Knowledge from science activities generates essential information needed for Health Canada to develop, implement, monitor and evaluate tobacco control policies, regulations and programs.

Science Strategies, Requirements and Activities

TCP has undertaken four interrelated science strategies: the generation and analysis of social research data to support the development of new policies; the generation and analysis of physical research data to support the development of new policies and regulations; the identification and dissemination of new knowledge and best practices to design effective strategies and programs for tobacco control; and the development and evaluation of effective mass media campaigns.

TCP works on developing, implementing and managing ongoing tobacco control surveillance programs, which provide federal and provincial partners with timely and reliable information related to tobacco use in Canada. TCP also conducts surveillance of smoking trends and behaviours, tests products and evaluates reports submitted by the industry (e.g. sales, chemistry, research) to verify compliance and to gain more knowledge about the products.

Science activities carried out in TCP support the generation and analysis of social research data to develop new policies and maintain program development and delivery. Findings from one research project often lead to more questions that generate additional research—all of which can be applied to better inform the public by developing effectively targeted mass media campaigns and contribute to sound tobacco control regulations and policies. Science activities include the Canadian Tobacco Monitoring Survey; Youth Smoking Survey; evaluation of industry reports submitted under the Tobacco Reporting Regulations; assessing

youth access to tobacco; and the ongoing evaluation and monitoring of industry (e.g. sales, products, toxic constituents and emissions).

In addition, TCP conducts public opinion research to address the many facets of tobacco control, including perceptions of light and mild monikers; the impact of health warning messages; the effect on smokers' behaviour of changes to tobacco products (e.g. reduced ignition propensity); and effective communication strategies for hard-to-reach populations. Measures are also taken to develop the body of knowledge relating to the psycho-social factors that influence an individual's decision to take up smoking, the factors that influence smokers to continue to smoke, and the factors that contribute to a person's decision to quit smoking. To gather these types of data, TCP acquires ongoing and systematic national and provincial assessments of data measuring the impacts of the FTCS and supporting programs, including mass media, proactive interventions, policy and regulations development, and compliance. TCP also develops mass media advertising campaigns and promotional material in support of tobacco control, and research is carried out on the effectiveness of mass media campaigns through baseline surveys, focus testing and ad recall surveys.

TCP assesses the physical, chemical or biological characteristics of tobacco products on the Canadian market to examine product modification and harm reduction (e.g. toxicological tests and data, biomarkers of exposure). Health Canada testing methods exist to analyze toxic constituents and emissions of tobacco products. A test method was chosen and products were tested to develop the Reduced Ignition Propensity Regulations. Toxicological test methods were also developed for regulations requiring that toxicity tests be conducted annually on cigarette emissions; results are reported to the Minister of Health.

TCP identifies new knowledge and best practices to design effective strategies and programs for tobacco control. For example, TCP disseminates knowledge to researchers, practitioners, educators, youth and the Canadian public. TCP also conducts literature reviews and environmental scans and adapts research information and outcomes to help design tobacco control programs and resources. The dissemination of this scientific knowledge or research findings supports various cessation and protection initiatives, such as engaging communities to implement smoke-free policies; designing and delivering evidence-based prevention, cessation and protection programs; developing Health Canada web-based, interactive cessation programs; and developing training materials and resources for practitioners.

To carry out its research strategy, the Tobacco Control Program collaborates with various organizations, including:

- Statistics Canada;
- National Cancer Institute of Canada;
- Heart and Stroke Foundation of Canada;
- Canadian Institutes of Health Research and Social Sciences;
- Humanities Research Council of Canada;
- provincial and territorial governments; and
- academic institutions.

Excellence

Health Canada is internationally recognized for its innovative initiatives in tobacco control. There is a high level of public support for our efforts. Excellent results have been achieved from the study of best practices in tobacco prevention—such as active participation by governments, researchers and practitioners in designing and evaluating a national approach to cessation and ongoing requests from national, international governments and non-governmental organizations to share our knowledge. For example, materials developed for mass media are used as models in other jurisdictions and the Programme is consulted to help other groups develop effective mass media campaigns.

The high standard of TCP's research activities is reflected in peer-reviewed material in scientific literature and in reviews of presentations made at various national and international conferences. When using external laboratories to carry out research, only ISO-17025—accredited or GLP-certified laboratories are used.

The results of our surveillance activities are peer reviewed and presented at conferences. The timeliness and reliability with which many of TCP's surveillance activities—including knowledge of survey design, data interpretation, knowledge in economic and scientific areas (e.g. social science, chemistry, biology)—are held in high esteem among public health researchers worldwide.

Challenges, Opportunities and Emerging Issues

Ongoing activities in prevention, cessation and protection depend on mass media campaigns to maintain the decline in smoking rates among Canadians of all ages. Changes in internal and government-wide policies on advertising and other mass media activities represent an ongoing challenge to maintain support and funding for proven successful activities.

Toxicological testing of tobacco products and biomarkers of exposure to disease are emerging areas. There is a need to explore innovative risk assessment methodologies to assess whether a modified tobacco product is more or less toxic than the range of products now on the market. Harm reduction in terms of product modifications, their impact on smoking trends or behaviour, including questions on how to assess and regulate such products, represent an emerging area in science.

Knowledge generated from science activities motivates, supports and builds capacity among other levels of government and key stakeholders to take effective action in tobacco control. Opportunities and challenges lie in developing collaboration with communities, research scientists, and municipal, provincial and territorial governments.

Literature review, collaboration with international colleagues and research on emerging areas are part of the operational plan to further TCP's knowledge. In certain areas, the opportunities and challenges lie in performing more secondary analysis of the data available, and a database repository is being developed to facilitate data analysis and handling.

Communication and Outreach

- Work is presented at numerous conferences, publications are peer reviewed and information is posted on the TCP Web site.
- The regulatory process includes a consultation component and dissemination of scientific findings relevant to the proposed regulations.
- Tobacco control stakeholders (e.g. Canadian Tobacco Control Research Initiative, non-governmental organizations and academics) are consulted or informed as required through various established forums.

Workplace Health and Public Safety Programme

The Workplace Health and Public Safety Programme (WHPSP) enhances productivity and quality of life by contributing to the health and safety of federal and other Canadian workers, visiting dignitaries and the traveling public in Canada.

- Public Service Health Program
- Public Health Bureau
- Policy and Workplace Health Strategies Bureau

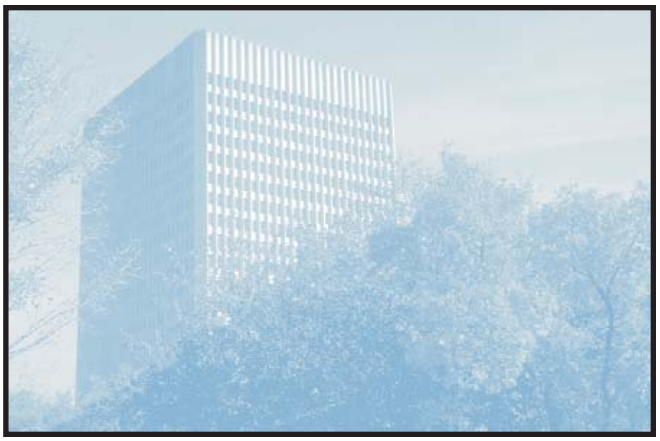
Public Service Health Program

The Public Service Health Program (PSHP) provides occupational health services nationally to federal departments and agencies on behalf of Treasury Board, and serves as the principal occupational health and safety advisor to Treasury Board Secretariat.

PSHP provides specialized services for promoting and protecting the health of federal public service employees in Canada and overseas, including Health Evaluations, Communicable Diseases, Workplace Investigations, Office Ergonomics, and Health Education, Promotion and Training. PSHP's scientific staff work with regional departments to provide the specialized knowledge and skills needed to assess workplace hazards, develop a risk management plan detailing corrective actions, formulate job hazard analyses and worksite profiles, and offer training to managers, supervisors and employees.

Science Strategies, Requirements and Activities

PSHP uses science extensively to deliver high-quality occupational health and safety services. This scientific approach includes data collection and evaluation involving various chemical, physical, and biological substances and agents, and requires integration of evolving occupational health and safety guidelines, standards and tools.



Currently, PSHP benefits from the services of around 200 personnel, 67 percent of whom are science professionals in medicine, nursing, industrial hygiene, occupational and environmental health. The nature of the PSHP is such that it has generated one of the few pools of medical and environmental health personnel with combined expertise in both occupational and public health.

To carry out its research strategy, the PSHB collaborates with various organizations, including:

- Human Resources and Social Development;
- Public Health Agency of Canada;
- Public Security and Emergency Preparedness Canada;
- World Health Organization (WHO);
- US Centers for Disease Control; and
- National Pandemic Influenza Committee.

Excellence

Protocols, standard operating procedures, guidelines and advisories are continually being developed on occupational health and safety issues on behalf of federal workers in Canada. These documents are subject to internal and external review by other subject matter experts.

Internal processes have been put in place to ensure the highest quality of services for Canadians. For example, analytical services are performed only by accredited and competent laboratories. Several internal standard operating procedures have also been prepared to ensure consistency and uniformity in services delivered throughout the country.

Ongoing participation on committees within and outside the federal government ensures sharing information and findings with other subject matter experts and the learning of new and current industry practices and information.

Challenges, Opportunities and Emerging Issues

Health care provision is highly labour intensive, which has resulted in an increasingly competitive market for the available supply of qualified professionals. Canada's health human resources market is dominated by the "baby boomer" population, which is shrinking significantly because of retirements.

PSHP's capacity to support departments and agencies through advice, guidance and direct services (e.g. immunizations) will have a direct impact on the federal government's state of readiness if there is a national health emergency such as a pandemic or a terrorist attack.

Communication and Outreach

- PSHP personnel are active in the knowledge community and regularly participate in important conferences, such as the Treasury Board Health and Safety Seminar.
- PSHP provides on-site support to federal workers for health prevention and promotion, including advice on precautionary measures, personal protective equipment and related fit testing and the handling of suspicious packages.
- PSHP also provides support to human resources and occupational health and safety coordinators in federal departments as well as workplace investigation, environmental sanitation and clean-up advice.

Public Health Bureau

The Public Health Bureau (PHB) works to reduce health risks to the traveling public related to communicable diseases on conveyances, and to ensure safe water in federal facilities through inspection, advice and consultation services to conveyance operators and federal departments.

PHB works with industry and other federal departments on two compliance programs: the Traveling Public Program and the Federal Drinking Water Compliance Program. Both programs assist Canada in fulfilling its national and international responsibilities pertaining to protecting the health of the traveling public and those using federal grounds or in federal buildings. PHB also develops policies and regulatory tools and frameworks to address current gaps in regulation and legislation related to public conveyances.

Under the Traveling Public Program, PHB environmental health officers (EHOs) carry out public health inspections on passenger conveyances (ferries, cruise ships, trains, aircrafts) and their ancillary services (flight kitchens, airports), which include inspections regarding water, food and sanitation. The Federal Drinking Water Compliance Program assists federal departments in demonstrating due diligence in protecting human health from risks related to drinking water.

Science Strategies, Requirements and Activities

Health inspections and audits are routinely carried out by Health Canada's EHOs. To ensure the integrity of these inspections, EHOs apply the latest technical and scientific knowledge. To achieve this, PHB follows trends and advancements in science and technology that inform risk assessment and management measures. It conducts regular literature reviews to gather knowledge and awareness of existing and emerging public health risks on conveyances and best practices for water quality management. EHOs develop and update their skills through training with scientists (e.g. epidemiologists, microbiologists, engineers) who possess the relevant knowledge and expertise.

PHB's health inspections and audits of conveyances have generated a knowledge base of data and information that has contributed to a wider epidemiological understanding of communicable diseases such as gastrointestinal illness (GI). This knowledge base is largely contained in the electronic Public Health Information Tracking System (PHITS) maintained by PHB and the GI Illness Surveillance Database maintained by PHB and PHAC. PHITS primarily tracks critical health violations and their respective corrective action statements. PHB collects and uses the GI Illness Surveillance Database to assist in taking action to prevent the spread of communicable disease via conveyances, and to contribute to the body of surveillance data available to the Public Health Agency of Canada.

Other research and scientific activities are conducted to inform policies and the development of a regulatory framework for conveyances. PHB staff work with scientists and researchers on issues such as risk assessments and international trends.

Central to the work of the Federal Drinking Water Compliance program is the need to gather and disseminate the best available scientific and technical knowledge on drinking water management and related best practices to federal departments. The program uses this knowledge to develop tools for federal departments, which help to implement appropriate measures that protect human health from drinking water-related risks and allow departments to demonstrate due diligence in drinking water management. PHB's Federal Drinking Water Compliance Program advises federal departments on drinking water risk management practices consistent with current scientific research and Health Canada's science-based *Guidelines for Canadian Drinking Water Quality* (1996).

To carry out its research strategy, PHB collaborates with various organizations, including:

- Interdepartmental Working Group on Drinking Water;
- World Health Organization;
- US Vessel Sanitation Program; and
- US Federal Drug Administration.

Excellence

In addition to working with its international and Canadian partners to develop international health regulations, PHB in collaboration with Statistics Canada and the U.S. Environmental Protection Agency conducted and extensive water testing program on aircraft and has launched an innovative, multi-disciplinary action plan for addressing Norovirus on conveyances. As well, PHB has been a leader in developing new tools and processes for use by federal departments in managing their drinking water responsibilities.

Challenges, Opportunities and Emerging Issues

Aside from conducting health inspections and audits, the Traveling Public Program lacks the capacity to conduct broader research and related scientific activities. Such capacity would allow the bureau to better understand and assess public health risks on conveyances, especially those surrounding emerging risks like new strains of influenza and other communicable diseases.

Communication and Outreach

- When significant public health risks on conveyances are identified, the Traveling Public Program informs the public of these risks and how best to avoid them. Information is provided on Health Canada's Web site, including procedures, protocols, reports and results of inspections of cruise ships. It also maintains ongoing dialogue and holds regular annual meetings with the transportation industry to share information and consult on how to best assess and manage public health risks on conveyances.
- The Federal Drinking Water Program publishes two newsletters a year, and holds an annual workshop on best practices for maintaining safe drinking water systems.

Policy and Workplace Health Strategies Bureau

The Policy and Workplace Health and Strategies Bureau supports the development and implementation of workplace health strategies for Canadians by providing advice, guidance and tools for employers.

Health Canada's exploration of comprehensive workplace health approaches has contributed to the generation of new knowledge and the creation of models of good practices that, when applied within work settings, have the potential to improve the health and well-being of Canadians, reduce work-related health care costs, and enhance the productivity of the Canadian economy. The accumulation of policy research on workplace health over the past two decades has also built a solid foundation on which future policy can be developed.

Science Strategies, Requirements and Activities

To further understand the impact of integrating comprehensive workplace health principles and policies into workplace practices, the bureau collaborates with partners that are conducting related research and promotes and evaluates current comprehensive workplace health models of good practice.

Occupational stress has been long recognized as a major workplace health hazard. The *Cost of Stress* field study will examine the measurable cost of occupational stress, assess the magnitude of these costs, and determine which specific organizational features and management practices can effectively reduce related costs. Several research projects have also been initiated in collaboration with the Health Policy Research Program (HPRP). This looks beyond individual and organizational outcomes to explore and test new hypotheses about workplace health policies and practices.

The Corporate Health Model, the Small Business Health Model, and the Farm Business Health Model are three resources that make up the Workplace Health System. This system is a comprehensive approach to health promotion programming and provides employers with guiding principles and a seven-step process for implementing workplace health policies and practices.

To carry out its research strategy, the WHPSP collaborates with various organizations, including:

- Human Resources and Social Development;
- Workplace Health for Health Care Providers;
- Public Health Agency of Canada;
- Duxbury Studies;
- Canadian Mental Health Strategy;
- Healthy Living Strategy;
- Public Service Human Resource Agency of Canada; and
- Workplace Health for Federal Public Servants.

Excellence

Research projects currently underway through HPRP must meet the terms and conditions as set out by Treasury Board Policy on Transfer Payments. Ethics approval is a mandatory requirement and research ethics boards are expected to operate in accordance with the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans*.

Challenges, Opportunities and Emerging Issues

There are no readily available original data that provide an indication of the cost of non-healthy workplaces on the health care system. A national survey on workplace health, conducted by Statistics Canada, would provide national-level data on working conditions and the health of Canadian workers.

Communication and Outreach

- Stakeholder engagement has been identified as one of five pillars in support of developing collaborative action on workplace health strategies for Canadians. (*The other four pillars include: 1) policy development; 2) research; 3) education and awareness; and 4) workplace health within the federal public service.*) Inclusion of this pillar acknowledges the many important roles that a variety of stakeholders (e.g. private, public, voluntary, labour, academic and research organizations) have in promoting a coordinated approach to improving workplace health.

Appendix: Acronym Glossary

A

AQI — Air Quality Index

B

BSE — Bovine Spongiform Encephalopathy

C

CAS — Canadian Addiction Survey
CBRN — Chemical Biological Radiological Nuclear
CCHO — Climate Change and Health Office
CCRPB — Consumer and Clinical Radiation Protection Bureau
CDS — Canada's Drug Strategy
CDSA — *Controlled Drug and Substances Act*
CEAA — *Canadian Environmental Assessment Act*
CEPA — *Canadian Environmental Protection Act*
CPR — Controlled Products Regulation
CPS — Consumer Product Safety
CPSC — Consumer Product Safety Commission (United States)
CTBT — Comprehensive Nuclear Test Ban Treaty
CSTA — Federal Council of Science and Technology Advisors

D

DAS — Drug Analysis Service
DSCSP — Drug Strategy and Controlled Substances Programme
DSL — Domestic Substances List

E

ECB — Environmental Contaminants Bureau
EH — Environmental Health
EHO — Environmental Health Officer
EHSB — Environmental Health Science Bureau
EMF — Electric and Magnetic Field

F

FCTC — Federal Convention on Tobacco Control
FDA — *Food and Drugs Act*
FPT — Federal-Provincial-Territorial
FTCS — Federal Tobacco Control Strategy
FTIR — Fourier Transform Infrared

G

GI — Gastrointestinal illness

H

HIB — Health Impacts Bureau
HECSB - Healthy Environments and Consumer Safety Branch (Health Canada)
HPA — *Hazardous Products Act*
HPRP — Health Policy Research Program

I

ISO — International Organization for Standardization

J

K

L

LIMS — Laboratory Information Management System

M

MOU — Memorandum of Understanding

N

NGO — Non-governmental organization
NRA — National Research Agenda
NSACB — New Substance Assessment and Control Bureau

O

OCS — Office of Controlled Substances
ODR — Office of Demand Reduction
OECD — Organisation for Economic Co-operation and Development
ORS — Office of Research and Surveillance
OSP — Office of Science Policy (Health Canada)

P

PAHO-WHO — Pan-American Health Organization-World Health Organization
PHB — Public Health Bureau
PHITS— Public Health Information Tracking System
PSEPC — Public Safety and Emergency Preparedness Canada
PSHP — Public Service Health Program
PSL — Product Safety Laboratory
PSP — Product Safety Programme

Q

R

REB — Research Ethics Board
RED — Radiation Emitting Device
RSA — Related Scientific Activities

S

S&T — Science and Technology
SEP — Safe Environments Programme
SWG — Surveillance Working Group

T

TCP — Tobacco Control Programme
TSE — Transmissible Spongiform Encephalopathy

U

USEPA — United States Environmental Protection Agency

V

W

WHMIS — Workplace Hazardous Materials Information System
WHPSP — Workplace Health and Public Safety Programme
WHO — World Health Organization
WQHB — Water Quality and Health Bureau

XYZ